

# STANFORD BULLETIN

2011-12



## ACCREDITATION

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

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

*"Core Commitment to Institutional Capacity*—The institution functions with clear purposes, high levels of institutional integrity, fiscal stability, and organizational structures to fulfill its purposes.

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

For more information, see the University's WASC Accreditation web site.

Also, see President Hennessy's statement (pdf) on Stanford's fulfilment of the Core Commitments to Institutional Capacity and Educational Effectiveness.

## NONDISCRIMINATION POLICY

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Stanford University admits qualified students of any race, color, national or ethnic origin, sex, age, disability, religion, sexual orientation, and gender identity to all the rights, privileges, programs, and activities generally accorded or made available to students at the University. Consistent with its obligations under the law, Stanford prohibits unlawful discrimination, including harassment, on the basis of race, color, national or ethnic origin, sex, age, disability, religion, sexual orientation, gender identity, or any other characteristic protected by applicable law in the administration of the University's programs and activities. The following person has been designated to handle inquiries regarding this nondiscrimination policy: the Director of the Diversity and Access Office, Mariposa House, 585 Capistrano Way, Stanford University, Stanford, CA 94305-8230; (650) 723-0755 (voice), (650) 723-1216 (TTY), (650) 723-1791 (fax), [equal.opportunity@stanford.edu](mailto:equal.opportunity@stanford.edu) (email).

## FUNDAMENTAL STANDARD

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Students at Stanford are expected to know, understand, and abide by the Fundamental Standard, which is the University's basic statement on behavioral expectations articulated in 1896 by Stanford's first President, David Starr Jordan, as follows:

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

See the "Judicial Affairs and Student Conduct" section of this bulletin for further information on The Fundamental Standard and The Honor Code.

## HONOR CODE

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The Honor Code is the University's statement on academic integrity. It is essentially the application of the Fundamental Standard to academic matters. Provisions of the Honor Code date from 1921, when the honor system was established by the Academic Council of the University Faculty at the request of the student body and with the approval of the President.

The Honor Code reads:

- A. *The Honor Code is an undertaking of the students, individually and collectively:*
1. *that they will not give or receive aid in examinations; that they will not give or receive unpermitted aid in class work, in the preparation of reports, or in any other work that is to be used by the instructor as the basis of grading;*
  2. *that they will do their share and take an active part in seeing to it that others as well as themselves uphold the spirit and letter of the Honor Code.*
- B. *The faculty on its part manifests its confidence in the honor of its students by refraining from proctoring examinations and from taking unusual and unreasonable precautions to prevent the forms of dishonesty mentioned above. The faculty will also avoid, as far as practicable, academic procedures that create temptations to violate the Honor Code.*
- C. *While the faculty alone has the right and obligation to set academic requirements, the students and faculty will work together to establish optimal conditions for honorable academic work.*

See the "Judicial Affairs and Student Conduct" section of this bulletin for further information on The Fundamental Standard and The Honor Code.

## CURRENT INFORMATION AND ACCURACY STATEMENT

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Every effort is made to ensure that the degree requirement and course information, applicable policies, and other materials contained in the *Stanford Bulletin* are accurate and current. The University reserves the right to make changes at any time without prior notice. The Bulletin in the form as it exists online at <http://bulletin.stanford.edu> and <http://explorecourses.stanford.edu> is therefore the governing document, and contains the then currently applicable policies and information.

Courses of Instruction are available at the *Stanford Bulletin's* ExploreCourses web site.

A non-official pdf of the Bulletin and pdfs of individual sections of the Bulletin are made available for download in September; these pdfs are produced once in September and are not updated to reflect corrections or changes made during the academic year.

## REGISTRAR'S OFFICE

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The *Stanford Bulletin* is an online publication of the Office of the University Registrar, Stanford University.

Address:

Office of the University Registrar  
630 Serra Street  
Suite 120  
Stanford University  
Stanford, California 94305-6032

Students with questions or issues should contact the Student Services Center or file a help ticket with Stanford's HelpSU system. Alumni, staff, or the general public may also file a help ticket to request the Registrar's Office assistance or to ask for information.

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

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

# ACADEMIC CALENDAR 2011-12

This calendar is also available at the University Registrar's web site. All dates are subject to change at the discretion of the University.

## AUTUMN QUARTER 2011-12

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- August 1 (Mon) Access opens for course enrollment.
- August 29 (Mon) M.D. first-year students, first day of instruction.
- September 1 (Thu) M.D. second-year students, first day of instruction.
- September 6 (Tue) Law School instruction begins for 1st-year J.D. students.
- September 16 (Fri, 5:00 p.m.) At-status enrollment deadline in order to receive stipend or financial aid refund by first day of term.
- September 19 (Mon) MBA first-year instruction begins.
- September 20 (Tue) New undergraduates arrive; Convocation.
- September 26 (Mon) First day of quarter; instruction begins; Law School instruction begins for 2nd/3rd-year J.D. & Advanced Degree Students
- September 26 (Mon, 5:00 p.m.) Preliminary Study List deadline. Students must be "at status"; i.e., students must have a study list with sufficient units to meet requirements for their status, whether full-time, 8-9-10 units (graduate students only), or approved Special Registration Status. The late study list fee is \$200.
- September 26 (Mon, 5:00 p.m.) Deadline to submit Leave of Absence for full refund. See Tuition and Refund Schedule: 2011-12 for a full refund schedule.
- September 29 (Thu) Conferral of degrees, Summer Quarter 2010-11.
- October 14 (Fri, 5:00 p.m.) Final Study List deadline. Last day to add or drop a class; last day to adjust units on a variable-unit course. Last day for tuition reassessment for dropped courses or units. Students may withdraw from a course until the Course Withdrawal deadline and a 'W' notation will appear on the transcript.
- November 14 (Mon, 5:00 p.m.) Term withdrawal deadline; last day to submit Leave of Absence to withdraw from the University with a partial refund.
- November 18 (Fri, 5:00 p.m.) Change of grading basis deadline.
- November 18 (Fri, 5:00 p.m.) Course withdrawal deadline.
- November 18 (Fri, 5:00 p.m.) Application deadline for Autumn Quarter degree conferral.
- November 21-25 (Mon-Fri) Thanksgiving Recess (no classes).
- December 5-11 (Mon-Sun) End-Quarter Period.
- December 9 (Fri) Last day of classes (unless class meets on Sat.).
- December 9 (Fri) Last opportunity to arrange Incomplete in a course, at last class.
- December 9 (Fri, noon) University thesis, D.M.A. final project, or Ph.D. dissertation, last day to submit.
- December 9 (Fri, 5:00 p.m.) Late application deadline for Autumn Quarter degree conferral (\$50 fee).
- December 9-16 (Fri-Fri) Law School examinations.
- December 12-16 (Mon-Fri) End-Quarter examinations.
- December 20 (Tue, 11:59 p.m.) Grades due.
- January 12 (Thu) Conferral of degrees, Autumn Quarter.

## WINTER QUARTER 2011-12

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- October 30 (Sun) Access opens for course enrollment.
- December 30 (Fri) At-status enrollment deadline in order to receive stipend or financial aid refund by first day of term.
- January 9 (Mon) First day of quarter; instruction begins for all students.
- January 9 (Mon, 5:00 p.m.) Preliminary Study List deadline. Students must be "at status"; i.e., students must have a study list with sufficient units to meet requirements for their status, whether full-time, 8-9-10 units (graduate students only), or approved Special Registration Status. The late study list fee is \$200.
- January 9 (Mon, 5:00 p.m.) Deadline to submit Leave of Absence for full refund. See Tuition and Refund Schedule: 2011-12 for a full refund schedule.
- January 16 (Mon) Martin Luther King, Jr., Day (holiday, no classes).
- January 27 (Fri, 5:00 p.m.) Final Study List deadline. Final day to add or drop a class; last day to adjust units on a variable-unit course. Last day for tuition reassessment for dropped courses or units. Students may withdraw from a course until the Course Withdrawal deadline and a 'W' notation will appear on the transcript.
- February 20 (Mon) Presidents' Day (holiday, no classes; Law and GSB do hold classes).
- February 22 (Wed, 5:00 p.m.) Term withdrawal deadline; last day to submit Leave of Absence to withdraw from the University with a partial refund.
- March 2 (Fri, 5:00 p.m.) Change of grading basis deadline.
- March 2 (Fri, 5:00 p.m.) Course withdrawal deadline.
- March 2 (Fri, 5:00 p.m.) Application deadline for Winter Quarter degree conferral.
- March 12-18 (Mon-Sun) End-Quarter Period.
- March 16 (Fri) Last day of classes (unless class meets on Sat.).
- March 16 (Fri) Last opportunity to arrange Incomplete in a course, at last class.
- March 16 (Fri, noon) University thesis, D.M.A. final project, Ph.D. dissertation, last day to submit.
- March 16 (Fri, 5:00 p.m.) Late application deadline for Winter Quarter degree conferral (\$50 fee).
- March 16-23 (Fri-Fri) Law School examinations.
- March 19-23 (Mon-Fri) End-Quarter examinations.
- March 27 (Tue, 11:59 p.m.) Grades due.
- April 5 (Thu) Conferral of degrees, Winter Quarter.

## SPRING QUARTER 2011-12

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- February 12 (Sun) Access opens for course enrollment.
- March 23 (Fri) At-status enrollment deadline in order to receive stipend or financial aid refund by first day of term.
- April 2 (Mon) First day of quarter; instruction begins for all students.
- April 2 (Mon, 5:00 p.m.) Preliminary Study List deadline. Students must be "at status"; i.e., students must have a study list with sufficient units to meet requirements for their status, whether full-time, 8-9-10 units (graduate students only), or approved Special Registration Status. The late study list fee is \$200.
- April 2 (Mon, 5:00 p.m.) Deadline to submit Leave of Absence for full refund. See Tuition and Refund Schedule: 2011-12 for a full refund schedule.
- April 5 (Thu) MBA First-year instruction begins.
- April 13 (Fri, 5:00 p.m.) Application deadline for Spring Quarter degree conferral.
- April 13 (Fri, 5:00 p.m.) Final Study List deadline. Last day to add or drop a class; last day to adjust units on a variable-unit course. Last day for tuition reassessment for dropped courses or units. Students may withdraw from a course until the Course Withdrawal deadline and a "W" notation will appear on the transcript.
- May 15 (Tue, 5:00 p.m.) Term withdrawal deadline; last day to submit Leave of Absence to withdraw from the University with a partial refund.
- May 25 (Fri, 5:00 p.m.) Change of grading basis deadline.
- May 25 (Fri, 5:00 p.m.) Course withdrawal deadline.
- May 28 (Mon) Memorial Day (holiday, no classes).
- June 1-7 (Fri-Thu) End-Quarter Period.
- June 4-8 (Mon-Fri) Law School examinations.
- June 6 (Wed) Last day of classes.
- June 6 (Wed) Last opportunity to arrange Incomplete in a course, at last class.
- June 6 (Wed, noon) University thesis, D.M.A. final project, or Ph.D. dissertation, last day to submit.
- June 6 (Wed, 5:00 p.m.) Late application deadline for Spring Quarter degree conferral (\$50 fee).
- June 7 (Thu) Day before finals, no classes.
- June 8-13 (Fri-Wed) End-Quarter examinations.
- June 14 (Thu, noon) Grades for graduating students due.
- June 16 (Sat) Senior Class Day.
- June 16 (Sat) Baccalaureate Saturday.
- June 17 (Sun) Commencement. Conferral of degrees, Spring Quarter.
- June 19 (Tue, 11:59 p.m.) Grades for non-graduating students due.

## SUMMER QUARTER 2011-12

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- April 15 (Sun) Access opens for course enrollment.
- June 15 (Fri) At-status enrollment deadline in order to receive stipend or financial aid refund by first day of term.
- June 25 (Mon) First day of quarter; instruction begins.
- June 25 (Mon, 5:00 p.m.) Preliminary Study List deadline.
- June 25 (Mon) Deadline to submit Leave of Absence for full refund.
- July 4 (Wed) Independence Day observed (holiday, no classes).
- July 6 (Fri, 5:00 p.m.) Final Study List deadline. Final day to add or drop a class; last day to adjust units on a variable-unit course. Last day for tuition reassessment for dropped courses or units. Students may withdraw from a course until the Course Withdrawal deadline and a "W" notation will appear on the transcript.
- July 27 (Fri, 5:00 p.m.) Term withdrawal deadline; last day to submit Leave of Absence to withdraw from the University with a partial refund. See Tuition and Refund Schedule: 2011-12 for a full refund schedule.
- August 3 (Fri, 5:00 p.m.) Change of grading basis deadline.
- August 3 (Fri, 5:00 p.m.) Course withdrawal deadline.
- August 3 (Fri, 5:00 p.m.) Application deadline for Summer Quarter degree conferral.
- August 11-16 (Sat-Thu) End-Quarter Period.
- August 16 (Thu) Last day of classes.
- August 16 (Thu) Last opportunity to arrange Incomplete in a course, at last class.
- August 17-18 (Fri-Sat) End-Quarter examinations.
- August 21 (Tue, 11:59 p.m.) Grades due.
- August 31 (Fri, noon) University thesis, D.M.A. final project, or Ph.D. dissertation, last day to submit.
- August 31 (Thu, 5:00 p.m.) Late application deadline for Summer Quarter degree conferral (\$50 fee).
- September 27 (Thu) Conferral of degrees, Summer Quarter.

## ACADEMIC CALENDAR 2011-12

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### *First day of classes and last day of finals*

- Autumn 2012-13: September 24 and December 14
- Winter 2012-13: January 7 and March 22
- Spring 2012-13: April 1 and June 12 (Commencement June 16)
- Summer 2012-13: June 24 and August 17



# Contents

<b>STANFORD BULLETIN</b> .....	<b>1</b>	<b>GRADUATE DEGREES</b> .....	<b>37</b>
<b>2011-12</b> .....	<b>1</b>	General Requirements .....	37
Accreditation.....	1	Degree-Specific Requirements .....	42
Nondiscrimination Policy .....	1	Advising and Credentials.....	45
Fundamental Standard .....	2	<b>ACADEMIC POLICIES AND STATEMENTS</b> .....	<b>46</b>
Honor Code .....	2	Registration and Study Lists .....	46
Current Information and Accuracy Statement .....	2	Records .....	48
Registrar's Office .....	2	Examinations .....	51
<b>ACADEMIC CALENDAR 2011-12</b> .....	<b>3</b>	Grading Systems.....	52
Autumn Quarter 2011-12.....	3	Academic Standing.....	54
Winter Quarter 2011-12.....	3	Student Academic Grievance Procedure .....	55
Spring Quarter 2011-12.....	4	<b>UNDERGRADUATE EDUCATION</b> .....	<b>58</b>
Summer Quarter 2011-12 .....	4	Stanford Introductory Studies.....	58
Academic Calendar 2011-12.....	4	Bing Overseas Studies Program .....	61
<b>STANFORD'S MISSION</b> .....	<b>9</b>	Undergraduate Advising and Research .....	62
A Brief History of Stanford .....	9	Center for Teaching and Learning.....	63
Leland and Jane Stanford.....	9	<b>GRADUATE EDUCATION</b> .....	<b>64</b>
The Case for a Liberal Education .....	9	Graduate Policy .....	64
Stanford Lands and Architecture .....	9	Graduate Fellowship Programs.....	65
Current Perspectives .....	10	Graduate Student Diversity.....	65
Stanford People.....	10	Cross-School Learning Opportunities .....	65
Looking Ahead.....	10	<b>GRADUATE SCHOOL OF BUSINESS</b> .....	<b>66</b>
<b>UNIVERSITY GOVERNANCE AND ORGANIZATION</b> .....	<b>11</b>	<b>SCHOOL OF EARTH SCIENCES</b> .....	<b>67</b>
The Board of Trustees.....	11	Undergraduate Programs in Earth Sciences .....	67
Executive Officers .....	11	Coterminal Bachelor's and Master's Degrees in Earth Sciences.....	67
The President .....	12	Graduate Programs in Earth Sciences.....	67
Committees and Panels Appointed by the President .....	12	Earth, Energy, and Environmental Sciences Graduate Program	
The Provost .....	12	(EEES) .....	68
Schools of the University.....	12	Earth Systems .....	69
The Academic Council .....	13	Emmett Interdisciplinary Program in Environment and Resources	
Committees of the Academic Council .....	13	(E-IPER) .....	73
Associated Students of Stanford University (ASSU) .....	13	Energy Resources Engineering.....	80
<b>ADMISSION AND FINANCIAL AID</b> .....	<b>14</b>	Environmental Earth System Science.....	86
Undergraduate Admission .....	14	Geological and Environmental Sciences .....	87
Nonmatriculated Study (Undergraduate).....	14	Geophysics.....	93
Graduate Admission.....	14	<b>SCHOOL OF EDUCATION</b> .....	<b>96</b>
Visas.....	17	Honors Program in Education (Undergraduate).....	97
Holds and Rescission .....	17	Minor in Education (Undergraduate).....	97
Undergraduate Financial Aid.....	18	Coterminal Bachelor's and Master's Program in Education .....	98
Graduate Financial Aid.....	19	Master of Arts in Education.....	98
Veterans' Educational Benefits .....	19	Stanford Teacher Education Program (STEP).....	98
<b>TUITION, FEES, AND HOUSING</b> .....	<b>20</b>	Doctoral Degrees in Education .....	98
Undergraduate Tuition .....	20	Ph.D. Minor in Education .....	99
Graduate Student Tuition.....	20	<b>SCHOOL OF ENGINEERING</b> .....	<b>100</b>
International Students .....	21	Undergraduate Programs in the School of Engineering .....	100
Application Fee .....	21	Graduate Programs in the School of Engineering .....	116
ASSU Fees .....	21	Overseas Studies Courses in Engineering .....	119
Document Fee .....	21	Aeronautics and Astronautics .....	120
Campus Health Service Fee .....	21	Bioengineering.....	123
Health Insurance .....	22	Chemical Engineering .....	126
Special Fees .....	22	Civil and Environmental Engineering .....	130
Payments .....	22	Institute for Computational and Mathematical Engineering ..	135
Meal Plans.....	22	Computer Science .....	138
Refunds .....	22	Electrical Engineering .....	143
Housing.....	23	Management Science and Engineering.....	148
<b>TRANSFER WORK</b> .....	<b>24</b>	Materials Science and Engineering .....	152
Undergraduate Transfer Work .....	24	Mechanical Engineering .....	156
Graduate Residency Transfer Credit.....	25	<b>SCHOOL OF HUMANITIES AND SCIENCES</b> .....	<b>163</b>
<b>UNDERGRADUATE DEGREES AND PROGRAMS</b> ..	<b>26</b>	African and African American Studies.....	163
Degree Programs.....	26	African Studies .....	167
Degree Requirements.....	27	American Studies .....	170
A Liberal Education .....	27	Anthropology .....	173
Undergraduate Minor.....	35	Applied Physics .....	180
Baccalaureate Honors .....	35	Archaeology.....	181
Special Registration Statuses (Undergraduate).....	35	Art and Art History .....	184
Minimum Progress for Undergraduates .....	36	Astronomy .....	192
Conferral of Degrees.....	36	Athletics, Physical Education, and Recreation .....	193
		Biology .....	195
		Biology, Hopkins Marine Station .....	203
		Biophysics.....	203
		Chemistry.....	204
		Classics .....	207

Communication.....	214
Comparative Literature.....	218
Comparative Studies in Race and Ethnicity (CSRE).....	222
Drama.....	232
East Asian Languages and Cultures.....	237
East Asian Studies.....	244
Economics.....	247
English.....	252
Ethics in Society Program.....	258
Feminist Studies.....	260
Financial Mathematics.....	263
French and Italian.....	264
German Studies.....	276
History.....	280
History and Philosophy of Science and Technology.....	291
Human Biology.....	292
Iberian and Latin American Cultures.....	295
Individually Designed Majors and Individually Designed Honors Program in Humanities.....	300
Division of International, Comparative and Area Studies.....	301
International Policy Studies.....	303
International Relations.....	305
Jewish Studies.....	310
Language Center.....	312
Latin American Studies.....	315
Linguistics.....	320
Division of Literatures, Cultures, and Languages.....	323
Mathematical and Computational Science.....	325
Mathematics.....	327
Medieval Studies.....	330
Modern Thought and Literature.....	330
Music.....	332
Philosophy.....	338
Physics.....	344
Political Science.....	349
Psychology.....	354
Public Policy.....	358
Religious Studies.....	363
Russian, East European and Eurasian Studies.....	366
Science, Technology, and Society.....	369
Slavic Languages and Literatures.....	372
Sociology.....	377
Statistics.....	384
Symbolic Systems.....	386
Urban Studies.....	395
Stanford in Washington.....	400
<b>SCHOOL OF LAW.....</b>	<b>400</b>
Joint and Dual Degrees in Law.....	401
Courses in Law.....	401
<b>SCHOOL OF MEDICINE.....</b>	<b>402</b>
Undergraduate Programs in the School of Medicine.....	402
M.S. and Ph.D. Programs in the School of Medicine.....	402
M.D. Program in the School of Medicine.....	402
Multiple-Degree Programs in the School of Medicine.....	402
Biochemistry.....	403
Center for Biomedical Ethics.....	404
Biomedical Informatics.....	404
Cancer Biology.....	407
Chemical and Systems Biology.....	408
Comparative Medicine.....	409
Developmental Biology.....	409
Genetics.....	410
Health Research and Policy.....	411
Immunology.....	412
Microbiology and Immunology.....	414
Molecular and Cellular Physiology.....	415
Neurobiology.....	416
Neurosciences.....	416
Obstetrics and Gynecology.....	417
Pathology.....	417
Radiation Oncology.....	418
Radiology.....	418
Stem Cell Biology and Regenerative Medicine.....	418
Structural Biology.....	420
<b>COURSES OF INSTRUCTION.....</b>	<b>422</b>
<b>2011-12.....</b>	<b>422</b>
Aeronautics and Astronautics (AA) Courses.....	423
African and African American Studies (AFRICAAM) Courses.....	426
African and Middle Eastern Languages (AMELANG) Courses.....	429
African Studies (AFRICAST) Courses.....	435
American Studies (AMSTUD) Courses.....	436
Anthropology (ANTHRO) Courses.....	441
Applied Physics (APPPHYS) Courses.....	458
Archaeology (ARCHLGY) Courses.....	461
Art History (ARTHIST) Courses.....	463
Art Studio (ARTSTUDI) Courses.....	473
Asian American Studies (ASNAMST) Courses.....	477
Athletics, Physical Education, and Recreation (ATHLETIC) Courses.....	478
Biochemistry (BIOC) Courses.....	485
Bioengineering (BIOE) Courses.....	486
Biology (BIO) Courses.....	491
Biology, Hopkins Marine Station (BIOHOPK) Courses.....	502
Biomedical Informatics (BIOMEDIN) Courses.....	505
Biophysics (BIOPHYS) Courses.....	508
Cancer Biology (CBIO) Courses.....	508
Cardiothoracic Surgery (CTS) Courses.....	509
Catalan Language (CATLANG) Courses.....	509
Center for Teaching and Learning (CTL) Courses.....	510
Chemical Engineering (CHEMENG) Courses.....	511
Chemical Systems Biology (CSB) Courses.....	516
Chemistry (CHEM) Courses.....	517
Chicana/o Studies (CHICANST) Courses.....	521
Chinese General (CHINGEN) Courses.....	522
Chinese Language (CHINLANG) Courses.....	524
Chinese Literature (CHINLIT) Courses.....	527
Civil and Environmental Engineering (CEE) Courses.....	529
Classics Art/Archaeology (CLASSART) Courses.....	547
Classics General (CLASSGEN) Courses.....	548
Classics Greek (CLASSGRK) Courses.....	553
Classics History (CLASSHIS) Courses.....	553
Classics Latin (CLASSLAT) Courses.....	555
Communication (COMM) Courses.....	555
Comparative Literature (COMPLIT) Courses.....	562
Comparative Medicine (COMPMD) Courses.....	570
Comparative Studies in Race and Ethnicity (CSRE) Courses.....	571
Computational and Mathematical Engineering (CME) Courses.....	576
Computer Science (CS) Courses.....	579
Dance (DANCE) Courses.....	593
Democracy, Development, and the Rule of Law (DDRL) Courses.....	595
Dermatology (DERM) Courses.....	595
Developmental Biology (DBIO) Courses.....	595
Division of Literatures, Cultures, and Languages (DLCL) Courses.....	596
Drama (DRAMA) Courses.....	597
Earth Systems (EARTHSYS) Courses.....	605
Earth, Energy, and Environmental Sciences (EEES) Courses.....	613
East Asian Studies (EASTASN) Courses.....	613
Economics (ECON) Courses.....	614
Education (EDUC) Courses.....	622
Electrical Engineering (EE) Courses.....	644
Energy Resources Engineering (ENERGY) Courses.....	657
Engineering (ENGR) Courses.....	661
English (ENGLISH) Courses.....	666
English for Foreign Students (EFSLANG) Courses.....	674
Environment and Resources (ENVRES) Courses.....	676
Environmental Earth System Science (EESS) Courses.....	678
Ethics in Society (ETHICSOC) Courses.....	683
Family Medicine (FAMMED) Courses.....	686
Feminist Studies (FEMST) Courses.....	687
Film Studies (FILMSTUD) Courses.....	689
Film, Practice of (FILMPROD) Courses.....	693
French General (FRENGEN) Courses.....	694

French Language (FRENLANG) Courses.....	696
French Literature (FRENLIT) Courses.....	698
Genetics (GENE) Courses.....	700
Geological and Environmental Sciences (GES) Courses.....	703
Geophysics (GEOPHYS) Courses.....	710
German General (GERGEN) Courses.....	715
German Language (GERLANG) Courses.....	717
German Literature (GERLIT) Courses.....	718
Health Research and Policy (HRP) Courses.....	722
History (HISTORY) Courses.....	725
History and Philosophy of Science (HPS) Courses.....	754
Human Biology (HUMBIO) Courses.....	754
Humanities and Sciences (HUMSCI) Courses.....	761
Iberian and Latin American Studies (ILAC) Courses.....	762
Iberian Languages (IBERLANG) Courses.....	767
Immunology (IMMUNOL) Courses.....	767
Institute for International Studies (Freeman Spogli) (IIS) Courses.....	769
Interdisciplinary Studies in Humanities (HUMNTIES) Courses.....	769
International Policy Studies (IPS) Courses.....	769
International Relations (INTNLREL) Courses.....	772
Introduction to the Humanities (IHUM) Courses.....	773
Introductory Seminars.....	777
Italian General (ITALGEN) Courses.....	797
Italian Language (ITALLANG) Courses.....	799
Italian Literature (ITALLIT) Courses.....	800
Japanese General (JAPANLNG) Courses.....	801
Japanese Language (JAPANLNG) Courses.....	803
Japanese Literature (JAPANLIT) Courses.....	805
Jewish Studies (JEWISHST) Courses.....	807
Korean General (KORGEN) Courses.....	811
Korean Language (KORLANG) Courses.....	811
Latin American Studies (LATINAM) Courses.....	812
Law, Nonprofessional (LAWGEN) Courses.....	812
Linguistics (LINGUIST) Courses.....	813
Management Science and Engineering (MS&E) Courses.....	821
Master of Liberal Arts (MLA) Courses.....	830
Materials Science and Engineering (MATSCI) Courses.....	831
Mathematical and Computational Science (MCS) Courses.....	836
Mathematics (MATH) Courses.....	836
Mechanical Engineering (ME) Courses.....	843
Medicine (MED) Courses.....	857
Medicine Interdisciplinary (INDE) Courses.....	863
Microbiology and Immunology (MI) Courses.....	866
Modern Thought and Literature (MTL) Courses.....	868
Molecular and Cellular Physiology (MCP) Courses.....	869
Music (MUSIC) Courses.....	869
Native American Studies (NATIVEAM) Courses.....	879
Neurobiology (NBIO) Courses.....	880
Neurology and Neurological Sciences (NENS) Courses.....	881
Neurosciences Program (NEPR) Courses.....	882
Neurosurgery (NSUR) Courses.....	882
Obstetrics and Gynecology (OBGYN) Courses.....	882
Ophthalmology (OPHT) Courses.....	883
Orthopedic Surgery (ORTHO) Courses.....	884
Otolaryngology (OTOHNS) Courses.....	885
OVERSEAS STUDIES: AUSTRALIA (OSPAUSTL) COURSES.....	885
OVERSEAS STUDIES: BARCELONA (CASB) (OSPCASB) COURSES.....	885
OVERSEAS STUDIES: BEIJING (OSPBEIJ) COURSES.....	887
OVERSEAS STUDIES: BERLIN (OSPBER) COURSES.....	888
OVERSEAS STUDIES: CAPETOWN (OSPCPTWNL) COURSES.....	890
OVERSEAS STUDIES: FLORENCE (OSPFLOR) COURSES.....	891
OVERSEAS STUDIES: KYOTO-KCJS (OSPKYOCT) COURSES.....	893
OVERSEAS STUDIES: KYOTO (OSPKYOTO) COURSES.....	894
OVERSEAS STUDIES: MADRID (OSPMADR) COURSES.....	895
OVERSEAS STUDIES: MOSCOW (OSPMOSC) COURSES.....	897
OVERSEAS STUDIES: OXFORD (OSPOXFRD) COURSES.....	897
OVERSEAS STUDIES: PARIS (OSPPARIS) COURSES.....	900
OVERSEAS STUDIES: SANTIAGO (OSPSANTG) COURSES.....	902
Pathology (PATH) Courses.....	903
Pediatrics (PEDS) Courses.....	905
Philosophy (PHIL) Courses.....	907
Physics (PHYSICS) Courses.....	925
Political Science (POLISCI) Courses.....	932
Portuguese Language (PORTLANG) Courses.....	941
Psychiatry (PSYC) Courses.....	942
Psychology (PSYCH) Courses.....	944
Public Policy (PUBLPOL) Courses.....	953
Radiation Oncology (RADO) Courses.....	957
Radiology (RAD) Courses.....	957
Religious Studies (RELIGST) Courses.....	958
Russian, East European, and Eurasian Studies (REES) Courses.....	972
Science, Technology, and Society (STS) Courses.....	973
Slavic General (SLAVGEN) Courses.....	974
Slavic Language (SLAVLANG) Courses.....	977
Slavic Literature (SLAVLIT) Courses.....	978
Sociology (SOC) Courses.....	980
Sophomore College (SCS) Courses.....	992
Spanish Language (SPANLANG) Courses.....	995
Special Language Program (SPECLANG) Courses.....	997
Statistics (STATS) Courses.....	1001
Stem Cell Biology and Regenerative Medicine (STEMREM) Courses.....	1007
Structural Biology (SBIO) Courses.....	1007
Structured Liberal Education (SLE) Courses.....	1008
Surgery (SURG) Courses.....	1008
Symbolic Systems (SYMSYS) Courses.....	1011
Tibetan Language (TIBETLNG) Courses.....	1012
Urban Studies (URBANST) Courses.....	1012
Writing and Rhetoric, Program in (PWR) Courses.....	1014
<b>CENTERS, LABORATORIES, AND INSTITUTES</b> .....	<b>1027</b>
Center for Space Science and Astrophysics.....	1028
Freeman Spogli Institute for International Studies (FSI).....	1028
Woods Institute for the Environment: Goldman Interschool Honors Program in Environmental Science, Technology, and Policy.....	1029
<b>LIBRARIES AND COMPUTING RESOURCES</b> .....	<b>1029</b>
Stanford University Libraries and Academic Information Resources.....	1029
Coordinate Libraries.....	1030
Hoover Institution on War, Revolution and Peace.....	1030
Information Technology Services (IT Services).....	1030
<b>THE CONTINUING STUDIES PROGRAM</b> .....	<b>1030</b>
Master of Liberal Arts Program.....	1031
Summer Session.....	1031
<b>STUDENT AFFAIRS</b> .....	<b>1032</b>
Student Services Center.....	1032
Dean of Student Life.....	1032
Dean of Educational Resources.....	1033
Office of Accessible Education (OAE).....	1033
Career Development Center.....	1033
Community Centers.....	1033
Diversity and First Gen Programs.....	1033
Graduate Life Office.....	1034
Haas Center for Public Service.....	1034
Bechtel International Center.....	1034
Judicial Affairs and Student Conduct.....	1035
Old Union.....	1035
Office of Residential Education.....	1035
Sexual Assault and Relationship Abuse Education and Response.....	1036
Student Activities and Leadership.....	1036
Tresidder Memorial Union.....	1036
Vaden Health Center.....	1036
<b>OTHER SERVICES AND PROGRAMS</b> .....	<b>1038</b>
Bookstore.....	1038
Diversity and Access Office.....	1038
Stanford Conference Services.....	1038
Ombuds.....	1038
Police Services.....	1039

Office for Religious Life..... 1039  
Stanford Alumni Association ..... 1039  
Stanford Events ..... 1039  
Awards and Honors ..... 1040  
Exchange Programs and Cross-enrollment Agreements ..... 1041  
**NONACADEMIC REGULATIONS..... 1044**  
Nondiscrimination Policy ..... 1044  
ADA (Americans with Disabilities Act)/Section 504 Grievance  
Procedure (Student) ..... 1044  
Title IX of the Education Amendments of 1972..... 1045  
Title VI of the Civil Rights Act of 1964..... 1045  
Grievances ..... 1046  
Student Non-Academic Grievance Procedure ..... 1046  
Age Discrimination Act of 1975..... 1047  
Ownership and Use of Stanford Name and Trademarks ..... 1048  
Copyright ..... 1048  
Peer-to-Peer File Sharing..... 1048  
Domestic Partners ..... 1048  
Sexual Harassment and Consensual Sexual or Romantic  
Relationships..... 1049  
Sexual Assault..... 1052  
Political Activities..... 1052  
Campus Disruptions..... 1054  
Use of the Main Quadrangle and Memorial Court ..... 1055  
Oval Policy ..... 1055  
Noise and Amplified Sound..... 1055  
Prohibition of the Possession of Dangerous Weapons on  
Campus ..... 1055  
Student Alcohol Policy ..... 1056  
Hazing Policy..... 1057  
Smoke-Free Environment ..... 1058  
Visitor Policy/University Statement on Privacy ..... 1058  
Computer and Network Usage..... 1058  
Protection of Sensitive Data ..... 1059  
Campus Safety and Criminal Statistics..... 1059  
**INDEX ..... 1060**  
..... 1060

# STANFORD'S MISSION

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

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

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

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

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

- [School of Earth Sciences Mission Statement](#)
- [Graduate School of Business Mission Statement](#)
- [School of Humanities and Sciences Mission Statement](#)
- [School of Engineering Mission Statement](#)
- [School of Medicine Mission Statement](#)
- [School of Education Mission Statement](#)
- [Stanford Law School Mission Statement](#)

## A BRIEF HISTORY OF STANFORD

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

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

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

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

## LELAND AND JANE STANFORD

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

## THE CASE FOR A LIBERAL EDUCATION

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

## STANFORD LANDS AND ARCHITECTURE

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

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

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

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

Mission Revival architecture. It is characterized by rectilinear sandstone buildings joined by covered arcades formed of successive half-circle arches, the latter supported by short columns with decorated capitals.

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

## CURRENT PERSPECTIVES

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

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

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

## STANFORD PEOPLE

By any measure, Stanford's faculty, which numbers approximately 1,900, is one of the most distinguished in the world. It includes 16 living Nobel laureates, 4 Pulitzer Prize winners, 19 National Medal of Science winners, 135 members of the National Academy of Sciences, 251 members of the American Academy of Arts and Sciences, 88 members of the National Academy of Engineering, and 30 members of the National Academy of Education. Yet beyond their array of honors, what truly distinguishes Stanford faculty is their commitment to sharing knowledge with their students. The great majority of professors teach undergraduates both in introductory lecture classes and in small freshman, sophomore, and advanced seminars.

Enrollment in Autumn Quarter 2010 totaled 15,666, of whom 6,887 were undergraduates and 8,779 were graduate students. Like the faculty, the Stanford student body is distinguished. Approximately 18 people apply to Stanford for every student who enters the freshman class. 89 Stanford students have been named Rhodes Scholars and 76 have been named Marshall Scholars. The six-year graduation rate for freshmen who entered Stanford University full-time in 2004 was 94.7 percent. Stanford awarded 4,869 degrees in 2010-11, of which 1,670 were baccalaureate and 3,199 were advanced degrees.

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

In the athletic arena, Stanford students have enjoyed tremendous success as well. Stanford fields teams in 35 Division I varsity sports. Of Stanford's 100 NCAA team titles, 83 have been captured since 1980, placing Stanford at the top among the nation's most title-winning schools during that time. In 2010-11, Stanford won national championships in men's gymnastics, women's water polo, and women's lightweight rowing. In 1999-2000, Stanford became the first school in Pac-10 history to win conference championships in football, men's basketball, and baseball in the same year. Athletic success has reached beyond The Farm, as well, with 48 Stanford athletes and coaches taking part in the 2008 Olympics in Beijing. Intramural and club sports are also popular; over 1,000 students take part in the club sports program, while participation in the intramural program has reached 9,000 with many active in more than one sport.

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

## LOOKING AHEAD

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

# UNIVERSITY GOVERNANCE AND ORGANIZATION

*Web site:* <http://www.stanford.edu/about/administration/>

Stanford University is a trust with corporate powers under the laws of the State of California. The University is a tax-exempt entity under section 501(c)3 of the Internal Revenue Code. Under the provisions of the Founding Grant, the Board of Trustees (with a maximum membership of 35) is custodian of the endowment and all the properties of Stanford University. The board administers the invested funds, sets the annual budget and determines policies for operation and control of the university. Among the powers given to the trustees by the Founding Grant is the power to appoint a president. The board delegates broad authority to the president to operate the university and to the faculty on certain academic matters. The formal legal name is "The Board of Trustees of the Leland Stanford Junior University."

## ACCREDITATION

Stanford University is accredited by the Accrediting Commission of Senior Colleges and Universities of the Western Association of Schools and Colleges.

## THE BOARD OF TRUSTEES

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

*Membership*—Board membership is set at 35, including the President of the University who serves *ex officio* and with vote. Trustees serve a five-year term and are eligible for appointment to one additional five-year term. At the conclusion of that term, a Trustee is not eligible for reelection until after a lapse of one year. Eight of the Trustees are elected or appointed in accordance with the Rules Governing the Election or Appointment of Alumni Nominated Trustees. They serve a five-year term.

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

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

*Meetings*—The Board generally meets five times each year.

## MEMBERS OF THE BOARD OF TRUSTEES AS OF AUGUST 2011

- Robert M. Bass, President, Keystone Group LP, Fort Worth, TX
- William R. Brody, President, Salk Institute for Biological Studies, La Jolla, CA

- Mariann Byerwalter, Chairman, JDN Corporate Advisory, LLC, Burlingame, CA
- James E. Canales, President and CEO, The James Irvine Foundation, San Francisco, CA
- James G. Coulter, Founding Partner, TPG Capital, LP, San Francisco, CA
- Steven A. Denning, Chairman, General Atlantic LLC, Greenwich, CT
- Bruce W. Dunlevie, General Partner, Benchmark Capital, Menlo Park, CA
- Armando Garza, Chairman, Alfa, Nuevo León, Mexico
- John A. Gunn, Chairman Emeritus and Director, Dodge and Cox, San Francisco, CA
- Christine U. Hazy, Co-Founder and Managing Director, Sketch Foundation, Los Angeles, CA
- John L. Hennessy, President, Stanford University, Stanford, CA
- Pete Higgins, Partner, Second Avenue Partners, Seattle, WA
- Leslie P. Hume, San Francisco, CA (Chair)
- Ann H. Lamont, Managing Partner, Oak Management Corporation, Norwalk, CT
- Frank D. Lee, CEO, Dragonfly Sciences, Inc., Wellesley, MA
- Goodwin Liu, Professor of Law, University of California, Berkeley, Berkeley, CA
- Susan R. McCaw, President, COM Investments, Santa Barbara, CA
- Hamid R. Moghadam, Chairman & Co-CEO, Prologis, Inc., San Francisco, CA
- Wendy Munger, South Pasadena, CA
- Paul A. Ormond, Chairman, President, CEO, HCR ManorCare, Toledo, OH
- Ruth M. Porat, Executive Vice President & Chief Financial Officer, Morgan Stanley, New York, NY
- Penny S. Pritzker, Chairman, TransUnion, Chicago, IL
- Miriam Rivera, Managing Partner, Ulu Ventures, Palo Alto, CA
- Richard A. Sapp, Rancho Santa Fe, CA
- Kavitarik Shriram, Founder, Sheralo Ventures LLC, Menlo Park, CA
- Ronald P. Spogli, Founding Partner, Freeman Spogli & Company, Los Angeles, CA
- Isaac Stein, President, Waverley Associates, Atherton, CA
- Thomas F. Steyer, Sr. Managing Member, Farallon Capital Management, LLC, San Francisco, CA
- Vaughn C. Williams, Of Counsel, Skadden Arps Slate Meagher & Flom, New York, NY
- Jerry Yang, Chief Yahoo and Co-Founder, Yahoo! Inc., Sunnyvale, CA
- Deborah A. Zoullas, Private Investor, D Squared Holdings LLC, New York, NY

## EXECUTIVE OFFICERS

### STANFORD ADMINISTRATION

- John Hennessy, *President*
- John Etchemendy, *Provost*
- David Demarest, *Vice President for Public Affairs*
- David A. Jones, *Vice President for Human Resources*
- Randall S. Livingston, *Vice President for Business Affairs and Chief Financial Officer*
- William J. Madia, *Vice President, SLAC National Accelerator Laboratory*
- Robert Reidy, *Vice President for Land, Buildings and Real Estate*

- Martin Shell, *Vice President for Development*
- Howard Wolf, *Vice President for Alumni Affairs and President, Stanford Alumni Association*
- Debra Zumwalt, *Vice President and General Counsel*

## CABINET

- Ann Arvin, *Vice Provost and Dean of Research*
- Harry Elam, *Vice Provost for Undergraduate Education*
- Persis Drell, *Director, SLAC National Accelerator Laboratory*
- Patricia Gumpert, *Vice Provost for Graduate Education*
- Larry Kramer, *Dean, School of Law*
- Pamela Matson, *Dean, School of Earth Sciences*
- Philip Pizzo, *Dean, School of Medicine*
- James Plummer, *Dean, School of Engineering*
- John Raisian, *Director, Hoover Institution on War, Revolution and Peace*
- Richard Saller, *Dean, School of Humanities and Sciences*
- Garth Saloner, *Dean, Graduate School of Business*
- Deborah Stipek, *Dean, School of Education*

## THE PRESIDENT

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

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

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

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

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

For additional information, see the Office of the President web site.

## COMMITTEES AND PANELS APPOINTED BY THE PRESIDENT

University Committees are appointed by and are primarily responsible to the President. Such committees deal with matters on which the responsibility for recommendation or action is clearly diffused among different constituencies of the University. In accordance with the *Report on the Committee Structure of the University*, Academic Council members are appointed to University Committees on nomination of the Senate Committee on

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

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

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

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

## THE PROVOST

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

## SCHOOLS OF THE UNIVERSITY

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

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

The deans of the schools report to the Provost.



# THE ACADEMIC COUNCIL

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*Web Site:* <http://academiccouncil.stanford.edu/>

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

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

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

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

## COMMITTEES OF THE ACADEMIC COUNCIL

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

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

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

## ASSOCIATED STUDENTS OF STANFORD UNIVERSITY (ASSU)

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

All registered students are members of the ASSU. They are governed by the ASSU Constitution and Bylaws, which was last revised and approved by student vote in April 2007.

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

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

# ADMISSION AND FINANCIAL AID

## UNDERGRADUATE ADMISSION

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

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

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

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

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

## NONMATRICULATED STUDY (UNDERGRADUATE)

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

Nonmatriculated status is a privilege and not a right. The University reserves the right, at its discretion, to withhold registration from, or require withdrawal for the program by, any student or applicant. In addition, nonmatriculated status may be

revoked at the University's discretion (and after consideration of such factors as the University considers relevant in the particular case) at the end of any quarter of enrollment.

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

*High School Nonmatriculated Students*—Local high school students are eligible to be considered to attend Stanford as nonmatriculated students on a limited basis when they have exhausted all of the courses in a given discipline offered by their high school. Nonmatriculated high school students are permitted to enroll in one course per quarter and are required to pay the applicable tuition. Permission from the academic department and the University Registrar is required.

*Summer Session*—Students wishing to enroll as nonmatriculated students during Summer Quarter should contact the

Summer Session Office for more information about the Summer Visitor Program. Admission to the Summer Visitor Program does not imply regular admission to Stanford for subsequent quarters or to one of Stanford's regular degree programs.

## GRADUATE ADMISSION

### MATRICULATED STUDY (GRADUATE STUDENTS)

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

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

### THE COTERMINAL DEGREE PROGRAM

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

## APPLICATION PROCESS

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

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

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

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

*Business*—Admission information is available for the M.B.A., Sloan Master's Program, and Ph.D. programs at <http://www.gsb.stanford.edu/admissions/>. All applications must be submitted electronically.

*Law*—Applicants for the JD degree should see the Law School Admissions web site at [http://www.law.stanford.edu/program/degrees/jd/jd\\_application/](http://www.law.stanford.edu/program/degrees/jd/jd_application/). Applicants for LL.M., J.S.M., J.S.D., and M.L.S. degrees can find instructions at <http://www.law.stanford.edu/program/degrees/advanced/application/>. These applications are submitted to the Director of Admissions, School of Law, Stanford University, Stanford, CA 94305-8610. The Law School Admissions Test is required.

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

*Coterminal Master's Program*—Interested Stanford undergraduates should contact directly the department in which they wish to pursue a master's degree and must adhere to the application deadlines described above.

## NONMATRICULATED STUDY (GRADUATE STUDENTS)

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

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

the department in which they wish to take courses and conveyed in writing to the Graduate Admissions Office. Applicants are notified of the decision by Graduate Admissions in the Office of the University Registrar.

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

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

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

Application forms for nonmatriculated status during the regular academic year are available from Graduate Admissions, Office of the University Registrar, 630 Serra Street, Suite 120, Stanford, CA 94305-6032. Deadlines for applying are included with the forms and are generally required two months before the start of the quarter.

Applicants interested in nonmatriculated student status for the Summer Quarter only should contact the Summer Session Office, 482 Galvez Mall, Stanford, CA 94305-6079.

## NON-DEGREE-GRANTING PROGRAMS

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

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

## STANFORD CENTER FOR PROFESSIONAL DEVELOPMENT

Qualified individuals may pursue graduate and professional certificates or take individual graduate and professional courses through the Stanford Center for Professional Development. Nonmatriculated students taking individual graduate courses for credit, or towards earning a graduate certificate, are charged tuition on a per-unit basis. For more information on available courses,

applications, and deadlines visit <http://scpd.stanford.edu> or phone (650) 725-3000.

## POSTDOCTORAL SCHOLARS

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

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

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

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

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

## VISITING STUDENT RESEARCHERS

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

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

submitted to Graduate Admissions, Office of the University Registrar by the department issuing the invitation.

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

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

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

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

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

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

See also the Graduate Academic Policies and Procedures Handbook, Activating Nonmatriculated Graduate Students (GAP 2.3), at <http://gap.stanford.edu/2-3.html>.

## STUDENTS OF NEW FACULTY

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

- have completed at their home institution all degree requirements equivalent to those required for Stanford's TGR status (i.e., completed all curricular requirements, candidacy, and residency), and
- be in good academic standing at their home institution, and remain so while at Stanford, and

- demonstrate agreement to the terms and conditions for this appointment by signing the Students of New Faculty Representations.

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

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

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

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

## HONORS COOPERATIVE PROGRAM

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

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

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

## VISAS

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

1. Student Visa (F-1), obtained with an I-20 Certificate of Eligibility issued by Stanford University. The graduate student on an F-1 visa must enroll in a full course of study. The accompanying spouse or child enters on an F-2 visa. F-2 visa holders may not hold employment or engage in business under any circumstances. The F-2 spouse of an F-1 student may not engage in full-time study, and the F-2 child may only engage if the study is in an elementary or secondary school (kindergarten through twelfth grade). The F-2 spouse and child may engage in study that is avocational or recreational in nature.

2. Exchange Visitor Visa (J-1), obtained with a DS-2019 Certificate of Eligibility issued by Stanford University or a sponsoring agency. This visa is required for graduate students sponsored by certain agencies, foundations, and governments. In some cases, exchange visitors must leave the United States at the conclusion of their programs, may not change to non-student visa status, and may not apply for permanent residency in the United States until they have returned to their home countries for at least two years. The accompanying spouse or child of an exchange visitor enters on a J-2 visa and may, in some cases, obtain permission to work. J-2 dependents can apply for an Employment Authorization document from U.S. Citizenship and Immigration Services in order to be employed in the U.S. There is no regulatory restriction on study for J-2 dependents.

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

Information on visas is sent to admitted graduate students in the *Welcome to Stanford* guide, mailed by Graduate Admissions, Office of the University Registrar. Information on visas for postdoctoral scholars and Visiting Student Researchers is available at the Bechtel International Center web site <http://stanford.edu/dept/icenter>.

## HOLDS AND RESCISSION

By applying for admission to Stanford University academic programs, applicants certify that the information they provide in their applications is their own work and, to the best of their knowledge, is complete and accurate. As also noted in the application materials, Stanford reserves the right to withdraw an offer of admission under certain circumstances, including: 1) if there is a significant drop in academic performance, a failure to graduate (in the applicant's current program), or a failure to satisfy a prerequisite or condition of admission; 2) if there has been a misrepresentation in or a violation of any of the terms of the application process; or 3) if the University learns that an applicant has engaged in behavior prior to the first day of class that indicates a serious lack of judgment or integrity. Indeed (and for example), Stanford may rescind an applicant's admission at any time, including after attendance and after degree conferral, if it determines, for example, that an individual has been admitted to Stanford on the basis of having provided false information or has withheld requested information. The University further reserves the right to require applicants to provide additional information and/or authorization for the release of information about any such matter, and to place a hold on registration and/or the conferral of a degree during the investigation into any such matter.

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

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

# UNDERGRADUATE FINANCIAL AID

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

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

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

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

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

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

## UNDERGRADUATE FINANCIAL AID APPLICATION AND AWARD NOTIFICATION PROCESS

### FINANCIAL AID PRIORITY FILING DEADLINES

Web Site: <http://www.stanford.edu/dept/finaid/undergrad/apply>

Prospective freshmen	Restrictive Early Action, November 15
Prospective freshmen	Regular Decision, February 15
Prospective transfers	March 15
Returning students	April 15

### APPLICANT DOCUMENTS

U.S. citizens and U.S. registered permanent residents who wish to be considered for all available funding administered by Stanford should submit the following documents:

1. Free Application for Student Aid (FAFSA): file online at <http://fafsa.ed.gov>. Stanford's school code is 001305. Freshman applicants who are California residents must file the FAFSA and submit a GPA Verification Form to the California Student Aid Commission (CSAC) by March 2, for Cal Grant consideration.
2. CSS PROFILE application: file online at <http://profileonline.collegeboard.com>. Stanford's school code is 4704.
3. Copies of parents' prior year W-2 forms. Continuing students should submit copies directly to the FAO. New applicants should submit signed copies of their parents' prior year federal tax returns and W-2 forms to the CSS IDOC service.

U.S. citizens and U.S. registered permanent residents who wish to apply only for federal aid consideration do not need to file the CSS PROFILE; they should file the FAFSA and submit tax documents directly to the FAO.

New International students should submit the CSS PROFILE application online at <http://profileonline.collegeboard.com>. The Certification of Finances form available from our web site should be submitted directly to the FAO. Canadians should also submit tax documents as listed above. Continuing international students will be asked to submit the International Student Financial Aid Application and Certification of Finances directly to the FAO.

Students whose application materials are filed after the priority filing deadlines or who have not secured all external need-based funds such as Pell and Cal Grants can expect higher amounts of student responsibility in their financial aid packages.

Applicants and their parents are required to submit accurate and complete information on all application documents. The University participates in the U.S. Department of Education's Quality Assurance Program to evaluate the accuracy of aid application data. As part of this program, the FAO may request additional documentation to verify reported data. Students who fail to submit the requested documentation will have their financial aid funds withheld or canceled and their future registration placed on hold. Financial aid awards may change as a result of the verification process.

### NOTIFICATION DATES

In December, the FAO notifies Restrictive Early Action applicants who apply by the November filing date of their estimated financial aid award. The FAO notifies freshman applicants who apply by the February 15 filing date in early April. Transfer applicants who apply by the March 15 filing date are normally notified of their financial aid award within five days of their notice of admission.

The FAO sends notification of award eligibility to continuing and returning applicants early June through August 1. Applicants who file after the priority filing date may not have a financial aid award or funds secured for disbursement by the Autumn Quarter payment due date.

*Financing Options*—The federal PLUS loan program is available to help parents who are U.S. citizens or U.S. registered permanent residents cover all or part of the expected family

contribution through a fixed-interest, long-term loan. PLUS loans are available to all parents who meet credit requirements regardless of their computed financial need. See the Financial Aid Office web site at <http://financialaid.stanford.edu> for details on the PLUS program. Parents should also contact their employers for information about what may be available to them as employees' benefits to help meet college costs.

## GRADUATE FINANCIAL AID

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

### FELLOWSHIPS AND ASSISTANTSHIPS

Fellowships, research assistantships, and teaching assistantships are important parts of the educational program for graduate students at Stanford. Schools and/or departments determine eligibility for University fellowships and assistantships on the basis of academic merit, program, and the availability of funds. Some departments admit only those students to whom they can offer support or who have guaranteed funds from outside sources. Other departments may offer admission without being able to provide fellowship or assistantship funding.

Fellowship and assistantship funding is provided so that students may focus on their studies; concurrent employment is therefore limited. Students with full assistantships are limited to eight additional hours of employment per week. Students on full fellowships may be paid for up to eight additional hours per week, or may hold a supplemental assistantship appointment up to a maximum of 25% with no additional hourly employment. International students who have Stanford assistantships may not work more than 20 hours per week, including the time required for their assistantship appointments. In Summer Quarter, graduate students who are not required to enroll full-time may be allowed additional employment.

Application procedures and deadlines for admission and University funding are described in the Guide to Graduate Admission and at <http://gradadmissions.stanford.edu>. Fellowships and assistantships are normally awarded to incoming students between March 15 and April 15, in accordance with the Council of Graduate Schools resolution. Acceptance of University funding obliges the student to inform the department of any additional funds received; in such cases, Stanford funding may be adjusted (see "Outside Fellowships" below). Recipients of all graduate fellowships and assistantships must enroll in courses for each quarter of their appointment. Students may make arrangements with Student Financial Services to have their assistantship salary credited directly to the University bill through a payroll deduction plan.

### OUTSIDE FELLOWSHIPS

Many graduate students hold fellowships won in national competition from outside agencies such as the National Science Foundation. Information on application procedures and terms of such fellowship programs may be obtained from the applicant's current academic institution or the national office of the agency administering the program. A student who receives support from an outside source must notify his or her Stanford academic department immediately; Stanford funding may be adjusted.

## STUDENT LOANS (GRADUATE STUDENTS)

Graduate students can apply for federal and private student loans through the University's Financial Aid Office (FAO). Available programs include federal Direct loans (also known as Stafford loans), federal Perkins loans, and federal graduate/professional PLUS loans. Information on these loan programs is available at <http://financialaid.stanford.edu> or by calling the FAO at (650) 723-3058. Students who are not U.S. citizens or U.S. registered permanent residents are not eligible for federal student loans.

*Application*—Students in the Schools of Business, Law, and Medicine (M.D. program) should consult their schools for loan application instructions. The following loan application requirements apply to graduate students in the Schools of Earth Sciences, Education, Engineering, Humanities and Sciences, and Medicine (Ph.D. only):

1. Free Application for Federal Student Aid (FAFSA); file online at <http://fafsa.ed.gov>. Stanford's school code is 001305.
2. Stanford Graduate Student Loan and Federal Work-Study Application; file online at <http://financialaid.stanford.edu>.

Students should complete the application process at least two months prior to the beginning of the quarter in which they need the funds. The FAO determines eligibility for student loans based on a review of FAFSA and application data, satisfactory academic progress, level of indebtedness, credit history, and availability of funds. Student loan eligibility may be affected by fellowship, assistantship, and other funding; total funding, including student loans, may not exceed the expense budget as determined by the FAO.

*Emergency funds*—Students may request a cash advance from the Student Services Center. Cash advances may not be used to pay University bills.

### COTERMINAL STUDENT FINANCIAL AID

Coterminal students, who are concurrently pursuing bachelor's and master's degrees, may receive University fellowships and assistantships only after completing 180 units. Most private and federal graduate fellowships are awarded only to students who have received their bachelor's degrees. Stanford undergraduate scholarships and grants are reserved for students in their first four years of undergraduate study.

## VETERANS' EDUCATIONAL BENEFITS

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

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

To comply with federal regulations concerning credit for previous training (38 CFR 21.4253), Stanford University is required to evaluate all previous education and training completed

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

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

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

## TUITION, FEES, AND HOUSING

Regular quarterly tuition for the 2011-12 academic year, payable Autumn, Winter, and Spring quarters, is as follows:

Undergraduate	\$13,350
Graduate 11-18 units	\$13,350
Graduate 8-10 units	\$8,680
Graduate Engineering 11-18 units	\$14,220
Graduate Engineering 8-10 units	\$9,240
Graduate School of Business, first year MBA	\$18,400
Graduate School of Business, second year MBA	\$17,706
School of Medicine (M.D. Program—FY 2011 and beyond)*	\$15,248
School of Medicine (M.D. Program—FY 2010 and earlier)*	\$16,074
Stanford Law School	\$15,820

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

For complete tuition information, see the Registrar's tuition web site at [http://studentaffairs.stanford.edu/registrar/students/tuition-fees\\_11-12](http://studentaffairs.stanford.edu/registrar/students/tuition-fees_11-12).

Regular tuition fees apply to the undergraduate Overseas Studies and Stanford in Washington programs. For Summer Quarter tuition rates and policies, see [http://studentaffairs.stanford.edu/registrar/students/summer-tuition\\_11-12](http://studentaffairs.stanford.edu/registrar/students/summer-tuition_11-12).

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

Requirements in Coterminal Programs" in the "Graduate Degrees" section of this bulletin.

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

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

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

## UNDERGRADUATE TUITION

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

During Summer Quarter, Stanford undergraduates may register on a unit-basis (minimum 3 units). For Summer Quarter tuition rates and policies, see <http://registrar.stanford.edu/students/finances/summer.htm>.

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

1. *Permit to Attend for Services Only (PSO)*—Undergraduates completing honors theses, clearing incompletes, or requiring a registration status, and who meet the PSO conditions listed in the "Special Registration Statuses (Undergraduate)" section of this Bulletin, may petition for PSO status one time only in their terminal quarter. The PSO rate is \$3,900 per quarter in 2010-11

2. *13th Quarter*—Undergraduates who meet the 13th Quarter conditions listed in the "Special Registration Statuses (Undergraduate)" section of this Bulletin may petition one time only to register for a minimum of eight units. For per-unit tuition rates, see the Registrar's tuition web site at <http://registrar.stanford.edu/students/finances>.

3. *Graduation Quarter*—Undergraduates may petition to register for Graduation Quarter registration status in the quarter in which they are receiving a degree if they are not using any University resources (including housing), have completed all University requirements, and meet the Graduation Quarter conditions listed in the "Special Registration Statuses (Undergraduate)" section of this bulletin. The Graduation Quarter rate is \$100 per quarter in 2011-12.

## GRADUATE STUDENT TUITION

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

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

- the tuition associated with a degree in the doctoral/professional category, if the other degree is in the master's category. Those degrees in the doctoral or professional category for tuition purposes are the Ph.D., D.M.A., J.S.D., M.D., and J.D. degrees. Those degrees in the master's category for tuition



purposes are the Engineer, M.A., M.S., M.P.P., M.B.A., M.F.A., L.L.M., M.L.S., and J.S.M. degrees.

2. the higher tuition rate, if both degrees are in the same category.
3. a University-approved tuition rate if the student is in a special program for which specific tuition agreements have been approved by the Faculty Senate (e.g., all joint degree programs (JDPs) or the Master of Science in Medicine program).

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

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

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

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

1. *Terminal Graduate Registration (TGR)*—Doctoral students, master's students, and students pursuing Engineer degrees who have completed all degree requirements other than the University oral exam and dissertation (doctoral students) or a required project or thesis (Engineer or master's students) and meet the conditions listed in the "TGR" section of this bulletin may request Terminal Graduate Registration tuition status. Each quarter, TGR students must enroll in the 801 (for master's and Engineer students) or 802 (for doctoral students) course in their department for zero units, in the appropriate section for their adviser. TGR students register at a special tuition rate: \$2,604 per quarter in 2011-12. TGR students may enroll in up to 3 units of course work per quarter at this tuition rate. Within certain restrictions, TGR students may enroll in additional courses at the applicable unit rate. The additional courses cannot be applied toward degree requirements since all degree requirements must be complete in order to earn TGR status.
2. *Graduate Tuition Adjustment*—Graduate students who need fewer than 8 units to complete degree requirements or to qualify for TGR status, may register for one quarter on a unit basis (3 to 7 units) to cover the deficiency. This status may be used only once during a degree program. For per-unit tuition rates, see the Registrar's tuition web site at <http://registrar.stanford.edu/students/finances>.
3. *Graduation Quarter*—Registration is required for the term in which a student submits a dissertation or has a degree conferred. Students who meet the conditions listed in the "Graduation Quarter" section of this bulletin are eligible to be assessed a special tuition rate of \$100 for the quarter in which they are receiving a degree.

## INTERNATIONAL STUDENTS

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

## APPLICATION FEE

Contact the Undergraduate Admission Office for information about the undergraduate application fee and the Graduate Admission section of the Office of the University Registrar for the current graduate application fee. Application fees for the School of Law, the School of Medicine, and the Graduate School of Business vary by program. Fees are payable at the time of application and are not refundable.

## ASSU FEES

The Associated Students of Stanford University (ASSU) fees are established by student vote in Spring Quarter. Fees directly fund activities of student organizations and not operations of ASSU. The 2011-12 fees are:

- *Undergraduates*—\$119 per quarter
- *Graduate Students*—\$30 per quarter

ASSU fees are assessed each term and can be waived. Waivers can be requested during the first two weeks of each quarter on the ASSU waiver web site at <http://waivers.stanford.edu>. Waivers granted result in a credit to the student's University bill.

## DOCUMENT FEE

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

The document fee for students admitted to new degree or non-degree programs in 2011-12 is \$200.

## CAMPUS HEALTH SERVICE FEE

All students enrolled on the main Stanford campus are required to pay the Campus Health Service Fee. The Campus Health Service Fee covers most of the services provided by Vaden Health Center, including primary care medical visits, psychological evaluation and short-term therapy at Counseling and Psychological Services (CAPS), and health and wellness programs. The services provided by Vaden Health Center are not covered by Cardinal Care or a student's private health insurance. More information and answers to questions about the fee can be found at <http://vaden.stanford.edu/fees/index>. The fee for 2011-12 is \$173 per quarter.

## HEALTH INSURANCE

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

For complete information on health insurance, see <http://vaden.stanford.edu/insurance/>.

Those who carry medical insurance through an alternate carrier are generally eligible for waiver of the Stanford student health insurance plan. For information on waiver procedures, see [http://vaden.stanford.edu/insurance/using\\_your\\_own.html#wave](http://vaden.stanford.edu/insurance/using_your_own.html#wave).

## SPECIAL FEES

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

*Law Student Services Fee*—A fee is charged each quarter to School of Law students for supplementary course materials.

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

*Late Study List Fees*—Charges are imposed for late submission of study lists. The amount is \$200.

*Laboratory Fee*—Students in chemistry laboratory courses are charged a nonrefundable fee.

*Music Practice; Athletics, Physical Education, Recreation; and Dance*—Courses for which special fees are charged are indicated in the *Time Schedule*.

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

*International Scholar Service Fee*—A one-time fee for visa authorization documents is charged to international postdoctoral and visiting scholars.

## PAYMENTS

By accepting Stanford's offer of admission and enrolling in classes, each student accepts responsibility for paying all debts to the University, including tuition and fees, for which he or she is liable.

Charges and credits from offices within the University are aggregated in a student's individual account and presented on the University bill. Student Financial Services sends the University bill electronically to students monthly via Stanford ePay. Students may view their account online 24 hours a day, seven days a week, via Stanford ePay at <http://axess.stanford.edu>. Payments should be made online through Stanford ePay. If necessary, the bill and a payment stub may be printed from Stanford ePay.

Term fees, such as tuition, fees, room, board, health insurance, and Campus Health Service Fee are due and must be received by the 15th of the month. For undergraduates, term fees are due the 15th of the month prior to the start of the quarter. For graduate students, term fees are due the 15th of the month after the start of the quarter. Online payments via Stanford ePay can be made up to midnight PST on the 15th of the month. Mailed payments must be postmarked by 5:00 p.m. on the 15th of the month.

After the start of the term, adding units may result in additional tuition charges. Other fees, such as room damage repair charges, petition fees, late fees, lab fees, library fees, DMCA file-sharing

related fees and other miscellaneous fees, are due after they are billed.

An individual's registration as a Stanford student constitutes his or her agreement to make timely payment of all amounts due.

## FORMS OF PAYMENT

Stanford's standard method of payment is electronic check (eCheck) using the online service, Stanford ePay. No fee is associated with ePay. See [http://fingate.stanford.edu/students/universbill/resources/stanford\\_epay.html](http://fingate.stanford.edu/students/universbill/resources/stanford_epay.html) for ePay payment instructions. If online payment is impossible, students may mail or deliver payment to the Student Services Center.

Stanford accepts the following forms of payment: Stanford ePay eCheck, personal check, cashier's check, money order, travelers checks in U.S. funds drawn on U.S. banks, cash, and wire transfer (recommended for foreign students, see [http://fingate.stanford.edu/students/universbill/payment\\_methods.html#wire\\_transfer](http://fingate.stanford.edu/students/universbill/payment_methods.html#wire_transfer) for wire transfer instructions). Stanford does not accept credit cards or postdated checks.

## ACCOUNT FEES AND ACTIONS

*Late Fees*—The University must receive the full amount due on or before the due date indicated on the bill. If full payment is not received by the due date, a late fee of 1.0% of the amount past due may be assessed. Anticipated aid (aid that has been accepted but not disbursed and is shown on the student account) reduces the total amount due prior to late fees being applied.

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

*Nonsufficient Funds*—Checks or eCheck payments returned due to insufficient funds have already been submitted twice to the bank. A non-refundable \$25.00 administrative fee is assessed. In addition, student accounts are subject to holds and late payment penalties may apply.

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

## MEAL PLANS

For information on 2011-12 meal plans, see the Stanford Dining web site and its meal plan rate page.

Stanford University's Residential Education program promotes the philosophy that living and learning are integrated and that formal teaching, informal learning, and personal support in residences are integral to a Stanford education. Meals play a key role in this mission of community building, leading, and learning. Therefore, residents of specially designated University residence halls (Branner, Crothers/ Crothers Memorial, Florence Moore, Lakeside, Manzanita, Murray, Ricker, Stern, Toyon, Wilbur, and Yost) are required to participate in a Stanford Dining meal plan. Stanford Dining is committed to excellence by providing meal plans that offer significant value, the highest quality, and maximum flexibility of dining across campus.

## REFUNDS

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

See the Registrar's Tuition page for 2011-12 for a schedule of refunds.

## ANNULLED REGISTRATION

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

## CANCELLATION OF REGISTRATION OR SUSPENSION FOR CAUSE

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

## INSTITUTIONAL INTERRUPTION OF INSTRUCTION

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

## LEAVES OF ABSENCE

A student in good standing who desires or is required to take a leave of absence from the University after the first day of instruction, but before the end of the first 60 percent of the quarter (term withdrawal deadline), may file a petition for a leave of absence and tuition refund with the Student Services Center. A leave of absence after the first 60 percent of the quarter (term withdrawal deadline) is only granted for approved health and emergency reasons. For more information on leaves of absence, undergraduates should see the "Leaves of Absence and Reinstatement (Undergraduate)" section of this bulletin, and graduate students should see the "Leaves of Absence (Graduate)" section of this bulletin.

## ROOM AND MEAL PLAN REFUNDS

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

Room refunds are made only when students move out of the residence system and graduate from or cease to be enrolled at the University. Eligibility for refunds is listed in the Residence Agreement and in the online termination form at <http://onlinetoc.stanford.edu>. Filing a termination of occupancy form and moving out of Student Housing does not necessarily entitle a student to a refund. Students in all-male fraternities or all-female sororities are billed directly by the fraternity or sorority, and refunds are arranged between the student and the fraternity or sorority.

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

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

## HOUSING

University housing is available to enrolled Stanford students. Student Housing, a division of Residential and Dining Enterprises, is responsible for: managing, maintaining, and cleaning the physical plant of student residences; assigning students to housing; and operating the regional housing front desks. Information on University housing assignments, options, policies, application procedures, and deadlines may be obtained from Housing Assignments online at <http://studenthousing.stanford.edu>, by mail or in person at 630 Serra Street, Suite 110, Stanford University, Stanford, CA 94305-6034, by telephone at (650) 725-2810, or by email at [housingassignments@lists.stanford.edu](mailto:housingassignments@lists.stanford.edu). Information regarding off-campus housing may be obtained from Community Housing at <http://offcampus.stanford.edu>, by mail or in person at 630 Serra Street, Suite 110, Stanford University, Stanford, CA 94305-6034, by telephone at (650) 723-3906, or by email at [communityhousing@lists.stanford.edu](mailto:communityhousing@lists.stanford.edu). For other housing related information, email [studenthousing@lists.stanford.edu](mailto:studenthousing@lists.stanford.edu) or phone the main student housing office at (650) 725-1600.

The department of Residential Education (<http://www.stanford.edu/dept/resed>, 650-725-2800) and the Graduate Life Office (<http://www.stanford.edu/group/glo>, 650-723-1171) are responsible for planning educational programs, counseling, and crisis intervention. In addition, Residential Education is responsible for the administration of local undergraduate residence offices.

## HOUSING RATES

Complete information on housing is available at <http://housing.stanford.edu>. Campus housing rates are generally below local area market rents.

- See undergraduate housing to apply for 2011-12 housing; rates are available at [http://housing.stanford.edu/ugrad/ugrad\\_rates\\_11.htm](http://housing.stanford.edu/ugrad/ugrad_rates_11.htm).
- See graduate housing to apply for 2011-12 housing; rates are available at [http://www.stanford.edu/dept/rde/shs/pdfs/grad\\_rates\\_11.pdf](http://www.stanford.edu/dept/rde/shs/pdfs/grad_rates_11.pdf).

All rates are per student and include utilities and coinless laundry. Room rates are charged quarterly on the University Bill. Information on payment options and procedures is discussed in housing assignment information from Housing Assignments and is available in complete detail from the Student Services Center, 2nd floor of Tresidder Memorial Union, 459 Lagunita Drive, Stanford University, Stanford, CA 94305-6036.

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

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

## UNDERGRADUATE RESIDENCES

Approximately 95 percent of undergraduates live in University housing, not counting students studying abroad during the academic year. All freshmen and transfers are required to live in

University residences for educational reasons and are automatically assigned housing following admission.

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

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

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

## GRADUATE RESIDENCES

*Web Site:* [http://www.stanford.edu/dept/rde/shs/grad/apply\\_11.htm](http://www.stanford.edu/dept/rde/shs/grad/apply_11.htm)

*Assignment to Graduate Residences*—Over 57 percent of matriculated graduate students live in Stanford student housing. Residence assignments are made on the basis of an annual lottery and quarterly waiting lists. New matriculated students are guaranteed University housing if:

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

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

After the first year, continuing matriculated graduate students are given priority for housing for a specified number of years based on their academic degree program. Master's students are given one additional year of limited priority for housing. Doctoral students are given five additional years of limited priority for housing. Limited priority years are not automatically cumulative, so students do not receive additional years of limited priority for subsequent degrees. If a student completes a master's program and then moves to a doctoral program, he or she receives four additional limited priority years, which is the difference between the allocation for a master's and a doctoral program. Students who live in residences that are open year-round and who remain in continuous occupancy in their rooms or apartments may renew their contracts annually if they meet certain eligibility requirements. Students who live in residences that are open only during the academic year, or who want to change residences, re-enter the lottery each year. Approximately 80% of continuing student applicants are assigned housing each year.

Single graduate students may request assignment to graduate apartments and residence halls, or to spaces in six undergraduate cooperative houses.

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

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

## COMMUNITY HOUSING

Community Housing maintains computerized listings of private rooms, houses, and apartments in surrounding communities that are available to students who want to live off-campus. Students must make rental arrangements directly with landlords. Information on community housing may be obtained from Community Housing at <http://offcampus.stanford.edu>, by mail or in person at 630 Serra Street, Suite 110, Stanford University, Stanford, CA 94305-6034, by telephone at (650) 723-3906, or by email at [communityhousing@lists.stanford.edu](mailto:communityhousing@lists.stanford.edu). During early September, temporary accommodations are available in student residence halls at a modest charge for students searching for off-campus housing for Autumn Quarter. Contact Stanford Conference Services for more information at (650) 725-1429.

## TRANSFER WORK

Stanford accepts a small number of undergraduate transfer students each year. Requirements for admission are described as part of the undergraduate application process and are listed on the Undergraduate Admission website. Stanford University has a designated adviser who coordinates support for transfer students.

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

See the "Advanced Placement" section of this Bulletin for information concerning Stanford's policy on credit for Advanced Placement work. Details on how to request credit for advanced placement examinations are available at the Registrar's Advanced Placement site.

## UNDERGRADUATE TRANSFER WORK

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

1. Credit may be granted for work completed at institutions in the U.S. only if the institutions are accredited.
2. Study in institutions outside the U.S., when validated by examination results, tutorial reports, or other official evidence of satisfactory work, may be credited toward a Stanford bachelor's degree, subject to the approval of the credit evaluator and the appropriate departments.
3. Credit is officially allowed only after the student has been unconditionally admitted to Stanford.
4. Credit is allowed for work completed at institutions in the U.S. only on the basis of an official transcript received by the Registrar at Stanford directly from the institution where the credit was earned.
5. Credit from another institution may be transferred for courses which are substantially equivalent to those offered at Stanford University on the undergraduate level, subject to the approval of the credit evaluator. A maximum of 20 quarter units may represent courses which do not parallel specific undergraduate courses at Stanford, again, subject to the approval of the credit evaluator as to quality and suitability.

6. Course work cannot duplicate, overlap, or regress previous work.
  7. Transfer course work cannot count towards secondary school diploma and/or graduation requirements.
  8. To fulfill GER requirements through transfer work, the course must match a specific Stanford course that fulfills the same GER requirement, be a minimum of three quarter units, and be taken for a letter grade.
  9. Transfer work can be used to satisfy a department major or minor requirement. The transfer work must first be officially accepted into the University through the Office of the University Registrar. Departments determine if approved transfer work can be used to satisfy a department major or minor requirement.
  10. The credit allowed at Stanford for one quarter's work may not exceed the number of units that would have been permissible for one quarter if the work had been done at Stanford; for work done under a system other than the quarter system, the permissible maximum units are calculated at an appropriate ratio of equivalence.
  11. Credit is allowed at Stanford for work graded 'A,' 'B,' 'C,' or 'Pass' (where 'Pass' is equivalent to a letter grade of 'C' or above), but not for work graded 'D' or below.
  12. No more than 45 (90 for transfer students) quarter units of credit for work done elsewhere may be counted toward a bachelor's degree at Stanford (including advance placement test credit).
  13. Credit earned in extension, correspondence, and online courses is transferable only if the university offering the courses allows that credit toward its own bachelor's degree. Such credit is limited to a maximum of 45 quarter units for extension courses, a maximum of 15 quarter units for correspondence and online study, and a maximum of 45 quarter units for the combination of extension, correspondence, and online courses.
  14. Credit earned in military training and service is not transferable to Stanford, unless offered by an accredited college or university in the U.S. and evaluated as above by the credit evaluator.
4. Courses must have been completed with a grade point average (GPA) of 3.0 (B) or better. Pass grades are accepted only for courses for which letter grades were not an option and for which the standard of passing is 'B' quality work.
  5. Courses must have been taken at a regionally accredited institution in the U.S. or at an officially recognized institution in a foreign country. Courses taken at foreign universities must be at the level of study comparable to a U.S. graduate program.

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

## GRADUATE RESIDENCY TRANSFER CREDIT

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

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

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

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

# UNDERGRADUATE DEGREES AND PROGRAMS

## DEGREE PROGRAMS

### **BACHELOR OF ARTS (B.A.), BACHELOR OF SCIENCE (B.S.)**

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

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

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

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

### **BACHELOR OF ARTS AND SCIENCE (B.A.S.)**

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

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

2. These students must have applied in advance for graduation with the B.A.S. degree instead of the B.A. or B.S. degree, been recommended by the Committee on Undergraduate Standards and Policy (C-USP),
3. Fulfilled a minimum of 180 units of University work described in point 1 of the "Bachelor of Arts (B.S.), Bachelor of Science (B.S.," section.
4. The requirements of each major without applying any course towards the requirements of more than one major, according to "Multiple Majors" section of this bulletin. The Major-Minor and Multiple Major Course Approval Form is required for graduation for students with the B.A.S degree.
5. The Writing, General Education, and Language requirements.
6. Students admitted as freshmen—A minimum of 180 units (including the last quarter in residence) at Stanford. In special cases, students who have earned at least 180 units in resident work may petition for a waiver of the last quarter-in-residence requirement for up to 15 units.
7. Students admitted as transfers—A minimum of 135 units (including the last quarter in residence) at Stanford. In special cases, students who have earned at least 135 units in resident work may petition for a waiver of the last quarter-in-residence requirement with no overlapping courses,  
Students who cannot meet the requirements for both majors without overlapping courses are not eligible for the B.A.S., but may apply to have a secondary major recorded on their transcripts. (See "The Major" in the "Undergraduate Degrees and Programs" section of this bulletin.)

### **DUAL BACHELOR'S DEGREES (CONCURRENT B.A. AND B.S.)**

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

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

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

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

### **SECOND BACHELOR'S DEGREE**

Stanford does not award a second Bachelor of Arts degree to an individual who already holds a Bachelor of Arts, nor a Bachelor of Science degree to an individual who already holds a Bachelor of Science degree. However, the holder of a Bachelor of Arts degree from Stanford may apply to the C-USP Subcommittee on

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

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

## COTERMINAL BACHELOR'S AND MASTER'S DEGREES

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

To apply for admission to a coterminal master's program, students must submit to the prospective graduate department the following: coterminal application, statement of purpose, preliminary program proposal, two letters of recommendation from Stanford professors, and a current Stanford transcript. Graduate Record Examination (GRE) scores or other requirements may be specified by the prospective department.

For coterminal students, the quarter following completion of 12 full-tuition undergraduate quarters is identified as the first graduate quarter for tuition assessment. Beginning with this quarter (13th quarter), coterminal students are subject to graduate student policies and procedures (including those described in the "Graduate Degrees" section of this bulletin) in addition to undergraduate minimum progress standards. These policies include continuous registration or leaves of absence for quarters not enrolled and minimal progress guidelines.

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

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

The specific University residency, unit requirement, and additional policies for a bachelor's/master's program are described under Coterminal Programs Residency Requirement in the "Graduate Degrees" section of this bulletin. For University

application forms, see <http://studentaffairs.stanford.edu/registrar/publications#Coterm>.

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

## DEGREE REQUIREMENTS

### A LIBERAL EDUCATION

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

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

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

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

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

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

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

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

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

## GENERAL EDUCATION REQUIREMENTS

### PURPOSE

The General Education Requirements are an integral part of undergraduate education at Stanford. Their purpose is: 1) to introduce students to a broad range of fields and areas of study within the humanities, social sciences, natural sciences, applied sciences, and technology; and 2) to help students prepare to become responsible members of society. Whereas the concentration of courses in the major is expected to provide depth, the General Education Requirements have the complementary purpose of providing breadth to a student's undergraduate program. The requirements are also intended to introduce students to the major social, historical, cultural, and intellectual forces that shape the contemporary world.

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

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

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

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

During Autumn Quarter 2004-05, the Academic Senate approved modifications to undergraduate General Education Requirements that became effective Autumn Quarter 2005-06 for all matriculated undergraduates who entered Stanford in Autumn Quarter 2004-05 or later.

The purpose of these modifications was 1) to give students a fuller and more articulate understanding of the purposes of the requirements and of a liberal arts education that these requirements embody; 2) to make a place in the curriculum for ethical reasoning to help make students aware of how pervasive ethical reasoning and value judgments are throughout the curriculum, and 3) to provide some greater freedom of choice by reducing the GERs by one course.

### AREA REQUIREMENTS

The following structure for General Education Requirements became effective with the 2005-06 entering freshman and transfer class:

*Introduction to the Humanities*—one quarter introductory courses followed by two quarter thematic sequences.

Introduction to the Humanities builds an intellectual foundation in the study of human thought, values, beliefs, creativity, and culture. Courses introduce students to methods of inquiry in the humanities: interdisciplinary methods in Autumn Quarter and discipline-based methods in Winter and Spring quarters.

*Disciplinary Breadth*—requirement satisfied by completing five courses of which one course must be taken in each subject area.

Disciplinary Breadth gives students educational breadth by providing experience in the areas of Engineering and Applied

Sciences, Humanities, Mathematics, Natural Sciences, and the Social Sciences.

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

Education for Citizenship provides students with some of the skills and knowledge that are necessary for citizenship in contemporary national cultures and participation in the global cultures of the 21st century. Education for Citizenship is divided into four subject areas: Ethical Reasoning, the Global Community, American Cultures, and Gender Studies.

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

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

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

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

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

Courses that have been certified as meeting the requirements are identified throughout this bulletin with the notational symbols listed below. A comprehensive list of certified courses also appears in the *Time Schedule of Classes* for that quarter.

#### Introduction to the Humanities

IHUM-1 (formerly GER:1a): first-quarter course

IHUM-2 (formerly GER:1b): second-quarter course

IHUM-3 (formerly GER:1c): third-quarter course

#### Disciplinary Breadth

DB-EngrAppSci (formerly GER:2b): Engineering and Applied Sciences

DB-Hum (formerly GER:3a): Humanities

DB-Math (formerly GER:2c): Mathematics

DB-NatSci (formerly GER:2a): Natural Sciences

DB-SocSci (formerly GER:3b): Social Sciences

#### Education for Citizenship

EC-AmerCul (formerly GER:4b): American Cultures

EC-GlobalCom (formerly GER:4a): Global Community

EC-Gender (formerly GER:4c): Gender Studies

EC-EthicReas (GER:4d): Ethical Reasoning

Students who matriculated Autumn Quarter 2004-05 or later



are subject to the revised General Education Requirements effective Autumn Quarter 2005-06. Students who matriculated Autumn Quarter 2003-04 or earlier remain on the old General Education Requirements, but may elect to change to the new system. Students interested in electing the revised GER system should contact the Student Services Center. No further changes are allowed once a student has elected to move to the new system.

### CREDIT TRANSFER

Students may propose that work taken at another college or university be accepted in fulfillment of a General Education Requirement. In such cases, the Office of the University Registrar determines, after appropriate faculty consultation, whether the work is comparable to any of the specifically certified courses or course sequences. To fulfill GER requirements through transfer work, the course must match a specific Stanford course that fulfills the same GER requirement, be a minimum of three quarter units, and be taken for a letter grade.

### LANGUAGE REQUIREMENT

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

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

Chinese	630	Italian	630
French	640	Japanese	620
German	630	Korean	630
Latin	630	Hebrew	540
Spanish	630		
4. Take a diagnostic test in a particular language which either:
  - a. Places them out of the requirement, *or*
  - b. Diagnoses them as needing one, two, or three additional quarters of college-level study. In this case, the requirement can then be fulfilled either by passing the required number of quarters of college-level language study at Stanford or the equivalent elsewhere, or by retaking the diagnostic test at a later date and placing out of the requirement.

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

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

### WRITING AND RHETORIC REQUIREMENT

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

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

The current Writing and Rhetoric requirement, effective beginning 2003, includes courses at three levels. The first two

levels are described in more detail below. Writing-intensive courses that fulfill the third level, the Writing in the Major (WIM) requirement, are designated under individual department listings.

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

1. PWR 1: a course emphasizing writing and research-based argument.
2. SLE: writing instruction in connection with the Structured Liberal Education program.
3. Transfer credit approved by the Office of the University Registrar for this purpose.

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

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

A complete listing of PWR 1 courses is available each quarter on the UAL web site at [http://ual.stanford.edu/AP/univ\\_req/PWR/Courses](http://ual.stanford.edu/AP/univ_req/PWR/Courses), and at the PWR office in Sweet Hall, Third Floor. Complete listings of PWR 2 and Write-2 courses are available to students on the UAL web site the quarter before they are scheduled to complete the WR 2 requirement.

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

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

### CREDIT

#### ADVANCED PLACEMENT

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

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

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

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

A maximum of 45 quarter units of Advanced Placement (AP), transfer credit, and/or other external credit (such as International Baccalaureate) may be applied toward the undergraduate degree. More than 45 units of AP, transfer, and other external credit may appear on the Stanford University transcript; however, only 45 units can be applied to the minimum units required for the undergraduate degree. Once credit has been posted it cannot be removed from the student record. Stanford University policies on

AP and other external credit are subject to review and change on an annual basis. Subjects not listed on this chart are not eligible for AP credit at Stanford University.

Further information is available from the Student Services Center or at <http://studentaffairs.stanford.edu/registrar/students/ap>.

### AP SCORES AND PLACEMENT

Test Subject	Score	Placement	Quarter Units
Calculus AB (or AB subscore)	5	MATH 51	10
	4	MATH 42	5
Calculus BC	4, 5	MATH 51	10
	3	MATH 42	5
Chemistry	5	CHEM 33 or above	4
Chinese (Language and Culture) <sup>1</sup>	5	Take placement exam if continuing in this language	10
Computer Science A	4,5	CS 106B or 106X	5
Computer Science AB	4,5	CS 106B, 106X, or 107	5
French (Language) <sup>1</sup>	5	Take placement exam if continuing in this language	10
German (Language) <sup>1</sup>	5	Take placement exam if continuing in this language	10
Japanese (Language and Culture) <sup>1</sup>	5	Take placement exam if continuing in this language	10
Latin (Literature or Virgil) <sup>1</sup>	4,5	Take placement exam if continuing in this language	10
Physics B	5	PHYSICS 25	8
	4	PHYSICS 23 and 25	4
Physics C Mechanics only	4,5	PHYSICS 43 and 45 or PHYSICS 23 and 25	4
	3	PHYSICS 41, 43, and 45 or PHYSICS 23 and 25	4
E&M only	4,5	PHYSICS 41 and 45 or PHYSICS 21 and 25	5
	3	PHYSICS 41, 43, and 45 or PHYSICS 21 and 25	4
Both Parts	4,5	PHYSICS 45 or PHYSICS 25	9
	3	PHYSICS 41, 43, and 45 or PHYSICS 25	8
Spanish (Language) <sup>1</sup>	5	Take placement exam if continuing in this language	10

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

Stanford University awards advanced placement credit for certain International Baccalaureate and international advanced placement subject examinations. The international test subjects must match the content of the College Entrance Examination Board (CEEB) Advanced Placement test subjects that receive advanced placement credit.

### ACTIVITY COURSES

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

### COURSES TAKEN ON SATISFACTORY/NO CREDIT OR CREDIT/NO CREDIT BASIS

A maximum of 36 units of credit (including activity courses) taken at Stanford or its overseas campuses for a "CR" or "S" grade

may be applied towards the 180 (225 if dual degrees are being pursued) units required for the bachelor's degree. The maximum for transfer students is 27 units.

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

### INTERNSHIP GUIDELINES

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

### UNDERGRADUATE TRANSFER WORK

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

- Credit may be granted for work completed at institutions in the U.S. only if the institutions are accredited.
- Study in institutions outside the U.S., when validated by examination results, tutorial reports, or other official evidence of satisfactory work, may be credited toward a Stanford bachelor's degree, subject to the approval of the credit evaluator and the appropriate departments.
- Credit is officially allowed only after the student has been unconditionally admitted to Stanford.
- Credit is allowed for work completed at institutions in the U.S. only on the basis of an official transcript received by the Registrar at Stanford directly from the institution where the credit was earned.
- Credit from another institution may be transferred for courses which are substantially equivalent to those offered at Stanford University on the undergraduate level, subject to the approval of the credit evaluator. A maximum of 20 quarter units may represent courses which do not parallel specific undergraduate courses at Stanford, again, subject to the approval of the credit evaluator as to quality and suitability.
- Course work cannot duplicate, overlap, or regress previous work.
- Transfer course work cannot count towards secondary school diploma and/or graduation requirements.
- To fulfill GER requirements through transfer work, the course must match a specific Stanford course that fulfills the same GER requirement, be a minimum of three quarter units, and be taken for a letter grade.
- Transfer work can be used to satisfy a department major or minor requirement. The transfer work must first be officially accepted into the University through the Office of the University Registrar. Departments determine if approved transfer work can be used to satisfy a department major or minor requirement.
- The credit allowed at Stanford for one quarter's work may not exceed the number of units that would have been permissible for one quarter if the work had been done at Stanford; for work done under a system other than the quarter system, the permissible maximum units are calculated at an appropriate ratio of equivalence.
- Credit is allowed at Stanford for work graded 'A,' 'B,' 'C,' or 'Pass' (where 'Pass' is equivalent to a letter grade of 'C' or above), but not for work graded 'D' or below.

12. No more than 45 (90 for transfer students) quarter units of credit for work done elsewhere may be counted toward a bachelor's degree at Stanford (including advance placement test credit).
13. Credit earned in extension, correspondence, and online courses is transferable only if the university offering the courses allows that credit toward its own bachelor's degree. Such credit is limited to a maximum of 45 quarter units for extension courses, a maximum of 15 quarter units for correspondence and online study, and a maximum of 45 quarter units for the combination of extension, correspondence, and online courses.
14. Credit earned in military training and service is not transferable to Stanford, unless offered by an accredited college or university in the U.S. and evaluated as above by the credit evaluator.

## LAST UNITS OUT OF RESIDENCE

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

## CONCURRENT ENROLLMENT

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

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

## THE MAJOR

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

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

## REQUIREMENTS

Undergraduates must select a major by the end of their sophomore year. All undergraduate major programs listed in this bulletin, except for certain honors degree programs that require application and admission in advance, are open to all students.

Students may use Axxess to declare, drop, or change a major at any time. In some departments or programs, though, a late change could easily result in extending the period of undergraduate study. Students who have applied to graduate, or who wish to declare an individually designed major, and coterminal students must use printed forms to select or change a major. Students requiring assistance should contact the Student Services Center. For academic advising regarding majors, students should consult the Undergraduate Academic Life Office (UAL).

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

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

## LIMITS OF THE MAJOR

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

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

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

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

## UNDERGRADUATE MAJOR UNIT REQUIREMENTS

Major Department	Units required outside the dept./program	Units required within the dept./program	Total # of units	Notes/Special Requirements	WIM Course
<b>School of Earth Sciences</b>					
Earth Systems	63-101	24	87-125	internship, senior seminar	EARTHSYS 260 OR EARTHSYS 200
Energy Resources Engineering	76-83	34	110-117	-	ENERGY 199
Geological & Environmental Sciences	26-44	54-60	80-104	advanced summer field experience	GES 150
Engr. Geol. & Hydrogeology	44-47	45-55	71-102	-	-
Geophysics	43-45	15	min. 58	-	GEOPHYS 185
<b>School of Engineering</b>					
Aeronautics and Astronautics	56-58	39	95-97	-	AA 190
Architectural Design	40	60	100	-	CEE 100
Atmosphere/Energy	50	51-53	101-103	-	STS 110
Bioengineering	54	62-64	116-118	-	BIOE 131
Biomechanical Engineering	42-63	49-64	103-116	-	BIO 44X
Biomedical Computation	51-65	47-56	109-114	Two quarters guided research	ENGR 199W, CS 191W, 272
Chemical Engineering	min. 70	50	min. 120	-	CHEMENG 185A
Civil Engineering	min. 57	min. 59	min. 116	-	CEE 100
Computer Science	min. 29	min. 32	96-106	senior project	CS 181W, 191W, 194W, 294W
Electrical Engineering	45	68	113	-	ENGR 102E with EE 100X or EE 108A
Engineering Physics	min. 45	min. 48	min. 93	at least 45 units in Engineering Fundamentals and Depths must be engineering units	EE 108A and ENGR 102E, ME 203 and ENGR 102M, MATSCI 161, 164, PHYSICS 107
Environmental Engineering	min. 57	min. 59	min. 116	-	CEE 100
Individually Designed Major	41	40	90-107	-	see adviser
Management Science and Engineering	46-79	45-60	96-134	senior project	MS&E 152W, 193W, 197
Material Science and Engineering	min. 53	min. 50	min 103	-	MATSCI 161, 164
Mechanical Engineering	61-65	45	106-110	-	ENGR 102M, ME 103D, and ME 203
Product Design	58-59	48	106-107	-	ENGR 102M, ME 103D, and ME 203
<b>School of Humanities and Sciences</b>					
African and African American Studies	50	10	60	AAAS thesis seminar	AFRICAAM 105
American Studies	20-25	35-40	60	-	AMSTUD 160
Anthropology	15	50	65	foreign language 1st qtr. at 2nd-year level	ANTHRO 90A, ANTHRO 90B, ANTHRO 90C
Archaeology	45	20	65	-	ARCHLGY 103
Art	-	-	-	-	-
Art History	-	61	61	library orientation, junior seminar	ARTHIST 1
Film and Media Studies	-	65	65	library orientation, senior seminar	FILMSTUD 101
Studio Art	-	65	65	library orientation, advanced seminar	ARTHIST 1
Asian American Studies	40	20	60	core curriculum, foundational course, senior research	CSRE 200X
Biology	min. 41	min. 49	90-105	fields of study have different unit ranges	BIO 145, 196A, 197WA, 197WB, 199W; BIOHOPK 44Y, 184H
Chemistry	34	52	86	-	CHEM 134

Chicana/o Studies	40	20	60	core curriculum, foundational course, senior research	CSRE 200X
Classics	-	-	60-65	majors seminar (CLASSGEN 176)	CLASSGEN 176
Communication	5	min. 60	65	-	COMM 104W, 137W
Comparative Literature	-	min. 40	65	Gateway course: 101 Core: 121, 122, 123 Capstone course: 199 3 electives in COMPLIT	COMPLIT 101
Comparative Studies in Race & Ethnicity	45	15	60	core curriculum, thematic concentration, senior research	CSRE 200X
Drama	-	60	60	-	DRAMA 101H DRAMA 168H
East Asian Languages	-	-	-	-	-
Chinese	0-16	29-44	min. 45	Capstone course: CHINGEN 198	CHINGEN 133
Japanese	0-20	25-44	min. 45	Capstone course: JAPANGEN 198-	JAPANGEN 138
East Asian Studies	75	1	76	Capstone course; overseas studies in E. Asian country 1 qtr; senior essay	CHINGEN 133; JAPANGEN 138
Economics	-	80	80	-	ECON 101
English	-	68-80	68-80	-	ENGLISH 160; ENGLISH 164; ENGLISH 196A
w/ Creative Writing	-	73-75	73-75	dept. approval	-
w/ Interdisciplinary Emphasis	15	58-60	73-75	dept. approval and interdisciplinary paper	-
w/ Interdepartmental Emphasis	16-20	53-55	69-75	16-20 units in foreign lang. lit.; dept. approval	-
w/ Philosophy	20-25	57-59	77-84	-	-
Feminist Studies	45	18 core	63	focus statement; practicum	FEMST 153
French and Italian	-	-	-	-	-
French	max. 24	32 above #100	56 above #100	-	FRENLIT 130,131,132,133
French and English Literatures	max. 24	32 above #100	56 above #100	4 Eng. Lit. courses	-
French and Italian Literatures	max. 24	32 above #100	56 above #100	4 Ital. Lit. courses	-
French and Philosophy	min. 21	32 above #100	65	Gateway course; capstone	-
Italian	max. 28	32 above #100	60 above #100	-	ITALLANG 127,128,129
Italian and English Literatures	max. 28	32 above #100	60 above #100	4 Eng. Lit. courses	-
Italian and French Literatures	max. 28	32 above #100	60 above #100	4 Fr. Lit. courses	-
Italian and Philosophy	min. 21	32 above #100	65	Gateway course; capstone	-
German Studies	0-25	35-60	60	3 above #130	GERLIT 127A
German and Philosophy	min. 21	min. 39	65	Gateway course; capstone	-
History	-	63-65	63-65	3 from #200-298	HISTORY 209S
Human Biology	min. 10	min. 39	min. 87	Internship	HUMBIO 4B
Iberian and Latin American Cultures	max. 30	30	60	core courses	ILAC 120
Individually Designed Major	-	75	all above #100	honors thesis	see adviser
International Relations	55-70	0-10	70	2 yr. foreign lang; Overseas studies 1 qtr.	HISTORY 102; POLISCI 110C,D,247R; INTNLREL 140A,C,
Jewish Studies (Individually Designed)	75-77	-	75-77	-	See CSRE
Linguistics	-	50	50	foreign lang. at 6th-qtr level, junior research paper	LINGUIST 150
Mathematical &	-	-	73-78	-	CS 181, MATH

Computational Science					109,110,120,171 STATS 166
Mathematics	up to 15 units	49	64	-	MATH 109,110,120,171
Music	-	67	66-76	piano-proficiency and ear-training exam	2 from: MUSIC 140- 149, 251
Native American Studies	40	20	60	core curriculum, foundational course, senior research	CSRE 200X
Philosophy	-	55	55	course in 194 series	PHIL 80
Philosophy and Literature	min. 15	min. 47	65	Gateway course; 194	-
Philosophy and Religious Studies	-	60	60	3 seminars; 20 units in each dept. + 20 advanced units from both depts.	PHIL 80 or RELIGST 290
Physics	21-23	58-59	79-82	-	PHYSICS 107
Political Science	0	70	70	Introductory course in primary and secondary concentration, advanced seminar (200 or 300 level)	POLISCI 3P/136S, 110C, 148, 110D, 124R, 120C
Psychology	10	60	70	-	PSYCH 70
Public Policy	59	28	87	min. 15 concentration units; senior seminar	PUBLPOL 106
Religious Studies	-	60	60	introductory course, majors' seminar, senior essay or honors thesis, senior colloquium	RELIGST 290
Science, Technology, & Society (B.A.)	37	32	69	min. 15 units in technical literacy, min. 20 units in concentration	STS 110; CS 181; COMM 120; HISTORY 140A; MS&E 193W
Science, Technology, & Society (B.S.)	50	32	82	min. 50 units in technical depth	STS 110; CS 181; COMM 120; HISTORY 140A; MS&E 193W
Slavic Languages and Literatures	-	-	-	-	SLAVLIT 156
Russian Language & Literature	0-10	46-56	56	1st- and 2nd- year Russian	-
Russian Language, Culture, & History	12-20	36-39	56	1st- and 2nd- year Russian	-
Russian Literature & Philosophy	21	40	67	Gateway course; capstone	-
Sociology	-	45-60	60	-	SOC 200, 202
Symbolic Systems	66-81	4	70-85	-	PHIL 80
Urban Studies	41	min. 32	73	25 units in concentration; capstone courses	URBANST 203

## MULTIPLE MAJORS

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

1. Formally declare all majors through Axxess to the Office of the University Registrar.
2. Satisfy the requirements of each major without applying any course towards the requirements of more than one major or any minor unless:
  - a. overlapping courses constitute introductory skill requirements (for example, introductory math or a foreign language);

- b. overlapping courses enable the student to meet school requirements (for example, for two majors within the School of Engineering). Currently, only the School of Engineering has school requirements for its undergraduate majors.

Students pursuing multiple majors must complete a multiple major program form indicating which courses they plan to apply toward each major and any minor(s). Departments must certify that the plan of study meets all requirements for the majors and any minor(s) without unallowable overlaps in course work; the School of Engineering Dean's office certifies this information in any case involving an Engineering major or minor. To facilitate advance planning, multiple major program forms are available at any time from the Registrar's forms web site. The Major-Minor and Multiple Major Course Approval Form is required for graduation for students with multiple majors or a minor. The form should be submitted to the Student Services Center by the Final Study List deadline of the quarter of intended graduation.

If the pursuit of multiple majors unduly delays an undergraduate's progress through Stanford, the University reserves the right to limit a student to a single major.

When students cannot meet the requirements of multiple majors without overlaps, the secondary major, may be relevant.

## SECONDARY MAJOR

In some cases, students may complete course requirements for more than one major, but they may not meet the requirements outlined for the multiple major option. For example, the student may develop a course plan in which courses requisite for one major overlap with requirements for another. In these cases, the student may declare a secondary major which results in the transcript bearing an annotation that the course requirements for that major have also been met. Secondary majors are not listed on the diploma.

## UNDERGRADUATE MINOR

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

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

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

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

Undergraduates use *Axess* to declare or drop a minor. The Major-Minor and Multiple Major Course Approval Form is required for graduation for students with a minor. The form should be submitted to the Student Services Center by the final study list deadline of the quarter of intended graduation.

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

## BACCALAUREATE HONORS

*With Distinction*—In recognition of high scholastic attainment, the University, upon recommendation of a major department or program, awards the Bachelor's Degree with Distinction. Distinction is awarded to 15% of the graduating class based on cumulative grade point averages. Distinction is calculated at the end of the Winter Quarter for each graduating class.

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

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

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

- Comparative Studies in Race and Ethnicity
- Democracy, Development, and the Rule of Law
- Education
- Environmental Science, Technology, and Policy
- Ethics in Society
- Feminist Studies
- International Security Studies
- Latin American Studies
- Science, Technology, and Society

The interdisciplinary honors programs are designed to complement study in a department major. The requirements for these honors programs are described in the department sections of this bulletin. If approved for interdisciplinary honors, the student should submit the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program form to the Student Services Center to declare the Interdisciplinary Honors Program.

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

## SPECIAL REGISTRATION STATUSES (UNDERGRADUATE)

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

*Permit to Attend for Services Only (PSO)*—Undergraduates in their terminal quarter who are completing honors theses, clearing incomplete grades, or have completed all requirements and are requiring a registration status to utilize university resources, may petition one time only for PSO status. PSO does not permit any course enrollment. Students should apply to graduate through *Axess* if applying for the PSO special registration status. The deadline for the completed PSO petition is the Preliminary Study List deadline of the applicable quarter.

*13th Quarter*—Undergraduates who have completed at least twelve full-time quarters may petition to register for 13th Quarter registration status at a reduced tuition rate for their final quarter, but must register for at least eight units. Undergraduate dual degree students must complete at least fifteen full-time quarters before petitioning for reduced tuition in their final quarter. Undergraduates should apply to graduate through *Axess* if applying for the 13th-quarter special registration status.

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

1. filing a Request for Last Units Out of Residence in order to complete up to 15 final units at another institution; or
2. returning from a discontinued status and filing a Request to Return and Register in Undergraduate Study ([http://ual.stanford.edu/pdf/returning\\_return\\_register.pdf](http://ual.stanford.edu/pdf/returning_return_register.pdf)) in order to confer their degree; or

3. if all degree requirements have been completed and student requires a registration status to graduate, but will not be using University resources or housing.

Coterm students are only eligible for the Graduation Quarter special registration status if they are conferring both the undergraduate and graduate degree in the same quarter. Undergraduates may be eligible for Graduation Quarter status in these three situations only if the student has completed all graduation requirements and will not be utilizing University resources, including housing. The deadline for the completed Graduation Quarter petition is the Preliminary Study List deadline of the applicable quarter.

withdraw their graduation applications or fail to meet degree requirements must reapply to graduate in a subsequent term.

Stanford University awards no honorary degrees.

## MINIMUM PROGRESS FOR UNDERGRADUATES

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

## CONFERRAL OF DEGREES

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

Students must apply for conferral of an undergraduate or graduate degree by filing an Application to Graduate by the deadline for each term. The deadlines are published in the Academic Calendar. A separate application must be filed for each degree program and for each conferral term. Applications are filed through Axess, the online service which allows students to update their administrative/academic records.

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

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

Students who wish to withdraw a request for conferral or make changes to the Application to Graduate should notify the Student Services Center in writing through the Withdrawal of Application to Graduate Form or other appropriate form. Students who



# GRADUATE DEGREES

## GENERAL REQUIREMENTS

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

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

### ENROLLMENT REQUIREMENTS

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

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

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

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

### LEAVES OF ABSENCE (GRADUATE)

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

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

Students on leave may complete course work for which an 'Incomplete' grade was awarded in a prior term and are expected to comply with the maximum one-year time limit for resolving incompletes; a leave of absence does not stop the clock on the time limit for resolving incompletes.

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

### VOLUNTARY LEAVES OF ABSENCE

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

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

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

### INVOLUNTARY LEAVES OF ABSENCE

An involuntary leave of absence can be imposed in circumstances in which a student:

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

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

## DISCONTINUATION AND REINSTATEMENT

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

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

Students who fail to be either enrolled by the final study list deadline or approved for a leave of absence by the start of a term or after a voluntary withdrawal are required to apply for reinstatement through the Graduate Admissions office before they can return to the same degree program. Students whose master's program or doctoral candidacy has expired must petition to have extensions of their programs or candidacy approved by their departments before reinstatement may be approved.

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

Reinstatement information is available from the Graduate Admissions office. A fee is required. Reinstatement applications must be submitted prior to the first day of the term for which re-enrollment is requested if the student is registering for courses.

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

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

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

## CHILDBIRTH ACCOMMODATION POLICY

Women graduate students, including students in professional schools, anticipating or experiencing a birth are eligible for an academic accommodation period of up to two consecutive academic quarters (in total) before and after the birth, during which the student may postpone course assignments, examinations, and other academic requirements. During this period, they are eligible for full-time enrollment and retain access to Stanford facilities, Cardinal Care, and Stanford housing. Such students are granted an automatic one quarter extension of University and departmental requirements and academic milestones, with the possibility of up to three quarters by petition under unusual circumstances. Women graduate students supported by fellowships, teaching assistantships, and/or research assistantships are excused from regular TA or RA duties for a period of six weeks during which they continue to receive support. Students do not receive a stipend or salary if none was received previously, but are eligible for the academic accommodation period and the one quarter extension of academic milestones. For more information and a complete statement of the policy, see <http://stanford.edu/group/gap/5-9>.

## RESIDENCY POLICY FOR GRADUATE STUDENTS

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

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

Students eligible for Veterans Affairs educational benefits should refer to "Veterans' Educational Benefits" in the "Admissions and Financial Aid" section of this bulletin.

It is Stanford University's general policy that units are applicable toward only one degree. Units may not normally be duplicated or double-counted toward the residency requirement for more than one degree. Exceptions to this general policy for specified combinations of degree types, known as Joint Degree Programs, may be approved by agreement of the Faculty Senate and the deans of the schools affected, with review by the Committee on Graduate Studies. See the "Joint Degree Programs" section of this bulletin for additional information.

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

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

This policy is effective for students who enter graduate programs beginning in the Autumn Quarter of the 2001-02 academic year. For information about the residency policy in effect for students who entered prior to Autumn Quarter 2001, see the *Stanford Bulletin* 2000-01.

## UNIVERSITY MINIMUM RESIDENCY REQUIREMENTS FOR GRADUATE DEGREES

Degree Type <sup>1</sup>	Minimum # of Units	Maximum Allowable External Transfer Units
M.A., M.S., M.F.A., M.L.A.	45	0 <sup>4</sup>
Engineer <sup>2</sup>	90	45
M.B.A., M.P.P. <sup>3</sup>	90	0 <sup>4</sup>
Ph.D., D.M.A. <sup>5</sup>	135	45
M.D.	235	90
J.D. <sup>6,7</sup>	109	45
M.L.S., L.L.M., J.S.M. <sup>7</sup>	35	0 <sup>4</sup>
J.S.D. <sup>7</sup>	44	0 <sup>4</sup>

1. The University has authorized the granting of the M.A.T., Ed.S. and Ed.D degrees, but they are not being offered.

- Up to 45 units completed at Stanford toward a M.A. or M.S. degree or accepted as transfer credit in an Engineering discipline may be used toward the 90 unit residency requirement for the Engineer degree. At least 45 units of work at Stanford are necessary to complete the 90 residency units for the Engineer degree.
- Enrollment in the M.P.P. program is limited to candidates who have earlier been accepted to another Stanford graduate degree program.
- Students eligible for Veterans Affairs educational benefits should refer to the Veterans Benefits section of “Admissions and Financial Aid” in this bulletin.
- Up to 45 units completed at Stanford toward a M.A. or M.S. degree or accepted as transfer credit may be used toward the 135 unit residency requirement for the Ph.D. or D.M.A. degree. At least 90 units of work at Stanford are necessary to complete the 135 residency units for the Ph.D. or D.M.A. degree.
- The Academic Senate approved these residency requirements on February 4, 2010, effective for the 2009-10 academic year.
- J.D. students entering prior to the Autumn Quarter 2009-10 must take the equivalent of 86 semester units.

### COTERMINAL PROGRAMS RESIDENCY REQUIREMENT

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

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

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

*Tuition Rate for Graduate Engineering*—The tuition rate for graduate Engineering is higher than for undergraduate programs. Students enrolled in a coterminal program in the School of Engineering begin to pay the higher graduate Engineering tuition rate after 12 full-tuition undergraduate quarters.

Coterminal students in the School of Engineering, with two undergraduate degrees, are assessed the graduate Engineering tuition rate in the quarter after they have been enrolled for 15 full-tuition quarters.

Engineering coterminal students would also start paying the graduate Engineering tuition rate if any undergraduate degree is conferred or if they are granted any graduate aid. Once charged under the graduate Engineering tuition schedule, the tuition will not revert thereafter to the undergraduate rate.

For additional information on the coterminal bachelor’s/master’s program, see Coterminal Bachelor’s and Master’s Degrees in the “Undergraduate Degrees and Programs” section of this bulletin.

### GRADUATE RESIDENCY TRANSFER CREDIT

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

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

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

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

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

### JOINT DEGREE PROGRAMS

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

An approved JDP includes a set of agreements between the participating programs and schools about matters such as admissions, advising, curricula, and tuition. In a JDP, a specified number of units may be double-counted toward the minimum University residency requirements for both degrees, reducing the total number of residency units required to complete both degrees. Application deadlines for each program or degree apply. Students must be admitted to the JDP no later than the study list deadline of the term prior to the term of expected degree conferral. In a JDP, both degrees are conferred concurrently since the units required for each degree are linked to the completion of both degrees. The sole exception is the J.D. degree which may be awarded prior to the second degree.

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

- Juris Doctor with a Master of Arts* in Economics, Education, History, Public Policy, or the Division of International Comparative and Area Studies: African Studies, East Asian Studies, International Policy Studies, Latin American Studies, and Russian, East European and Eurasian Studies (J.D./M.A.)
- Juris Doctor with a Master of Science* in Bioengineering, Electrical Engineering, Computer Science, Health Research and Policy, Interdisciplinary Program in Environment & Resources, or Management Science and Engineering (J.D./M.S.)
- Juris Doctor with a Master in Public Policy* (J.D./M.P.P)
- Juris Doctor with a Doctor of Philosophy* in Bioengineering, Economics, History, Interdisciplinary Program in Environment

and Resources, Management Science and Engineering, Philosophy, Political Science, Psychology, or Sociology (J.D./Ph.D.)

- *Juris Doctor with a Master of Business Administration* (J.D./M.B.A.)
- *Master of Business Administration with a Master of Arts in Education* (M.B.A./M.A.)
- *Master of Business Administration with a Master of Science in Interdisciplinary Program in Environment and Resources* (M.B.A./M.S.)
- *Master of Business Administration with a Master of Public Policy* (M.B.A./M.P.P.)
- *Master of Arts in International Policy Studies with a Master in Public Policy* (M.A./M.P.P.)
- *Master of Science in Management Science and Engineering with a Master in Public Policy* (M.S./M.P.P.)
- *Doctor of Philosophy in Economics, Education, Psychology, or Sociology with a Master in Public Policy* (Ph.D./M.P.P.)

Specific requirements for the joint degree programs are available from the participating departments and schools and at <http://registrar.stanford.edu/students/academics/jdp.htm>.

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

## GRADUATE UNITS REQUIREMENTS

The University's expectation is that the units counted towards all graduate degrees are primarily in graduate courses. All units must be in courses at or above the 100 level and at least 50 percent of those must be courses designated primarily for graduate students (typically at least the 200 level). Units earned in courses below the 100 level may not be counted towards the minimum unit requirement for the master's degree. Department specifications for the level of course work accepted for a particular master's degree program may be higher than the University's specifications.

## MINIMUM PROGRESS REQUIREMENTS FOR GRADUATE STUDENTS

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

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

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

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

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

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

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

## GUIDELINES FOR DISMISSAL OF GRADUATE STUDENTS FOR ACADEMIC REASONS

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

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

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

"Student Academic Grievance Procedure" section of this bulletin.

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

## ADDITIONAL SPECIFICS FOR DEGREES WITH CANDIDACY

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

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

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

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

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

## TERMINAL GRADUATE REGISTRATION (TGR)

Doctoral students who have been admitted to candidacy, completed all required courses and degree requirements other than the University oral exam and dissertation, completed 135 units or 10.5 quarters of residency (if under the old residency policy), and submitted a Doctoral Dissertation Reading Committee form, may request Terminal Graduate Registration status to complete their dissertations. Students pursuing Engineer degrees may apply for TGR status after admission to candidacy, completion of all required courses, and completion of 90 units or six quarters of

residency (if under the old residency policy). Students enrolled in master's programs with a required project or thesis may apply for TGR status upon completion of all required courses and completion of 45 units. Students with more than one active graduate degree program must be TGR-eligible in all programs in order to apply for TGR status.

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

Each quarter, TGR students must enroll in the 801 (for master's and Engineer students) or 802 (for doctoral students) course in their department for zero units, in the appropriate section for their adviser. TGR students register at a special tuition rate: \$2,517 per quarter in 2010-11. TGR students may enroll in up to 3 units of course work per quarter at this tuition rate. Within certain restrictions, TGR students may enroll in additional courses at the applicable unit rate. The additional courses cannot be applied toward degree requirements since all degree requirements must be complete in order to earn TGR status. See the "Minimum Progress Requirements for Graduate Students" of this bulletin for information about satisfactory progress requirements for TGR students.

## GRADUATE TUITION ADJUSTMENT

Graduate students who need only 3 to 7 remaining units to complete degree requirements or to qualify for TGR status, may register for one quarter on a unit basis (3 to 7 units) to cover the deficiency. This status may be used only once during a degree program. The Graduate Tuition Adjustment may also be requested by students whom have been approved by the Disability Resource Center or who have an approved Childbirth Accommodation.

## GRADUATION QUARTER STATUS

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

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

Students on graduation quarter are registered at Stanford and, therefore, have the rights and privileges of registered students. Graduation Quarter status may be used only once during a degree program. There is a tuition rate of \$100 for the graduation quarter.

## CONFERRAL OF DEGREES

Upon recommendation to the Senate of the Academic Council by the faculty of the relevant departments or schools and the Committee on Graduate Studies, degrees are awarded four times each year, at the conclusion of Autumn, Winter, Spring, and Summer terms. All diplomas, however, are prepared and

distributed after degree conferral in accordance to the distribution dates listed on the Registrar's Office web site at <http://registrar.stanford.edu/students/records/diplomas.htm>.

Students must apply for conferral of a graduate degree by filing an Application to Graduate in Axess by the deadline for each term. The deadlines are available in the Academic Calendar. A separate application must be filed for each degree program and for each conferral term.

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

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

Students who wish to withdraw a request for conferral or make changes to the Application to Graduate should submit the Withdrawal of Application to Graduate form to the Student Services Center by the late application to graduate deadline. Students who withdraw their graduation applications or fail to meet degree requirements must reapply to graduate in a subsequent term.

Stanford University awards no honorary degrees.

## CHANGES OF DEGREE PROGRAMS

Graduate students are admitted to Stanford for a specific degree program. Students who have attended Stanford for at least one term and who are currently enrolled may submit a Graduate Program Authorization Petition to make one of the following changes: (1) change to a new degree program in the same department; (2) change to a new degree program in a different department; (3) add a new degree program in the same or a different department to be pursued with the existing program. Coterminal students must have the bachelor's degree conferred before adding a second advanced degree program. Summer term enrollment is optional for students beginning a new degree program in the Autumn term provided that they have been enrolled the prior Spring term.

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

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

Students who wish to terminate study in a graduate program should submit a properly endorsed Request to Permanently Withdraw from Degree Program form to the Student Services Center. To return to graduate study thereafter, the student is

required to apply for reinstatement (if returning to the same degree program) or admission (if applying to a different program). Both applications require payment of a fee.

## DEGREE-SPECIFIC REQUIREMENTS

### MASTER OF ARTS AND MASTER OF SCIENCE

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

### MASTER'S PROGRAM PROPOSAL

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

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

### TIME LIMIT FOR COMPLETION OF THE MASTER'S DEGREE

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

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

### MASTER IN PUBLIC POLICY

The degree of Master in Public Policy (M.P.P.) is a two-year program leading to a professional degree. Enrollment in the M.P.P. program is limited to candidates who have earlier been accepted to another Stanford graduate degree program. In addition to completing the general requirements for advanced degrees and the program requirements specified in the "Public Policy" section of this bulletin, candidates for the degree of Master of Public Policy (M.P.P.) must outline an acceptable program of study on the

Master's Degree Program Proposal and complete their degrees within the time limit for completion of the master's degree.

## **MASTER OF BUSINESS ADMINISTRATION**

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

## **MASTER OF FINE ARTS**

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

## **MASTER OF LIBERAL ARTS**

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

## **ENGINEER**

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

## **CANDIDACY**

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

## **THESIS**

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

The deadline for submission of theses for degree conferral in each term is specified by the University academic calendar. If submitting via the paper process, three copies of the thesis, bearing the approval of the adviser under whose supervision it was prepared, must be submitted to the Office of the University Registrar before the quarterly deadline listed on the University academic calendar. A fee is charged for binding copies of the paper thesis. If submitting via the electronic process the signed thesis signature page and title page must be submitted to the Student Services Center and one final copy of the thesis must be uploaded, and approved by the Final Reader, on or before the

quarterly deadline indicated in the University's academic calendar. There is no fee charged for the electronic submission process.

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

## **MASTER OF LEGAL STUDIES**

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

## **MASTER OF LAWS**

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

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

## **MASTER OF THE SCIENCE OF LAW**

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

The degree is primarily designed for those qualified students who hold a J.D. or its equivalent and who are at the Stanford Law School for independent reasons (for example, as teaching fellows) and who wish to combine work toward the degree with their primary academic activities. Specially qualified lawyers, public officials, academics, and other professionals who have worked outside the United States may apply for the degree through the Stanford Program in International Legal Studies (SPILS). The Stanford Law School Student Handbook (pdf) provides detailed information on degree requirements.

## **DOCTOR OF JURISPRUDENCE**

The degree of Doctor of Jurisprudence (J.D.) is conferred on candidates who satisfactorily complete courses in law totaling the number of units required under the current Faculty Regulations of the Stanford Law School over not less than three academic years and who otherwise have satisfied the requirements of the University and the Stanford Law School. The Stanford Law School Student Handbook (pdf) provides detailed information on degree requirements.

## **DOCTOR OF THE SCIENCE OF LAW**

The degree of the Doctor of the Science of Law (J.S.D.) is conferred upon candidates who hold a J.D. or its equivalent, who complete one academic year in residence, and who, as a result of independent legal research, present a dissertation that is, in the opinion of the faculty of the Stanford Law School a contribution to

knowledge. Such work and dissertation must conform to the rules of the Stanford Law School and the University for the dissertation and the University Oral Examination, as described in the "Doctor of Philosophy" section of this bulletin.

Candidacy is limited to students of exceptional distinction and promise. The Stanford Law School Student Handbook (pdf) provides detailed information on degree requirements.

## DOCTOR OF MUSICAL ARTS

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

## DOCTOR OF MEDICINE

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

## DOCTOR OF PHILOSOPHY

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

## CANDIDACY

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

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

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

## TIME LIMIT FOR COMPLETION OF A DEGREE WITH CANDIDACY

All requirements for the degree must be completed before candidacy expires. Candidacy is valid for five years unless terminated by the department (for example, for unsatisfactory progress). The time limit is not automatically extended by a student's leave of absence. All requests for extension, whether prompted by a leave or some other circumstance, must be filed by the student before the conclusion of the program's time limit. Departments are not obligated to grant an extension. Students may receive a maximum of one additional year of candidacy per extension. Extensions require review by the department of a dissertation progress report, a timetable for completion of the

dissertation, any other factors regarded as relevant by the department, and approval by the department; such approval is at the department's discretion.

## TEACHING AND RESEARCH REQUIREMENTS

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

## FOREIGN LANGUAGE REQUIREMENT

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

## UNIVERSITY ORAL EXAMINATION

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

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

The University Oral Examination Committee consists of at least five Stanford faculty members: four examiners and the committee chair from another department. All members are normally on the Stanford Academic Council, and the chair must be a member. Emeritus faculty are also eligible to serve as examiners or chair of the committee. (A petition for appointment of an examining committee member who is not on the Academic Council may be approved by the chair of the department if that person contributes an area of expertise that is not readily available from the faculty.) The chair of the examining committee may not have a full or joint appointment in the adviser's or student's department, but may have a courtesy appointment in the department. The chair can be from the same department as any other member(s) of the examination committee and can be from the student's minor department provided that the student's adviser does not have a full or joint appointment in the minor department.

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

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

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

The candidate passes the examination if the examining committee casts four favorable votes out of five or six, five favorable votes out of seven, or six favorable votes out of eight. Five members present and voting constitute a quorum. If the



committee votes to fail a student, the committee chair sends within five days a written evaluation of the candidate's performance to the major department and the student. Within 30 days and after review of the examining committee's evaluation and recommendation, the chair of the student's major department must send the student a written statement indicating the final action of the department.

## DISSERTATION

An approved doctoral dissertation is required for the Ph.D. and J.S.D. degrees. The doctoral dissertation must be an original contribution to scholarship or scientific knowledge and must exemplify the highest standards of the discipline. If it is judged to meet this standard, the dissertation is approved for the school or department by the doctoral dissertation reading committee. Each member of the reading committee signs the signature page of the dissertation to certify that the work is of acceptable scope and quality. One reading committee member reads the dissertation in its final form and certifies on the Certificate of Final Reading that department and University specifications have been met.

Dissertations must be in English. Approval for writing the dissertation in another language is normally granted only in cases where the other language or literature in that language is also the subject of the discipline. Such approval is routinely granted for dissertations in the Division of Literatures, Cultures, and Languages, in accordance with the policy of the individual department. Dissertations written in another language must include an extended summary in English.

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

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

## DOCTORAL DISSERTATION READING COMMITTEE

The doctoral dissertation reading committee consists of the principal dissertation adviser and two other readers. At least one member must be from the student's major department. Normally, all members are on the Stanford Academic Council. The student's department chair may, in some cases, approve the appointment of a reader who is not on the Academic Council, if that person is particularly well qualified to consult on the dissertation topic and holds a Ph.D. or equivalent foreign degree. Former Stanford Academic Council members, emeritus professors, and non-Academic Council members may thus on occasion serve on a reading committee. If they are to serve as the principal dissertation adviser, however, the appointment of a co-adviser who is currently on the Academic Council is required. A non-Academic Council member (including emeritus professors and former Academic Council members) may replace only one of three required members of dissertation reading committees.

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

## PH.D. MINOR

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

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

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

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

A Ph.D. minor form outlining a program of study must be approved by the major and minor departments. This form is submitted at the time of admission to candidacy and specifies whether representation from the minor department on the University oral examination committee is required.

# ADVISING AND CREDENTIALS

## ADVISING

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

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

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

adviser. This may entail some modification of the student's research project.

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

## TEACHING CREDENTIALS

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

Current Stanford undergraduates wishing to complete the requirements for a teaching credential should apply to the coterminal program at the School of Education. All other applicants should apply directly to the Stanford Teacher Education Program (STEP) at the School of Education.

# ACADEMIC POLICIES AND STATEMENTS

## COMPLIANCE WITH UNIVERSITY POLICIES/REGISTRATION HOLDS

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

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

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

## NOTIFICATION/OBLIGATION TO READ EMAIL

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

## REGISTRATION AND STUDY LISTS

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

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

## STUDY LIST CHANGES

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

Courses or units may be dropped by students through the end of the third week of classes, without any record of the course remaining on the student's transcript. No drops are permitted after this point.

A student may withdraw from a course after the final study list deadline through the end of the eighth week of each quarter. In this case, a grade notation of 'W' (withdraw) is automatically recorded on the student's transcript for that course. Students who do not officially withdraw from a class by the end of the eighth week are assigned the appropriate grade or notation by the instructor to reflect the work completed.

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

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

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

## REPEATED COURSES

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

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

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

## AMOUNT OF WORK

The usual amount of work for undergraduate students is 15 units per quarter; 180 units (225 for dual degree students) are required for graduation. Registration for fewer than 12 units is rarely permitted and may cause the undergraduate to be ineligible for certification as a full-time student. The maximum is 20 units (21 if the program includes a 1-unit activity course). Requests for exception to the maximum may be considered for compelling

reasons, the approval of which may include conditions or restrictions. A past superior academic performance is not considered to be sufficient justification for exceeding the maximum. Petitions for programs of fewer than 12 or more than 20 units must be submitted to the Office of the Vice Provost for Undergraduate Education, Sweet Hall, first floor. For additional information regarding satisfactory academic progress, refer to the "Academic Standing" section of this bulletin.

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

## UNIT OF CREDIT

Every unit for which credit is given is understood to represent approximately three hours of actual work per week for the average student. Thus, in lecture or discussion work, for 1 unit of credit, one hour per week may be allotted to the lecture or discussion and two hours for preparation or subsequent reading and study. Where the time is wholly occupied with studio, field, or laboratory work, or in the classroom work of conversation classes, three full hours per week through one quarter are expected of the student for each unit of credit; but, where such work is supplemented by systematic outside reading or experiment under the direction of the instructor, a reduction may be made in the actual studio, field, laboratory, or classroom time as seems just to the department.

## AUDITING

No person shall attend any class unless he or she is a fully registered student enrolled in the course or meets the criteria for auditors. Auditors are not permitted in courses that involve direct participation such as language or laboratory science courses, field work, art courses with studio work, or other types of individualized instruction. Auditors are expected to be observers rather than active participants in the courses they attend, unless the instructors request attendance on a different basis. Stanford does not confer credit for auditing, nor is a permanent record kept of courses audited. Students who have been suspended are not permitted to audit.

Auditors may not join classes for the first time after the University's final study list deadline. Auditors are not eligible for other University services or privileges including housing, health insurance (Cardinal Care), Vaden clinical services, and the University health plan. The University Registrar reviews for approval any other services or privileges that may be sought.

In all cases of auditing, the instructor's prior consent and the Office of the University Registrar's prior approval are required. Further information is available from the Office of the University Registrar.

## RELIGIOUS HOLIDAYS

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

## LEAVES OF ABSENCE AND REINSTATEMENT (UNDERGRADUATE)

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

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

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

### VOLUNTARY LEAVE

Students have the option of taking a voluntary leave of absence for up to one year upon filing a petition to do so with the Office of the University Registrar and receiving approval. The leave may be extended for up to one additional year provided the student files (before the end of the initial one-year leave) a petition for the leave extension with the Office of the University Registrar and receives approval. Undergraduates who take an approved leave of absence while in good standing may enroll in the University for the subsequent quarter with the privileges of a returning student. However, the University may condition its approval of a petition for leave of absence on the student's meeting such requirements as the University deems appropriate in the individual case for the student to be eligible to return (such as, in the case of a leave for medical reasons, proof of treatment and/or an interview with a provider at Vaden Health Center or Counseling and Psychological Services or its designee).

Undergraduates who wish to withdraw from the current quarter, or from a quarter for which they have registered in advance and do not wish to attend, must file a leave of absence petition with and receive approval from the Office of the Vice Provost for Undergraduate Education, via the office of Undergraduate Advising and Research (UAR), Sweet Hall, first floor. Information on tuition refunds is available in the "Refunds" section of this bulletin.

### INVOLUNTARY LEAVE

An involuntary leave of absence can be imposed in circumstances in which a student:

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

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

Life publishes the full Involuntary Leave of Absence Policy on its web site at <http://studentaffairs.stanford.edu/studentlife/involuntary-leave>.

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

### REINSTATEMENT

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

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

Leaves of absence for and reinstatements of graduate students are addressed in the "Graduate Degrees" section of this bulletin.

## RECORDS

### TRANSCRIPTS

Transcripts of Stanford records are issued by the Office of the University Registrar upon the student's request when submitted in writing or via the online Axess system. There is no charge for official transcripts. The courses taken in one quarter do not appear on any student's transcript until after the final study list deadline. The University reserves the right to withhold transcripts or records of students with unmet obligations to the University.

### CERTIFICATION OF ENROLLMENT OR DEGREES

The Office of the University Registrar can provide written confirmation of registration, enrollment, or degree status upon request by the student. The printed certification can be used whenever enrollment or degree verification is required for car insurance, loan deferments, medical coverage, scholarship purposes, and so on. Using Axess, students are able to print an official certification at no charge. Certification of full- or part-time enrollment cannot be provided until after the study list is filed for the quarter in question.

Degrees are conferred quarterly, but diplomas are issued in accordance to the distribution dates listed on the Registrar's Office web site at <http://studentaffairs.stanford.edu/registrar/students/diplomas>. After conferral, the degree awarded to a student can be verified by contacting the Office of the University Registrar for an official

transcript, or official degree certification form. Requests for transcripts or degree certifications must be made by the student in writing or through Axess.

Stanford University has authorized the National Student Clearinghouse (NSC) to act as its agent for purposes of third party enrollment and degree verification. The NSC will be able to verify degrees and enrollment for only those students who have not placed a privacy block on their academic record. The student's name when enrolled, Social Security Number or Student ID, and date of birth will be required for identification purposes and enrollment or degree verification. All third parties should contact the National Student Clearinghouse by phone or visit their web site for current enrollment and degree verification information, instructions, and fees.

Full-time enrollment for undergraduates is considered to be enrollment in a minimum of 12 units of course work per quarter at Stanford. Work necessary to complete units from previous quarters does not count toward the 12 units necessary for full-time status in the current quarter. Enrollment in 8 to 11 units is considered half-time enrollment. Enrollment in 1 to 7 units is considered less-than-half-time, or part-time enrollment. During Summer Quarter, all graduate students who hold appointments as research or teaching assistants are considered to be enrolled on at least a half-time basis.

All undergraduates validly registered at Stanford are considered to be in good standing for the purposes of enrollment certification.

Stanford uses the following definitions (in units) to certify the enrollment status of graduate and professional students each quarter:

	<i>Graduate</i>	<i>Business (M.B.A., Sloan)</i>	<i>Law</i>	<i>Medicine (M.D.)</i>
Full time:	8 or more	11 or more	9 or more	9 or more
Half time:	6 or 7	6-10	6-8	6-8
Part time:	5 or fewer	5 or fewer	5 or fewer	5 or fewer

TGR students enrolled in a course numbered 801 or 802 are certified as full time. Graduate students on an approved Graduation Quarter status are certified as full time.

As a general proposition, only information classified by the University as directory information (see the "Directory Information" section of this bulletin) can be confirmed to inquirers other than the student.

## PRIVACY OF STUDENTS RECORDS

### NOTIFICATION OF RIGHTS UNDER FERPA

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

1. The right to inspect and review the student's education records within 45 days of the date the University receives a request for access.

The student should submit to the Registrar, Dean, chair of the department, or other appropriate University official, a written request that identifies the record(s) the student wishes to inspect. The University official will make arrangements for access and notify the student of the time and place where the records may be inspected. If the records are not maintained by the University official to whom the request was submitted, that official shall advise the student of the correct official to whom the request should be addressed.

2. The right to request the amendment of the student's education records that the student believes are inaccurate, misleading, or otherwise in violation of the student's privacy rights under FERPA.

A student may ask the University to amend the record that he or she believes is inaccurate or misleading. The student should write the University official responsible for the record (with a copy to the University Registrar), clearly identify the

part of the records he or she wants changed, and specify why it should be changed.

If the University decides not to amend the record as requested by the student, the University will notify the student of the decision and advise the student of his or her right to a hearing regarding the request for amendment.

Additional information regarding the hearing procedures is provided to the student when notified of the right to a hearing.

3. The right to consent to disclosures of personally identifiable information contained in the student's education records, except to the extent that FERPA authorizes disclosure without consent.

FERPA contains various exceptions to the general rule that the University should not disclose education records without seeking the prior written consent of the student. The following circumstances are representative of those in which education records (and information drawn from education records) may be disclosed without the student's prior written consent:

- a. Upon request, the University may release Directory Information (see the "Directory Information" section of this bulletin).
  - b. School officials who have a legitimate educational interest in a student's education record may be permitted to review it. A school official is: a person employed by the University in an administrative, supervisory, academic or research, or support staff position (including law enforcement unit personnel and health staff); a person or company with whom the University has contracted (such as an attorney, auditor, or collection agent); a person serving on the Board of Trustees; or a student or volunteer serving on an official committee (or representing a recognized student group), such as a disciplinary or grievance committee, or assisting another school official in performing his or her tasks. A school official has a legitimate educational interest if the official needs to review an education record in order to fulfill his or her responsibility to Stanford or to the student.
  - c. The University discloses education records without consent to officials of another school, in which a student seeks or intends to enroll, upon request of officials at that other school.
  - d. The University may choose to disclose education records (and information drawn from education records) to either supporting parent(s) or guardian(s) where the student is claimed as a dependent under the Internal Revenue Code.
  - e. The University may inform persons including either parent(s) or guardian(s) when disclosure of the information is necessary to protect the health or safety of the student or other persons.
  - f. For students under the age of 21, the University may notify either parent(s) or guardian(s) of a violation of any law or policy relating to the use of alcohol or controlled substances.
  - g. The University must provide records in response to lawfully issued subpoenas, or as otherwise compelled by legal process.
4. The right to file a complaint with the U.S. Department of Education concerning alleged failures by the University to comply with the requirements of FERPA.

The name and address of the office that administers FERPA is: Family Policy Compliance Office, U.S. Department of Education, 400 Maryland Avenue, SW, Washington, DC 20202-4605.

### SHARING INFORMATION WITH PARENTS

Students are encouraged to maintain an ongoing, open dialogue with parents throughout their careers at Stanford about academic progress and personal development. Most student difficulties are resolved at Stanford without involving parents. The University

does recognize, however, that there are some exceptional situations where parental involvement may be appropriate to assist a student through a difficult circumstance. Under those circumstances, Stanford may (but is not required to) choose to disclose information to parents if permitted by law.

Under the Family Educational Rights and Privacy Act (FERPA), Stanford is permitted to disclose information drawn from education records to parents if one or more parent claims the student as a dependent for federal tax purposes. Some laws, especially those relating to medical and mental health care, prohibit the disclosure of information without the student's consent, even where the student is a tax dependent.

## DIRECTORY INFORMATION

The University regards the following items of information as "directory information," that is, information that the University may make available to any person upon specific request (and without student consent):

- Name\*
- Date of birth
- Place of birth
- Directory addresses and telephone numbers
- Email addresses
- SUNet ID (as opposed to Stanford Student ID Number)\*
- Mailing addresses
- Campus office address (for graduate students)
- Secondary or permanent mailing addresses
- Residence assignment and room or apartment number
- Specific quarters or semesters of registration at Stanford
- Stanford degree(s) awarded and date(s)
- Major(s), minor(s), and field(s)
- University degree honors
- Student theses and dissertations\*
- Participation in officially recognized sports or activities\*
- Weight and height of members of athletic teams\*
- Institution attended immediately prior to Stanford
- ID card photographs

For more information, see Stanford's FERPA web page at <http://studentaffairs.stanford.edu/registrar/students/ferpa>.

Students may prohibit the release of any of the items listed above (except those with an "\*") by designating which items should not be released on the Privacy function of Axess. Students may prohibit the release of all directory information listed above after an appointment with the Office of the University Registrar to discuss the ramifications of this action. Student theses and dissertations can be restricted through the publishing options and embargo settings students select during submission.

Students, faculty, and others with questions regarding student records should contact the Office of the University Registrar.

## CONSENT TO USE OF PHOTOGRAPHIC IMAGES

Registration as a student and attendance at or participation in classes and other campus and University activities constitutes an agreement by the student to the University's use and distribution (both now and in the future) of the student's image or voice in photographs, video or audio capture, or electronic reproductions of such classes and other campus and University activities.

If any student in a class where such photographing or recording is to take place does not wish to have his or her image or voice so used, the student should raise the matter in advance with the instructor.

## STANFORD UNIVERSITY ID NUMBER

The Stanford University ID Number is assigned to each student's academic record for unique identification. It is printed on the Stanford University ID card and on documents distributed by the Office of the University Registrar and other administrative

offices. It is a violation of University policy to use another's Stanford University ID Number to misrepresent yourself in any way; such use can result in loss of student privileges or other disciplinary action.

## SUNET ID

The SUNet ID provides access to the Stanford University Network (SUNet) and its services, and identifies authorized users of these services. Each member of the Stanford electronic community creates a unique SUNet ID and SUNet ID password for him/herself. SUNet IDs provide:

- Axess services
- Email service
- Storage space within Stanford's distributed file system
- Usenet newsgroups
- World wide web services, including serving of personal web pages on the Leland system and access to Stanford Web Resources

The SUNet ID together with SUNet ID password may serve in place of a signature on electronic forms. The SUNet ID password must remain confidential. It is a violation of University policy to use another's SUNet ID or SUNet ID password to misrepresent yourself in any way; such use can result in loss of student privileges or other disciplinary action.

## IDENTIFICATION CARDS

The ID card serves as an identification card, an electronic key, and a debit card, allowing cardholders to use services for which they have privileges, to enter certain facilities, and to make purchases.

ID cards are available to registered students, faculty, academic staff, and regular staff. Students obtain their ID cards at the Student Services Center, Tresidder Union, 459 Lagunita Drive, 2nd Floor (650) 498-CARD). Faculty and staff obtain ID cards at George Forsythe Hall, 275 Panama Street, Room 190 (650-498-CARD).

Courtesy ID cards are available for spouses and domestic partners of the Stanford professoriate, academic staff, regular staff, and students. These cards may be obtained from the Stanford Card ID Office at Forsythe Hall. The spouse/partner courtesy ID card enables use of some campus services during terms for which the student is registered.

Visiting Scholars who are on campus for a minimum of one quarter and contribute to Stanford's mission by teaching or collaborating on Stanford research also receive ID cards and campus privileges during their stay on campus. These cards may be obtained from the Stanford Card ID Office at Forsythe Hall.

Library access and borrowing privileges are reserved for the Stanford professoriate, academic staff, regular staff, students, and others closely associated with the University with a need for such access.

ID cards bear a photograph of the cardholder. This photograph is maintained in an online database and, as stated in the "Directory Information" section of this bulletin, is available for classroom, student residence, and other use upon specific request and without student consent unless the student has designated that the photograph not be released. Photographs can be designated as private using the Privacy function of Axess.

Misuse of the ID card may result in discipline or administrative action.

For more information, see <http://campuscard.stanford.edu>. For the complete policy on Stanford Identification Cards, see the Administrative Guide, 28-4 (pdf).

# EXAMINATIONS

## MIDTERMS

Classes that give midterm examinations outside of regular class hours must:

1. announce the date and time during the first week of the academic quarter, and
2. provide reasonable alternative times to those students for whom these announced times are not convenient.

According to Honor Code interpretations and applications, different examinations may be given at these alternative times.

## END-QUARTER POLICY STATEMENT

The End-Quarter Period is a time of reduced social and extracurricular activity preceding final examinations. Its purpose is to permit students to concentrate on academic work and to prepare for final examinations.

In Autumn, Winter, and Spring quarters, End-Quarter starts seven full days (to begin at 12:01 a.m.) prior to the first day of final exams. In Spring Quarter, final examinations begin on Friday; no classes are held on Thursday, the day before. In Summer Quarter, this consists of the weekend and the four class days preceding the final examinations, which take place on Friday and Saturday of the eighth week. (See the *Time Schedule* for dates.)

During the End-Quarter Period, classes are regularly scheduled and assignments made; this regular class time is used by instructors in whatever way seems best suited to the completion and summation of course material. Instructors should neither make extraordinary assignments nor announce additional course meetings in order to "catch up" in course presentations that have fallen behind. They are free, however, and even encouraged to conduct optional review sessions and to suggest other activities that might seem appropriate for students preparing for final examinations.

No graded homework assignments, mandatory quizzes, or examinations should be given during the End-Quarter Period except:

1. In classes where graded homework assignments or quizzes are routine parts of the instruction process.
2. In classes with laboratories where the final examination will not test the laboratory component. In such a case, the laboratory session(s) during the End-Quarter Period may be used to examine students on that aspect of the course.

Major papers or projects about which the student has had reasonable notice may be called due in the End-Quarter Period.

Take-home final examinations, given in place of the officially scheduled in-class examination, may be distributed in the End-Quarter Period. Although the instructor may ask students to return take-home examinations early in the final examination period, the instructor may not call them due until the end of the regularly scheduled examination time for that course. Such a policy respects the principle that students' final examinations are to be scheduled over a period of several days.

End-quarter examinations may not be held during this period. This policy preserves the instruction time for courses and protects the students' opportunities for extensive review and synthesis of their courses.

During the End-Quarter Period, no musical, dramatic, or athletic events involving compulsory student participation may be scheduled, unless approved as exceptions by the Committee on Undergraduate Standards and Policy (C-USP), nor may routine committee meetings be scheduled (such as those of the ASSU, the Senate of the Academic Council, or the committees of the President of the University) when such meetings normally would involve student participation.

*Note*—Students who believe that there are faculty who are violating End-Quarter policy should contact the Office of the University Registrar.

## END-QUARTER EXAMINATIONS

Examinations are part of the process of education at the same time that they are a means to measure the student's performance in course work. Their structure, content, frequency, and length are to be determined in accordance with the nature of the course and the material presented in it, subject only to the limitations contained herein.

Great flexibility is available regarding the types of examinations that an instructor may choose to employ. Examinations, including final examinations, may be, for example, in-class essay examinations, take-home essay examinations, objective examinations, oral examinations, or appropriate substitutes such as papers or projects. Instructors may use any type of examination, paper, or project, or any combination thereof, guided only by the appropriateness of the types of examinations, papers, or projects for the material upon which the student is being examined.

When the final examination is an in-class examination, the following regulations apply:

1. A three-hour period is reserved during examination week for the final examination in each course of more than 2 units. This examination period must be available for students, but not necessarily in its entirety, if an in-class examination is given. In courses with extraordinary meeting times, such that ambiguity might exist as regards the period reserved for the final examination, the schedule should be clarified and students informed no later than the end of the second week of the quarter.
2. Examinations in 1- or 2-unit courses must be completed by the end of the last class meeting before the End-Quarter Period, except in Summer Quarter when examinations must be completed during the last regularly scheduled class session.

When the final examination or its appropriate substitute is not an in-class examination (for example, when an instructor chooses to employ a take-home examination, paper, or project in lieu of an in-class examination), the following regulations apply:

1. The schedule and format of the final examination or its appropriate substitute are made known not later than the end of the second week of the quarter and, if changed subsequently, may be only an option of the plan originally announced by the instructor.
2. Although the instructor may ask students to return take-home examinations early in the final examination period, the instructor may not call them due until the end of the regularly scheduled examination time for that course.

In submitting official Study Lists, students commit to all course requirements, including the examination procedures chosen and announced by the course instructor. In choosing courses, students should take cognizance of the official schedule of final examinations announced on the Registrar's web site at <http://studentaffairs.stanford.edu/registrar/final-exams>. Students anticipating conflicts in final examination schedules should seek to resolve these with the instructors involved before the Preliminary Study List deadline at the beginning of the quarter. If accommodation cannot be made at that time, the student should revise his or her Study List before the Final Study List deadline at the end of the third week of the quarter in order to be able to meet the required final examination.

If unforeseen circumstances prevent the student from sitting for the regularly scheduled examination, instructors should make alternative arrangements on an individual basis. Such unforeseen circumstances include illness, personal emergency, or the student's required participation in special events (for example, athletic championships) approved as exceptions by the Committee on Undergraduate Standards and Policy (C-USP). Inquiries regarding these circumstances may be directed to the Office of the Vice Provost for Undergraduate Education, Sweet Hall.

## STATEMENT CONCERNING EARLY EXAMINATIONS

Students are reminded that taking final examinations earlier than the scheduled time is a privilege, not a right. They should request this privilege only in the event of extraordinary circumstances.

Since the final examination schedule for each quarter is published annually on the Registrar's web site at the time of course selection and enrollment, students are expected to make their academic plans in light of known personal circumstances that may make certain examination times difficult for them.

In general, faculty members are discouraged from giving final examinations earlier than the published and announced times. If faculty nevertheless decide to administer early examinations, either the questions should be completely different from those on the regularly scheduled examination or the early examination should be administered in a highly controlled setting. An example of such a setting would be a campus seminar room where the examination questions would be collected along with students' work and students would be reminded of their Honor Code obligations not to share information about the examination contents. Giving students easy opportunities to abuse the integrity of an examination is unfair to honest students and inconsistent with the spirit of the Honor Code.

Academic fields differ in the degree to which early examination requests present dilemmas for faculty. If, for example, an examination format consists of a small number of essay questions, where students would be greatly advantaged by knowing the question topics, faculty should be especially reluctant to allow early examinations unless they are willing to offer totally different examinations or a different kind of academic task, for example, a final paper in lieu of an examination.

## GRADING SYSTEMS

### GENERAL UNIVERSITY GRADING SYSTEMS

The general University grading system is applicable to all of Stanford University except the Graduate School of Business, the School of Law, and M.D. students in the School of Medicine. Note that the GPA (grade point average) and rank in class are not computed under the general University grading system. Stanford does use an internal-only GPA which is based on units completed up to the time of conferral of the first bachelor's degree. This information is used for internal purposes only (including academic standing) and is not displayed on the official transcript which is sent outside the University. Most courses are graded according to the general University grading system. However, courses offered through Law, Business, and Medicine are graded according to those schools' grading systems, even in cases where students in other programs are enrolled in their classes. Note also that, as to graduate students, there may be departmental requirements as to grades that must be maintained for purposes of minimum academic progress.

### DEFINITION AND EXPLANATION OF GRADING SYSTEMS

All grades/notations for courses taken in 1995-96 or later are to be visible on student transcripts. Effective Summer Quarter 2008-09, the notation \* was changed to GNR (Grade Not Reported).

A (+,-)	Excellent
B (+,-)	Good
C (+,-)	Satisfactory
D (+,-)	Minimal pass
	Plus (+) and minus (-) may be used as modifiers with the above letter grades

NP	Not Passed
NC	No Credit (unsatisfactory performance, 'D+' or below equivalent, in a class taken on a satisfactory/no credit basis)
CR	Credit (student-elected satisfactory; A, B, or C equivalent)
S	No-option Satisfactory; A, B, or C equivalent
L	Pass, letter grade to be reported
W	Withdraw
N	Continuing course
I	Incomplete
RP	Repeated Course
*	No grade reported (effective through Spring 2008-09).
GNR	Grade not reported (effective beginning Autumn Quarter 2009-10).

### EXPLANATION

NC	The notation 'NC' represents unsatisfactory performance in courses taken on a satisfactory/no credit basis. Performance is equivalent to letter grade 'D+' or below.
NP	The notation 'NP' is used by instructors in courses taken for a letter grade that are not passed.
CR	In a course for which some students receive letter grades, the 'CR' represents performance that is satisfactory or better when the student has elected the 'CR' grading option.
S	For an activity course or a course in which the instructor elects to grade students only on a satisfactory/no credit basis, the 'S' represents performance that is satisfactory or better. For such a course, no letter grades may be assigned for satisfactorily completed work. It should be noted that the Registrar is unable to record course grades submitted when the instructor has not observed the required distinction between 'S' and 'CR.' The 'satisfactory' options are intended to relieve the pressure on students for achievement in grades. The 'satisfactory' options in no way imply fewer or different course work requirements than those required of students who elect evaluation with a letter grade. A department may limit the number of 'satisfactory' courses to count for a major program. No more than 36 units of Stanford course work (including activity courses) in which a 'CR' or 'S' was awarded can be applied toward the 180 (225 if dual degrees are being pursued) units required for a bachelor's degree. Transfer students are limited to 27 'CR' or 'S' units applied to the 180/225 minimum.
L	The 'L' is a temporary notation that represents creditable completion of a course for which the student will receive a permanent letter grade before the start of the next quarter. The 'L' is given when the instructor needs additional time to determine the specific grade to be recorded, but it is not appropriate if additional work is expected to be submitted by the student. A student receives unit credit for work graded 'L.'
N	The 'N' indicates satisfactory progress in a course that has not yet reached completion. Continuation courses need not continue at the same number of units, but the grade for all quarters of such a course must be the same.
N-	The 'N-' grade indicates unsatisfactory progress in a continuing course. The first 'N-' grade constitutes a warning. The adviser, department chair, and student should discuss the deficiencies and agree on the steps necessary to correct them. A second consecutive 'N-' will normally cause the department to deny the student further registration until a written plan for the completion of the degree requirements has been submitted by the student and accepted by the department. Subsequent 'N-' grades are grounds for dismissal from the program.
I	The 'I' is restricted to cases in which the student has satisfactorily completed a substantial part of the course work. No credit will be given until the course is



completed and a passing grade received. When a final grade is received, all reference to the initial 'I' is removed.

'I' grades must be changed to a permanent notation or grade within a maximum of one year. If an incomplete grade is not cleared at the end of one year, it is changed automatically by the Office of the University Registrar to an 'NP' (not passed) or 'NC' (no credit) as appropriate for the grading method of the course. Students must request an incomplete grade by the last class meeting. Faculty may determine whether to grant the request or not. Faculty are free to determine the conditions under which the incomplete is made up, including setting a deadline of less than one year.

- RP The notation 'RP' (meaning Repeated Course) replaces the original grade recorded for a course when a student retakes a course. (See the "Repeated Courses" section of this bulletin.)
- W The notation 'W' (meaning Withdraw) is recorded when a student withdraws from a course.
- \* The '\*' symbol appears when no grade has been reported to the Registrar for courses taken prior to 2001-02. The '\*' symbol remains on the transcript until a grade has been reported (effective through Spring 2008-09).
- GNR The notation 'GNR' appears when no grade has been reported to the Registrar. The 'GNR' notation remains on the transcript until a grade has been reported. (Effective beginning Autumn Quarter 2009-10.)

## REPORTING OF GRADES

All grades should be reported within 96 hours after the time and day reserved for the final examination, and in no case later than noon of the fourth day (including weekends) after the last day of the final examination period.

In the case of degree candidates in Spring Quarter, final grades should be reported by noon of the day following the end of the final examination period.

## REVISION OF END-QUARTER GRADES

When duly filed with the Office of the University Registrar, end-quarter grades are final and not subject to change by reason of a revision of judgment on the instructor's part; nor are grades to be revised on the basis of a second trial (for example, a new examination or additional work undertaken or completed after the end of the quarter). Changes may be made at any time to correct an actual error in computation or transcription, or where some part of the student's work has been unintentionally overlooked; that is, if the new grade is the one that would have been entered on the original report had there been no mistake in computing and had all the pertinent data been before the instructor, the change is a proper one.

If a student questions an end-quarter grade based on the grading of part of a specific piece of work (for example, part of a test) on the basis of one of the allowable factors mentioned in the preceding paragraph (for example, an error in computation or transcription, or work unintentionally overlooked, but not matters of judgment as mentioned below), the instructor may review the entire piece of work in question (for example, the entire test) for the purpose of determining whether the end-quarter grade was a proper one. In general, changing an end-quarter grade is permitted on the basis of the allowable factors already mentioned whether an error is discovered by the student or the instructor; however, changing a grade is not permitted by reason of revision of judgment on the part of the instructor.

In the event that a student disputes an end-quarter grade, the established grievance procedure should be followed (see the "Student Academic Grievance Procedure" section of this bulletin).

## GRADUATE SCHOOL OF BUSINESS GRADES

All courses offered by the Graduate School of Business are graded according to the following five-level scheme:

- H Honors. Work that is of truly superior quality.
- HP High Pass. A passing performance, and one that falls approximately in the upper quarter of passing grades.
- P Pass. A passing performance that falls in the center of the distribution of all passing grades.
- LP Low Pass. A passing performance that falls approximately in the lower quarter of passing grades.
- U Unsatisfactory. A failing performance. Work that does not satisfy the basic requirements of the course and is deficient in significant ways.
- GNR The notation 'GNR' appears when no grade has been reported to the Registrar. The 'GNR' notation remains on the transcript until a grade has been reported (effective Autumn Quarter 2009-10).

GSB courses may receive grades of "+" (Pass) for courses taken on a Pass-Fail basis, with "U" denoting a failing grade, "I" for Incomplete, and "N" for a continuing grade. The grade of N is recorded in a course that spans more than a single quarter, where the grade in an earlier quarter will be determined only later, after the entire course sequence is complete..

Prior to 2009-10, an asterisk (\*) notation was placed when no grade was reported.

## STANFORD LAW SCHOOL GRADES

Effective Autumn Quarter 2009-10, units earned in the Stanford Law School are quarter units. Units earned in the Stanford Law School prior to 2009-10 were semester units. The following grading system became effective in Autumn Semester 2008-09. J.D. students who graduated in 2009 remained on the prior grading system but all other students shifted to the new grading system. For more information, see [http://law.stanford.edu/experience/studentlife/SLS\\_Student\\_Handbook.pdf](http://law.stanford.edu/experience/studentlife/SLS_Student_Handbook.pdf).

- H Honors (exceptional work, significantly superior to the average performance at the school)
- P Pass (representing successful mastery of the course material)
- R Restricted credit (representing work that is unsatisfactory)
- F Fail (representing work that does not show minimally adequate mastery of the material)
- MP Mandatory pass (representing P or better work)
- N Continuing course
- I Incomplete
- \* No grade reported
- GNR Grade not reported (effective Autumn Quarter 2009-10).

The grading systems employed at the Stanford Law School September 2001 through Spring 2009 were as follows. Under the numerical system (with letter equivalents), the range of satisfactory grades ran from 4.3 to 2.5 as outlined in the following distribution. Below the grade of 2.5 was one level of restricted credit (2.2) and one level of failure (2.1). The number grades with letter equivalents were as follows:

4.3-4.2	A+	3.4-3.2	B+	2.2	Restricted Credit
4.1-3.9	A	3.1-2.9	B	2.1	Failure
3.8-3.5	A-	2.8-2.5	B-		

On this old system, students could elect to take a limited number of courses on a credit/restricted credit/no credit system (K/RK/NK). 'K' was awarded for work that was comparable to numerical grades 4.3 to 2.5, 'RK' for Restricted Credit-level work (2.2), and 'NK' for Failure-level work (2.1). A limited number of courses were offered on a mandatory credit (KM)/no credit (NK) basis.

'N' is a temporary notation used in a continuing course; it is replaced with a final grade upon completion of the course series.

## SCHOOL OF MEDICINE GRADES

In general, the following grades are used in reporting on the performance of students in the M.D. program:

Pass (+)	Indicates that the student has demonstrated to the satisfaction of the department or teaching group responsible for the course that the student has mastered the material taught in the course.
Fail (-)	Indicates that the student has not demonstrated to the satisfaction of the department or teaching group responsible for the course that the student has mastered the material taught in the course.
Incomplete (I)	Indicates that extenuating medical or personal circumstances have prevented the student from completing the course requirements. This grade is given when requested by the student with the prior approval of an Advising Dean in the School of Medicine.
Continuing (N)	Indicates that the course has not concluded and the student is continuing the course.
Exempt (Ex)	Indicates a course that is exempted by examination. No units are awarded.
GNR	The notation 'GNR' appears when no grade has been reported to the Registrar. The 'GNR' notation remains on the transcript until a grade has been reported (effective Autumn Quarter 2009-10).

In general, a 'Fail' grade can be cleared by repeating and passing the particular course or by other arrangement prescribed by the department or teaching group. An 'Incomplete' grade can be made up in a manner specified by the department or teaching group within a reasonable time; if the deficiency is not made up within the specified time, the 'Incomplete' grade becomes a 'Fail' grade. The opportunity to clear a 'Fail' grade or an 'Incomplete' grade cannot be extended to individuals who are not registered or eligible to register as students in the M.D. program. For more specific information, see <http://med.stanford.edu/md/curriculum/assessment-grading.html>.

## ACADEMIC STANDING

Undergraduates matriculating in or after Autumn 1999 are required to adhere to the following academic standards.

Undergraduates must maintain a minimum 2.0 cumulative GPA and a quantitative unit requirement for good academic standing. In addition, a minimum 2.0 cumulative GPA is required for conferral of a baccalaureate degree.

Undergraduates normally are expected to plan their academic programs so that they can complete 180 units in four years (twelve quarters), including the requirements for a major and the General Education, Writing and Rhetoric, and Language Requirements. Satisfactory academic progress is, on average, 45 units per academic year for four years leading to at least 180 units, a cumulative grade point average of at least 2.0, and a baccalaureate degree.

While undergraduates are expected to register for a minimum of 12 units, they are required to earn at least 9 units each quarter (by the end of the final exam period) and at least 36 units in their most recent three quarters of Stanford enrollment (by the end of the third final exam period). In addition, students are expected to maintain a cumulative grade point average of at least 2.0. Transfer work completed at other institutions is not considered in this calculation.

A student earning fewer than 9 units per quarter or fewer than 36 units in three quarters, or earning less than a 2.0 cumulative grade point average, is placed on probation. Additionally, a student may be placed directly on provisional registration or suspension

(further defined in this section) without first being placed on probation if the student had a prior probation status. Students on probation or provisional registration status are required to earn a minimum of 12 units of new course work per quarter (by the end of the final quarter examination period for each quarter) in each quarter for three consecutive quarters, and achieve and maintain a cumulative grade point average of at least 2.0 to attain good academic standing. (A Stanford Summer Session quarter counts toward the three consecutive quarter requirement if 11 or more units are earned). The C-USP Subcommittee on Academic Standing may stipulate otherwise by acting upon a petition for fewer units.

Full-time enrollment is considered to be enrollment in a minimum of 12 units of course work per quarter at Stanford. Under extenuating circumstances, students may petition to the C-USP Subcommittee on Academic Standing to take fewer units. Work necessary to complete units from previous quarters does not count toward the 12 units necessary for full-time enrollment in the current quarter. All students registering for fewer than 12 units should consider the effects of that registration on their degree progress, visas, deferment of student loans, residency requirements, varsity athlete status, and their eligibility for financial aid and awards.

All undergraduates validly registered at Stanford are considered to be in good standing for the purposes of enrollment certification and athletic participation.

Units are granted for courses completed with grades 'A,' 'B,' 'C,' 'D,' 'Satisfactory' ('CR' or 'S'), and 'L.' Courses graded 'N' are counted provisionally as units completed, provided the student enrolls in the continuing segment of that course the following quarter. When the course is completed, the student receives the units for which he or she enrolled. No units are granted for a course in which the student receives an 'I' or an '\*' ('GNR' replaces the '\*' effective Autumn Quarter 2009-10) until the course is completed satisfactorily and the final grade reported. No units are granted for a course in which the student receives a 'W'. (See the "Grading Systems" section of this bulletin).

Students who receive all 'W's as the result of a Leave of Absence (either voluntary or involuntary) are subject to Academic Standing policies.

The C-USP Subcommittee on Academic Standing in its discretion is empowered to place conditions on students on probation or provisional registration in regard to enrollment and participation in programs and activities. In addition, students on probation require approval in advance from Undergraduate Advising and Research, Residential Education, and the Overseas Studies Program office or Stanford in Washington Program office in order to participate in Stanford's Overseas Studies Program or Stanford in Washington while students on provisional registration are ineligible to participate in these programs.

Academic performance of a student participating in a coterminal program, and whose undergraduate degree or degrees have not yet been conferred, is reviewed on a case-by-case basis in conjunction with the graduate department or program in which the student is enrolled.

Students receiving federal student aid funds must maintain satisfactory academic progress standards that may be stricter than those outlined here. See the Financial Aid Office web site at <http://financialaid.stanford.edu> for details.

### UNDERGRADUATES MATRICULATING PRIOR TO AUTUMN 1999

Note: Undergraduates matriculating prior to Autumn 1999 are required to adhere to the academic standards described above but are exempt from the minimum 2.0 cumulative GPA requirement for academic standing purposes. However, departments can elect to require a minimum GPA for course work applicable to the major and the minor. Refer to departmental literature for specific requirements.

## PROBATION

A student who fails to earn at least 36 units of work in his or her most recent three quarters of enrollment at the University (by the end of the third final exam period), or who fails to earn by the end of the final examination period at least 9 quarter units of work in his or her most recent quarter of enrollment at the University, or who has a cumulative grade point average of less than 2.0, shall be placed on probation (warning status).

A student shall be removed from probation after three consecutive subsequent quarters of enrollment at the University if, in each quarter, he or she earns a minimum of 12 units of new course work by the end of the final examination period and achieves and maintains a cumulative grade point average of at least 2.0. A student may also be removed from probation at the discretion of the C-USP Subcommittee on Academic Standing or its designees as a result of a review of individual records.

## PROVISIONAL REGISTRATION

A student who, while on probation, fails in any quarter of registration to earn a minimum of 12 units of new course work by the end of the final examination period or fails to achieve and maintain a cumulative grade point average of at least 2.0, shall be placed on provisional registration status. In addition, and on occasion, a student may also be placed directly on provisional registration without first being placed on probation if the student has had a prior probation status.

A student shall be removed from provisional registration after three consecutive subsequent quarters of enrollment at the University if, in each quarter, he or she earns a minimum of 12 units of new course work by the end of the final examination period and achieves and maintains a cumulative grade point average of at least 2.0. A student may also be removed from provisional registration at the discretion of the C-USP Subcommittee on Academic Standing or its designees as a result of a review of individual records.

## SUSPENSION

A student who, while on provisional registration, fails to earn a minimum of 12 units of new course work by the end of the final examination period, or who fails to achieve and maintain a cumulative grade point average of at least 2.0, shall be suspended. In addition, and on occasion, a student may also be suspended directly from probation; or may be suspended without first being placed on probation or provisional registration if the student has had a prior probation status.

While students suspended for the first time are suspended for one year, students suspended a subsequent time may be suspended for up to three years.

Students suspended for one year are not eligible to enroll for four quarters (including Summer Quarter) following the quarter in which the suspension was issued. Students suspended for up to three years are not eligible to enroll for up to twelve quarters (including Summer Quarter) following the quarter in which the suspension was issued.

As well, until re-enrollment, students who are suspended are ineligible for the privileges associated with registration—privileges that include living in University housing, participating in voluntary student organizations, and involvement in any activity for which enrollment is a requirement.

*Appeal of Suspension*—Students who have been suspended, and who believe they have a compelling reason to appeal their suspension, without a break in enrollment, are required to submit a Petition to Appeal Academic Suspension. Otherwise, students are expected to complete their academic suspension in full.

## RETURNING FROM SUSPENSION

Students are required to submit a properly endorsed application for reinstatement to request reenrollment after the suspension period has been completed. Instructions including deadlines for

requesting to return should be obtained from the Office of the Vice Provost for Undergraduate Education, via the office of Undergraduate Advising and Research (UAR), Sweet Hall. The C-USP Subcommittee on Academic Standing, or those designated by the subcommittee, acts upon all requests concerning academic standing, including requests to return after academic suspension. The subcommittee or its designees may determine whether the application for reinstatement to return will be approved or not, and/or the conditions a student must meet in order to return. Request to return decisions may be based on activities while away from campus, the perceived potential for successful completion of the program, as well as any other factors or considerations regarded as relevant to the Vice Provost for Undergraduate Education or the subcommittee or its designees.

Questions concerning academic standing or requests to return should be directed to the Office of the Vice Provost for Undergraduate Education, via the office of Undergraduate Advising and Research (UAR), Sweet Hall.

Students returning from suspension should also contact appropriate campus offices, such as Housing and Financial Aid, regarding those deadlines and procedures.

## NOTIFICATION (ACADEMIC STANDING)

Written notification that a student is on probation, provisional registration, or suspension is sent to the student, to the student's academic adviser, and to other relevant university offices and individuals as soon as possible after the close of the quarter. Students also receive written notification of the outcome of their Petition to Appeal Academic Suspension or request to return after suspension. Current student status, such as whether a student is enrolled or not, is considered Directory Information for FERPA purposes at Stanford, and Stanford may provide either parent(s) or guardian(s) written notification of a change in student status. Provided that a student consents, or the student is a dependent for income tax purposes, Stanford may also provide either parent(s) or guardian(s) written notification that the student is on probation, provisional registration, suspension, or leave of absence (either voluntary or involuntary). Other FERPA exceptions may also apply.

## STUDENT ACADEMIC GRIEVANCE PROCEDURE

The following policy is subject to periodic review and modification.

1. Coverage
  - a. Any Stanford undergraduate or graduate student who believes that he or she has been subjected to an improper decision on an academic matter is entitled to file a grievance to obtain an independent review of the allegedly improper decision, followed by corrective action if appropriate. A grievance is a complaint in writing made to an administrative officer of the University concerning an academic decision, made by a person or group of persons acting in an official University capacity, that directly and adversely affects the student as an individual in his or her academic capacity.
  - b. This grievance procedure applies only in those cases involving a perceived academic impropriety arising from a decision taken by: (1) an individual instructor or researcher; (2) a school, department, or program; (3) a committee charged to administer academic policies of a particular school, department, or program; or (4) the University Registrar, the Vice Provost for Undergraduate Education, the C-USP Subcommittee on Academic Standing, or a Senate committee or subcommittee charged to administer academic policies of the Senate of the Academic Council. This procedure does not apply to: (1)

- complaints expressing dissatisfaction with a University policy of general application challenged on the grounds that the policy is unfair or inadvisable; (2) individual school, department, or program academic policies, as long as those policies are not inconsistent with general University policy; (3) matters proceeding through the Office of Judicial Affairs; or (4) involuntary leave decisions.
- c. Individuals should be aware that the University Ombuds Office is available to all Stanford students, faculty, and staff to discuss and advise on any matter of University concern and frequently helps expedite resolution of such matters. Although it has no decision-making authority, the University Ombuds Office has wide powers of inquiry, including into student complaints against instructors.
2. Grievance and Appeal Procedures
    - a. *Informal Attempts at Resolution:* the student first should discuss the matter, orally or in writing, with the individual(s) most directly responsible. If no resolution results, the student should then consult with the individual at the next administrative level, for example, the chair or director of the relevant department or program, or, for those cases in which there is none, with the school dean. At this stage, the department chair or program director, if any, may inform the dean that the consultation is taking place and may solicit his or her advice on how to ensure that adequate steps are taken to achieve a fair result. Efforts should be made to resolve the issues at an informal level without the complaint escalating to the status of a formal grievance.
    - b. *The Filing of the Grievance:*
      1. If informal means of resolution prove unsatisfactory, the student should set forth in writing a statement of the decision that constitutes the subject matter of the dispute, the grounds on which it is being challenged, and the reasons why the grievant believes that the decision was improperly taken. The statement should also include a description of the remedy sought and the informal efforts taken to date to resolve the matter. It is at this point that the complaint becomes a formal grievance. The written grievance should specifically address the matters set forth in the Standards for Review, as stated in Section 4 below. The grievance should include an allegation of any adverse effects on the grievant, known to the grievant at the time of filing.
      2. The grievance document should be submitted to the dean of the school in which the grievance arose; for a grievance concerning a decision of the University Registrar, the Vice Provost for Undergraduate Education, or of a Senate committee or subcommittee, the procedures set forth herein for grievances and appeals shall be modified as stated in Section 3 below. A grievance must be filed in a timely fashion, that is, normally within 30 days of the end of the academic quarter in which the adverse decision occurred or should reasonably have been discovered. Except in extraordinary circumstances, delay in filing a grievance may constitute grounds for rejection of the grievance.
    - c. *The Response to the Grievance:*
      1. The relevant dean will consider the grievance. The dean may attempt to resolve the matter informally or make whatever disposition of the grievance that he or she deems appropriate. The dean may, in appropriate cases, remand the grievance to a lower administrative level (including to the level at which the grievance arose) for further consideration.
      2. The dean may also refer the grievance, or any issue therein, to any person (the "grievance officer") who will consider the matter and report to the dean as the latter directs. The dean will inform the grievant (and the party against whose decision the grievance has been filed) in writing of any referral of the matter and will specify the matters referred, the directions to the person or persons to whom the referral is made (including the time frame within which the person is to report back to the dean), and the name of that person.
  3. In undertaking the review, the dean or the grievance officer may request a response to the issues raised in the grievance from any individuals believed to have information considered relevant, including faculty, staff, and students.
  4. Should attempts to resolve the matter informally not be successful, the dean will decide the grievance, and will notify the grievant (and the party against whose decision the grievance has been filed) in writing of the disposition made of the grievance and the grounds for the disposition at the earliest practicable date after his or her receipt of the grievance.
  5. Normally, no more than 60 days should elapse between the filing of a grievance and the disposition by the dean. If, because of absence of key persons from the campus or other circumstances or exigencies (including those due to breaks in the academic calendar), the dean decides that disposition on that schedule is not possible, he or she shall inform the grievant (and the party against whose decision the grievance has been filed) of that in writing, giving the grounds therefore and an estimate of when a disposition can be expected. During summers and the winter closure, this time frame will nearly always be extended.
  - d. *The Filing of an Appeal:*
    1. If the grievant is dissatisfied with the disposition of the grievance at the decanal level, either on substantive or on procedural grounds, he or she may appeal in writing to the Provost.
    2. The appeal must specify the particular substantive or procedural bases of the appeal (that is, the appeal must be made on grounds other than general dissatisfaction with the disposition) and must be directed only to issues raised in the grievance as filed or to procedural errors in the grievance process itself, and not to new issues. The appeal must contain the following:
      - a. A copy of the original grievance and any other documents submitted by the grievant in connection therewith.
      - b. A copy of the determination made by the dean on that grievance.
      - c. A statement of why the reasons for the determination of the dean are not satisfactory to the grievant. This statement should specifically address the matters set forth in the *Standards for Review* in Section 4 below.
      3. The grievant will file his or her appeal at the earliest practicable date after the grievant's receipt of the determination by the dean. Normally, no more than 30 days should elapse between the transmittal of the dean's decision on the grievance and the filing of the appeal. Except in extraordinary circumstances, delay in filing an appeal will constitute grounds for rejection of the appeal.
  - e. *The Response to the Appeal:*
    1. The Provost may attempt to resolve the matter informally, or refer the appeal, or any issue thereof, to any person (the "grievance appeal officer") who shall consider the matter and report to the Provost as the latter directs. The Provost may also, in appropriate cases, remand the matter to a lower administrative level (including to the level at which the grievance arose) for further consideration.

2. The Provost will inform the grievant (and the party against whose decision the grievance has been filed) in writing of any referral of the matter and will specify the matters referred, the directions to the person to whom the referral is made (including the time frame within which the person is to report back to the Provost), and the name of that person.
3. Should attempts be made to resolve the matter informally not be successful, the Provost will decide the appeal, and will notify the grievant (and the party against whose decision the grievance has been filed) in writing of the disposition made of the grievance and the grounds for the disposition at the earliest practicable date after his or her receipt of the appeal. The decision of the Provost shall be final, unless the grievant requests a further appeal to the President pursuant to subsection 2f below, and the President agrees to entertain this further appeal.
4. Normally no more than 45 days should elapse between the filing of the appeal and the disposition by the Provost. If, because of absence of key persons from the campus or other circumstances or exigencies (including those due to breaks in the academic calendar), the Provost judges that disposition on that schedule is not possible, he or she will inform the grievant (and the party against whose decision the grievance has been filed) of the fact in writing, giving the grounds therefore and an estimate of when a disposition can be expected. During summers and the winter closure, this time frame will nearly always be extended.
  - f. *The Request to the President:* if the student is dissatisfied with the disposition of the appeal by the Provost, he or she may write to the President of the University giving reasons why he or she believes the grievance result to be wrong (following the general format set forth in subsection 2d.2 above). No more than 30 days should elapse between the transmittal of the Provost's disposition and the written statement to the President urging further appeal. In any case, the President may agree or decline to entertain this further appeal. If the President declines to entertain the further appeal, the decision of the Provost is final. If the President decides to entertain the further appeal, he or she will follow the general procedures set forth in Section 2e above, and the decision of the President will be final.
3. Grievances Concerning Decisions of the University Registrar, the Vice Provost for Undergraduate Education, or of a Senate Committee or Subcommittee
  - a. For a grievance concerning a decision of the University Registrar, the Vice Provost for Undergraduate Education, the C-USP Subcommittee on Academic Standing, or of a Senate committee or subcommittee, the grievant will file his or her grievance with the Provost, rather than with the dean, and the Provost will handle that grievance in accordance with the procedures set forth in Section 2c above.
  - b. There is no appeal of the Provost's disposition of that grievance, except as may be available under Section 2f above.
4. Standards for Review and Procedural Matters
  - a. The review of grievances or appeals will usually be limited to the following considerations:
    1. Were the proper facts and criteria brought to bear on the decision? Were improper or extraneous facts or criteria brought to bear that substantially affected the decision to the detriment of the grievant?
    2. Were there any procedural irregularities that substantially affected the outcome of the matter to the detriment of the grievant?
  3. Given the proper facts, criteria, and procedures, was the decision one which a person in the position of the decision maker might reasonably have made?
    - b. The time frames set forth herein are guidelines. They may be extended by the relevant administrative officer in his or her discretion for good cause.
    - c. Questions concerning the filing and appeal of grievances should be directed to the Office of the Provost.

# UNDERGRADUATE EDUCATION

*Vice Provost for Undergraduate Education:* Harry J. Elam, Jr.  
*Senior Associate Vice Provost for Undergraduate Education:*  
Martha Cyert  
Web Site: <http://ual.stanford.edu>

The Vice Provost for Undergraduate Education (VPUE) is responsible for building partnerships with faculty, departments, programs, and schools to promote and sustain excellence in undergraduate education at Stanford. It has a special focus on the academic programs in the first and second year that engage students in critical thinking and scholarly inquiry and that lay the foundations for their subsequent fields of concentration and future achievements. Other VPUE programs support upper class students in research, the arts, overseas study, and writing. VPUE works to ensure equity and accessibility for all students and to promote the core values of a liberal arts education. It seeks to help students create individually meaningful and coherent educational programs by guiding them in their choice of courses, programs of study, and extracurricular academic opportunities. VPUE fosters productive interactions between faculty and students and excellence in teaching through the provision of resources to departments and faculty for research with undergraduates, curriculum and pedagogical development, opportunities for mentoring, and small group seminars.

VPUE programs for first- and second-year students include New Student Orientation/Approaching Stanford, Introduction to the Humanities, Program in Writing and Rhetoric, Introductory Seminars, and Sophomore College. Programs for more advanced students include the Bing Overseas Study Program, Writing in the Major, Arts Intensive Program, and Bing Honors College. Undergraduate Advising and Research, the Center for Teaching and Learning, Diversity Outreach, and the Hume Writing Center serve undergraduates throughout their time at Stanford. The Office of the VPUE works closely with the Office of the Vice Provost for Student Affairs and the Admissions Office. The Vice Provost for Undergraduate Education reports to the Provost.

Policies governing undergraduate education are formulated by Faculty Senate committees and voted into legislation by the Faculty Senate. The Committee on Undergraduate Standards and Policies (C-USP) addresses such topics as general education requirements, grading, awards, advising, and teaching evaluation. The Committee to Review Undergraduate Majors (C-RUM) oversees the initiation and review of undergraduate degree programs. Committee members include the Vice Provost for Undergraduate Education or his delegated staff (*ex-officio*) and representatives from the faculty at large, administration (such as the Office of the University Registrar), and students. The Associated Students of Stanford University (ASSU) nominations committee selects student members. The VPUE also maintains, by rule of the Faculty Senate, the Introduction to the Humanities Governance Board and the Writing and Rhetoric Governance Board to oversee these University degree requirements. Finally, the Undergraduate Advisory Council (UGAC) was established by the Provost in 1996 to serve as the main faculty advisory body for the Vice Provost for Undergraduate Education.

## STANFORD INTRODUCTORY STUDIES

*Program Directors:* Marvin Diogenes, Ellen Woods  
*Offices:* Sweet Hall  
*Email:* [stanfordintrostudies@stanford.edu](mailto:stanfordintrostudies@stanford.edu)  
*Web Site:* <http://sis.stanford.edu>

Stanford Introductory Studies offers courses taught by faculty from across the seven Schools of the University. Some of these courses satisfy University Requirements (IHUM, GER, and the Writing and Rhetoric Requirement) while others provide seminar opportunities for first- and second-year students. Special residential programs such as Structured Liberal Education and September Studies (Sophomore College, Arts Intensive, and Bing Honors College) expand SIS curricular opportunities for students. The Hume Writing Center, which manages writing services such as tutorials and workshops for all students, is also part of SIS.

### INTRODUCTION TO THE HUMANITIES PROGRAM

*Director:* Russell A. Berman  
*Associate Director:* Ellen Woods

*Affiliated Faculty:* Lanier Anderson (Philosophy), Chris Bobonich (Philosophy), Eavan Boland (English), Scott Bukatman (Art and Art History), Steven Carter (Asian Languages), David Como (History), Adrian Daub (German Studies), Dan Edelstein (French and Italian), Harry Elam (Drama), Michele Elam (English), Zephyr Frank (History), Paul Harrison (Religious Studies), Robert Harrison (French and Italian), Ursula Heise (English), Ian Hodder (Archaeology and Anthropology), Christian Kaesser (Classics), Joshua Landy (French and Italian), Henry Lowood (University Libraries, Science and Technology), Marsh H. McCall, Jr. (Classics), Ian Morris (Classics), Alice Rayner (Drama), Eric Roberts (Computer Science), Orrin Robinson (German Studies), Janice Ross (Drama), Gabriella Safran (Slavic Languages), Nariman Skakov (Slavic Languages), Jennifer Summit (English), Kenneth Taylor (Philosophy), Blakey Vermeule (English), Barbara Voss (Archaeology and Anthropology), Steven Weitzman (Religious Studies), Laura Wittman (French and Italian), Tobias Wolff (English), Allen Wood (Philosophy), Lee Yearley (Religious Studies), Mark Zoback (Geophysics)

*Lecturers:* Sarah Allison, Lalaie Ameeriar, Nicholas Bauch, Kristin Boyce, Renu Cappelli, Bill Carter, Dan Contreras, John Corbally, Zenon Culverhouse, Jon Daehnke, Matthew Daube, William Elison, Jackie Feke, Catherine Flynn, Corinne Gartner, James Genone, William Goldman, Abby Heald, Andrew Hui, Michael Hunter, Ruth Kaplan, Kimberly Lewis, Tomas Matza, Liz Mullane, Christy Pichichero, Anne Pollok, Toma Roberts, Kathryn Lafrenz Samuels, Matthew Sayre, Jeffrey Schwegman, Janna Segal, Patricia Slatin, Melissa Stevenson, Anise Strong, Natalya Sukhonos, Bulbul Tiwari, Candace West, Gabriel Wolfenstein, Joshua Wright, Zhaohua Yang, Kari Zimmerman

*Offices:* Sweet Hall, Second Floor  
*Mail code:* 3068  
*Phone:* (650) 723-0944  
*Email:* [ihumprogram@stanford.edu](mailto:ihumprogram@stanford.edu)  
*Web Site:* <http://ual.stanford.edu/ihum>

Courses offered by the Introduction to the Humanities Program have the subject code IHUM and are listed in the "Introduction to the Humanities Courses" section of this bulletin.

Introduction to the Humanities offers courses that satisfy a three-quarter General Education Requirement (GER) for first-year students. The purpose of the Introduction to the Humanities (IHUM) requirement is to build an intellectual foundation in the

study of human thought, values, beliefs, creativity, and culture. Introduction to the Humanities courses enhance skills in analysis, reasoning, argumentation, and oral and written expression, thus helping to prepare students for more advanced work in the humanities, and for work in other areas.

The IHUM requirement may be satisfied in two ways:

1. *Introduction to the Humanities courses*—a one quarter, interdisciplinary course followed by a two quarter course sequence.
2. *The Program in Structured Liberal Education*—a three quarter, residence-based learning experience, which satisfies the IHUM requirement, both of the University Writing and Rhetoric requirements, and the General Education Requirement in Disciplinary Breadth: Humanities. For information on the program, see the "Structured Liberal Education" section of this bulletin.

## PROGRAM IN WRITING AND RHETORIC

*Faculty Director:* Nicholas Jenkins

*Associate Director:* Jonathan Hunt

*Lecturers:* Christine Alfano, Paul Bator, Julia Bleakney, Shaleen Brawn, Kevin DiPirro, Erik Ellis, Mark Feldman, Marjorie Ford, Wendy Goldberg, Patti Hanlon-Baker, Arturo Heredia, Donna Hunter, Chris Kamrath, John Lee, Sohui Lee, Kimberly Moekle, Gabrielle Moyer, Kelly Myers, Alyssa O'Brien, John Pell, John Peterson, Sarah Pittock, Delphine Red Shirt Shaw, Carolyn Ross, Helle Rytönen, Kim Savelson, Susan Schuyler, Ruth Starkman, Sigrid Streit, Rod Taylor, Andrew Todhunter, Susan Wyle

*Guest Lecturer:* Jonah Willihnganz

*Teaching Affiliates:* Sarah Allison (Aut), Brianna Bilsky (Wtr, Spr), Marissa Gemma (Aut), Hanna Janiszewska (Aut), Kenneth Ligda (Aut), Vasile Stanescu (Aut)

*Offices:* Sweet Hall, Third Floor

*Mail Code:* 3069

*Phone:* (650) 723-2631

*Email:* pwrcourses@stanford.edu

*Web Site:* <http://pwrcourses.stanford.edu>

Courses offered by the Program in Writing and Rhetoric are listed under the subject code PWR on the *Stanford Bulletin's* ExploreCourses web site.

The Program in Writing and Rhetoric (PWR) designs and teaches courses that meet the Writing and Rhetoric requirement for undergraduates at Stanford as well as intermediate and advanced writing and rhetoric classes. For more information on the requirement, see the "Writing and Rhetoric Requirement" page on the UAL website.

PWR courses engage students in rhetorical analysis of texts and research-based argument. Students in PWR courses learn and practice time-tested rhetorical principles to gain increasing control over the intellectual and stylistic elements of their writing; they learn to analyze the persuasive strategies of others and to apply those insights to their own writing.

Toward these ends, PWR 1 focuses on elements of academic argument: understanding a writer's stance; developing an argumentative thesis; discovering, developing, and deploying cogent proofs; making appropriate organizational and stylistic choices; and understanding the expectations of audiences. The course emphasizes research-based writing, including the effective use of primary and secondary sources and data based on fieldwork. Students enrolled in PWR 1 carry out significant research and use it as the basis for a persuasive research-based argument.

PWR 2 further develops students' skills in writing and oral presentation, emphasizing the ongoing development of content, organization, and style. The course addresses the dynamic interdependence of writing and speaking, as well as the importance of visual and multimedia elements in the effective presentation of research. Students enrolled in PWR 2 have opportunities to draft and revise written assignments and oral presentations as well as

opportunities to present the results of scholarly inquiry, with an emphasis on how to work purposefully and well with a variety of presentation media.

As a general rule, students complete a minimum of three major assignments in both PWR 1 and 2. Written assignments vary from 5 to 15 pages in length, and students work intensively on revising each piece of writing. All assignments involve analyzing a range of texts as well as identifying, evaluating, and using multiple sources in support of research-based arguments. In-class work focuses on how to read with an increasingly critical eye and how to identify, evaluate, integrate, and cite sources effectively.

Writing and Rhetoric classes enroll no more than 15 students, and all classes are conducted as seminars in which participation is crucial. In-class activities include close reading of and responding to the writing of peers; these workshops are augmented by a minimum of three individual or small group conferences with the PWR instructor during the quarter.

## COURSES

The Writing and Rhetoric requirement includes courses at three levels.

1. The first-level course, taken in the first year, can be satisfied by courses in PWR or Structured Liberal Education; the curriculum emphasizes analysis and research-based argument.
2. The second-level course, to be completed by the end of the sophomore year, is a writing and oral/multimedia presentation course taught by the Program in Writing and Rhetoric and by other programs and departments; completion of Structured Liberal Education also satisfies the second-level requirement.
3. The third-level course is a Writing in the Major (WIM) course taught in each major, providing students with systematic opportunities to develop skills for writing in their chosen fields. A list of certified WIM courses may be found in the table of "Undergraduate Major Unit Requirements" in the "Undergraduate Degrees and Programs" section of this bulletin. WIM course descriptions may be found under individual department and program sections.

The sequence of required courses provides a coordinated approach responsive to how students mature as writers, researchers, and presenters during their undergraduate years. At each level, students develop greater sophistication in conducting inquiry and producing scholarly work in progressively more specific disciplinary contexts.

Before the term in which students enroll in the first two levels of the requirement, they review course descriptions on the web site at <http://pwrcourses.stanford.edu>. After reviewing the offerings, students submit a list of top choices, and the PWR office assigns students to courses based on these preferences.

Students wishing to pursue advanced work in Writing and Rhetoric may enroll in electives offered by PWR. Topics vary; further information may be found in the PWR section of the *Stanford Bulletin's* ExploreCourses web site or on the PWR advanced courses web page.

## WRITING AND RHETORIC 2 REQUIREMENT

The Writing and Rhetoric 2 requirement may be satisfied through completion of courses offered through PWR or by other programs and departments. In addition to PWR 2, some Introductory Seminars certified by the Writing and Rhetoric Governance Board satisfy the second-level Writing and Rhetoric requirement (Write-2). Courses offered as Introductory Seminars require an additional application form; see <http://introsems.stanford.edu> for more information.

## HUME WRITING CENTER

*Location:* Building 460 (Margaret Jacks Hall), Room 20

*Mail Code:* 2085

*Phone:* (650) 723-0045

*Email:* [hwc@stanford.edu](mailto:hwc@stanford.edu)

*Web Site:* <http://hwc.stanford.edu>

The Hume Writing Center supports student writing in the full range of academic and extracurricular contexts. The Center emphasizes support for students' writing for PWR, Introduction to the Humanities, and Stanford Introductory Seminars while also serving all Stanford undergraduates through one-to-one and group tutorials, workshops, and seminars. The Center also works with students in WIM courses and students writing Honors theses. Other events sponsored or hosted by the Center include readings for Parents Weekend and Admit Weekend. For further details on the Center, see <http://hwc.stanford.edu>.

## PWR PEDAGOGY PROGRAM

PWR offers ENGLISH 397A, a pedagogy seminar for all graduate students (TAs) from English, Modern Thought and Literature, and Comparative Literature who teach PWR courses as part of their graduate studies. Taught in the Autumn Quarter, the pedagogy seminar focuses on syllabus design, developing writing assignments, and responding to student writing. The history of rhetoric and writing supplies a theoretical foundation as well as practical lessons on how to teach writing and research most effectively. Elements of the pedagogy program include class visits; group evaluation of writing assignments; workshops and lectures; a handbook on teaching; a library of teaching materials; and individual work with mentors and peers.

## PEER WRITING CONSULTANTS

The Program in Writing and Rhetoric offers PWR 195, a course on the tutoring of writing for undergraduates chosen to serve as peer writing consultants in the Hume Writing Center and across the campus.

## STRUCTURED LIBERAL EDUCATION

*Director:* Carolyn Lougee Chappell (History)

*Assistant Director:* Greg Watkins

*Lecturers:* Yoon Sook Cha, Nicole Lopez, Jacob Mackey, Jeremy Sabol, Greg Watkins

*Offices:* Sweet Hall, Second Floor, and Florence Moore Hall

*Mail Code:* 94305-8581

*Phone:* (650) 725-0102

*Email:* [sle-program@stanford.edu](mailto:sle-program@stanford.edu)

*Web Site:* <http://sle.stanford.edu>

The Program in Structured Liberal Education (SLE) is a year-long residence-based great works course that satisfies several requirements at once: IHUM, Writing and Rhetoric (both PWR1 and PWR2), and the Disciplinary Breadth GER in Humanities. The curriculum includes works of philosophy, literature, art, and music from the ancient world to the present. The program is interdisciplinary in approach; it emphasizes intellectual rigor and individualized contact between faculty and students.

SLE has two fundamental purposes: to develop a student's ability to ask effective questions of texts, teachers, the culture, and themselves; and to develop intellectual skills in critical reading, expository writing, logical reasoning, and group discussion. SLE encourages students to live a life of ideas in an atmosphere that stresses critical thinking and a tolerance for ambiguity. Neither the instructors nor the curriculum provides ready-made answers to the questions being dealt with; rather, SLE encourages a sense of intellectual challenge, student initiative, and originality.

The residence hall is the setting for lectures and small group discussions. SLE enhances the classroom experience with other educational activities, including a weekly film series, writing tutorials, occasional special events and field trips, and a student-produced play each quarter.

Freshmen interested in enrolling in SLE should indicate this preference for their IHUM assignment. SLE is designed as a three-quarter sequence, and students are expected to make a commitment for the entire year (9 units autumn and winter, 10 units spring).

## INTRODUCTORY SEMINARS

*Participating Faculty:* Over 200 faculty from more than 60 departments teach an SIS Introductory Seminar. See faculty listings in each department's section of this bulletin for pertinent information.

*Offices:* Sweet Hall, 229B, Second Floor

*Mail Code:* 3069

*Phone:* (650) 724-2405

*Email:* [introsems@stanford.edu](mailto:introsems@stanford.edu)

*Web Site:* <http://introsems.stanford.edu>

Introductory Seminars provide opportunities for first- and second-year students to work closely with their peers and Stanford faculty in an intimate and focused setting. These courses aim to intensify the intellectual experience of the freshman and sophomore years by engaging students in a small group setting; introducing them to the variety and richness of academic topics, methods, and issues which lie at the core of particular disciplines; and fostering a spirit of mentorship between faculty and students. Over 200 faculty from more than 60 departments take part in the program. The courses provide department credit and many count towards an eventual major as well as fulfill General Education Requirements (GERs) including Write 2.

Freshman Seminars and Sophomore Seminars and Dialogues are offered in many disciplines throughout the academic year. Freshman preference seminars are typically given for 3-4 units to a maximum of 16 students, and generally meet twice weekly. Although preference for enrollment is given to freshmen, sophomores and first-year transfer students may participate on a space-available basis and with the consent of the instructor. Sophomore preference seminars and dialogues give preference to sophomores and first-year transfer students, but freshmen may participate on a space-available basis and with the consent of the instructor. Sophomore preference seminars are given for 3-5 units to a maximum of 14 students, while sophomore preference dialogues are given for 1-2 units to a maximum of 5 students.

All seminars require a brief application. For a list of introductory seminars offered in 2011-12, see the Introductory Seminars online catalog. For information about applying see the *Stanford Introductory Seminars* web site for undergraduates. Since courses are offered through the departments, specific scheduling or certifications should be checked via the Stanford Bulletin's ExploreCourses.

Due dates for 2011-12 applications for the courses are at 5 p.m. on:

- Autumn Quarter: September 6, 2011
- Winter Quarter: November 28, 2011
- Spring Quarter: March 5, 2012.

## SEPTEMBER STUDIES

*Director:* Marvin Diogenes

Courses in September Studies at Stanford allow students to return to campus three weeks prior to the beginning of Autumn Quarter to work with faculty on a focused area of study or artistic practice. The programs facilitate mentoring relationships between faculty and students. Sophomore College participants have completed their first year and are rising sophomores; Arts Intensive participants are sophomores, juniors and seniors; and Bing Honors College participants are seniors.

## SOPHOMORE COLLEGE

*Offices:* Sweet Hall, Third Floor

*Mail code:* 3069

*Phone:* (650) 724-4667

*Email:* [sophcollege@stanford.edu](mailto:sophcollege@stanford.edu)

*Web Site:* <http://soco.stanford.edu>

Sophomore College offers sophomores the opportunity to study intensively with Stanford faculty for several weeks before the beginning of Autumn Quarter. Students immerse themselves in a subject and collaborate with peers, upper-class course assistants,



and faculty in constructing a community of scholars. They are also encouraged to explore the full range of Stanford's academic resources both in workshops and individually. Sophomore College is characterized by an atmosphere of intense academic exploration. Each Sophomore College course enrolls twelve to fourteen students, who live together in a Stanford residence and receive two units of academic credit. Courses are announced in March, and applications are due in April. For more information or to apply, see <http://soco.stanford.edu>.

## ARTS INTENSIVE

*Offices:* Sweet Hall, Third Floor

*Mail code:* 3069

*Phone:* (650) 724-4667

*Email:* [artsintensive@stanford.edu](mailto:artsintensive@stanford.edu)

*Web Site:* <http://artsintensive.stanford.edu>

The Arts Intensive (AI) Program enrolls Stanford students in courses that encourage a dynamic immersion into the process of making art. The program aims to engage students, regardless of the level of expertise, in the practice of a particular artistic discipline. In 2011, courses were offered in acting, filmmaking, ballet, graphic design, sound design, fiction writing, conservation photography, and product design. Courses are taught by Stanford arts faculty and visiting artists; students live together in a Stanford residence during the program and receive two units of academic credit. Enrollment is by application and takes place in Spring for the upcoming September program. For more information or to apply see <http://artsintensive.stanford.edu>.

## BING HONORS COLLEGE

Bing Honors College brings students who are writing honors theses to campus in September before the start of the regular school year for a program of intensive scholarship and writing guided by faculty from participating departments and programs. By concentrating solely on the thesis for nearly three weeks, participants begin the senior year with a commitment to independent scholarship in an atmosphere of shared intellectual purpose. The College sponsors cross-disciplinary forums, such as writing workshops and methodology panels, as well as residential activities, and a celebratory concluding event to which students invite their research advisers. Students participating in the College receive room and board.

If you are a prospective honors student and interested in joining Bing Honors College, please contact your department to find out whether it is participating.

## FRESHMAN-SOPHOMORE COLLEGE

*Location:* 236 Santa Teresa, Stanford, CA 94305

*Web Site:* <http://frosoco.stanford.edu>

The Freshman-Sophomore College (FroSoCo) at Sterling Quad is a residence for approximately 180 freshmen and sophomores interested in broad intellectual exploration of the liberal arts and sciences. The college integrates intellectual, academic, and social activities with residential life. Entering freshmen have the option of living for two years in FroSoCo.

# BING OVERSEAS STUDIES PROGRAM

*Program Director:* Robert Sinclair

***Stanford Program in Australia***

*Director:* Peter Mumby, School of Biological Sciences, University of Queensland

*Faculty-in-Residence:* Kevin Arrigo

*Program Faculty:* Claire Baker, Bill Casey, Ron Johnstone, Ian Lilly, Catherine Lovelock, Selina Ward

***Stanford Program in Beijing***

*Acting Director:* Chao Fen Sun

*Faculty-in-Residence:* Gordon Chang, Chao Fen Sun

*Program Faculty:* Li Chen, Wenxiang Gong, Anshan Li, Bobai Li, Kun Li, Hua Qian, Liyan Qin, Shizhou Wang, Suolao Wang, Yan Wang, Pei Zhang, Li-an Zhou, Xiaoya Zhu

***Stanford Program in Berlin***

*Director:* Karen Kramer

*Faculty-in-Residence:* Charlotte Fonrobert, Mark E. Lewis, M. Rush Rehm

*Program Faculty:* Maria Biege, Diana Boebe, Ulrich Brückner, Knut Ebeling, Martin Jander, Wolf-Dietrich Junghanns, Ingo Klein, Sylvia Kloetzer, Matthias Pabsch, Cemile Tat, Jochen Wohlfeil

***Stanford Program in Cape Town***

*Director:* Timothy Stanton

*Faculty-in-Residence:* Prudence Carter

*Program Faculty:* Mohamed Adhikari, Diane Cooper, Stephan Klingebiel, Janice McMillan, Sophie Oldfield, John Parkington, Chris Saunders, Mary Simons, Nolubabalo Tyam

***Stanford Program in Florence***

*Director:* Ermelinda Campani

*Faculty-in-Residence:* Tom Byers, Garry Gold, Matthew Kohrman

*Program Faculty:* Khaled Fouad Allam, Stefano Cannicci, Pompeo Della Posta, Paolo Galluzzi, Anthony Molho, Leonardo Morlino, Lapo Pistelli, Fiorenza Quercioli, Filippo Rossi, Abraham Sofaer, Timothy Verdon

***Stanford Program in Kyoto***

*Director:* Andrew Horvat

*Faculty-in-Residence:* Jaroslaw Kapuscinski

*Program Faculty:* Naoko Asami, Peter Duus, Toshiko Fujiwara, Toshihiko Hayashi, Yuko Kawahara, Catherine Ludvik, Kiyoko Tanaka, Hiroko Tayama, Haruka Ueda

***Stanford Program in Madrid***

*Director:* Santiago Tejerina-Canal

*Faculty-in-Residence:* Geoffrey Cohen, Michael Predmore, Robert Waymouth

*Program Faculty:* Almudena Ariza Armada, Francisco Javier Bobillo de la Peña, Miguel Buñuel, María Teresa Cambor Portilla, Julia Doménech, Sylvia Hilton, Sheila Klaiber, Miguel Larrañaga Zulueta, Antonio Muñoz, Laura Murcia, Alicia Pérez Blanco, Oscar Sánchez Fuster

***Stanford Program in Moscow***

*Director:* Alexander Abashkin

*Faculty-in-Residence:* Lazar Fleishman

*Program Faculty:* Tatyana Boldyreva, Maxim Bratersky, Galina Filatova, Edward Ivanian, Lisa Kurganova, Carol Leonard, Vladimir Mau, Sergei Medvedev, Vadim Novikov, Alexander Rubailov, Angelina Sidyganova

***Stanford Program in Oxford***

*Director:* Geoffrey Tyack

*Faculty-in-Residence:* Denise Gigante, David Palumbo-Liu, Kenneth Schultz

*Program Faculty:* Giovanni Capoccia, James Forder, Alison Kahn, Helen Kidd, Robert McMahan, Amanda Palmer, Emma Plaskitt, Richard Rowley, Robert Saunders, Muhammad Talib

***Stanford Program in Paris***

*Director:* Estelle Halévi

*Faculty-in-Residence:* Marisa Galvez, Roland Greene, S. Lochlann Jain, Paul Switzer

*Program Faculty:* Laurie Boussaguet, Colette Deremble, Jean-Paul Deremble, Jean-Marie Fessler, Brigitte Gallini, Sonia Gourevitch, Patrick Guédon, Choukri Hmed, Tiphaine Karsenti, Eloi Laurent, Jacques Le Cacheux, Giovanni Lévi, Florence Mercier, Elizabeth Molkou, Jean-Pierre Morgand, Martial Poirson, Pauline Reyman, Marie-Christine Ricci, Sylvie Strudel, Fabrice Virgili

***Stanford Program in Santiago***

*Director:* Iván Jaksic

*Faculty-in-Residence:* Susan Cashion

*Program Faculty:* Mabel Abad, César Albornoz, Andrés Bobbert, Germán Correa, Claudio Fuentes, Alexander Galetovic, Rolf Lüders, Sergio Micco, Sergio Missana, Alvaro Palma, Hernan

Pons, Sharon Reid, Emilio Rivano, Bernardo Subercaseaux, Gloria Toledo

*Program Offices:* Sweet Hall, Ground Floor, 590 Escondido Mall

*Mail Code:* 3089

*Phone:* (650) 723-3558

*Email:* bospstudy@lists.stanford.edu

*Web Site:* <http://bosp.stanford.edu>

Courses offered by the Overseas Studies Program are listed on the *Stanford Bulletin's* ExploreCourses web site under subject codes beginning with OSP:

- Australia [OSPAUSTL]
- Barcelona (Consortium for Advanced Studies ) [OSPBARCL]
- Beijing [OSPBEIJ]
- Berlin [OSPBER]
- Cape Town [OSPCPTWN]
- Florence [OSPFLOR]
- Kyoto [OSPKYOTO]
- Kyoto Consortium for Japanese Studies [OSPKYOCT]
- Madrid [OSPMADR]
- Moscow [OSPMOSC]
- Oxford [OSPOXFRD]
- Paris [OSPPARIS]
- Santiago [OSPSANTG].

The Bing Overseas Studies Program (BOSP) provides opportunities for Stanford students to broaden their undergraduate education through study in another country and immersion in its culture. Regular programs in Australia, Beijing, Berlin, Cape Town, Florence, Kyoto, Madrid, Moscow, Oxford, Paris, and Santiago offer courses in social and natural sciences, humanities, and engineering with full Stanford credit. Many courses also count toward major requirements and/or fulfill General Education Requirements. Students may enroll for one or more quarters at most locations. Academic or paid internships are available at the Beijing, Berlin, Florence, Kyoto, Madrid, Moscow, Paris, and Santiago programs. Research opportunities are available in various formats at different centers. Service-learning and community-based research opportunities are available in Cape Town. Minimum academic and language prerequisites are specific to each program. See <http://bosp.stanford.edu> for information on these requirements.

While studying overseas through BOSP, students remain registered at Stanford and pay regular tuition, along with the overseas fee, which is based on Stanford room and board rates. Regular financial aid applies, and may be increased to cover additional costs. At most centers, students live in a homestay or with local students.

In addition to regular programs offered for enrolled Stanford students, the University is a member of two consortia: the Consortium for Advanced Studies in Barcelona and the Kyoto Consortium for Japanese Studies. Overseas Studies occasionally offers a limited number of special programs.

Overseas Studies, located on the ground floor of Sweet Hall, has full-time staff members and student advisors to assist in planning for overseas study. Course information, while accurate at the time of publication, is subject to change. See <http://bosp.stanford.edu> for updated information.

## UNDERGRADUATE ADVISING AND RESEARCH

*Dean:* Julie Lythcott-Haims

*Program Office:* Sweet Hall, first floor

*Phone:* (650) 723-2426

*Fax:* (650) 725-1436

*Web Site:* <http://ual.stanford.edu>

*Email:* [advising@stanford.edu](mailto:advising@stanford.edu), [vpue-research@stanford.edu](mailto:vpue-research@stanford.edu)

*Appointments:* (650) 723-2426

Undergraduate Advising and Research introduces students to the full intellectual richness of undergraduate study at Stanford, supports students in their academic and intellectual pursuits, and seeks to instill within them a deep sense of identity within and belonging to our community of scholars at Stanford. This means different things for different students at different times, leading to an emphasis on extended one-on-one interactions between students and advisers. The substance of these interactions flows from the scholarship and teaching of the broad intellectual community at Stanford.

The UAR staff includes professional advisors in Sweet Hall, the Athletics Academic Resource Center, and in the undergraduate residences. Freshmen are assigned to academic advisers (faculty and academic staff) according to their preliminary academic interest and residence. The professional advisers in Sweet Hall, the Athletics Academic Resource Center, and the undergraduate residences complement the role of the assigned advisers with a comprehensive understanding of the curriculum; they advise students broadly on their courses of study and long-term goals. Some freshmen receive enhanced academic support through participation in Expanded Advising Programs (EAP).

UAR functions include:

- overseeing the transition of freshmen/transfers into the university
- assistance with curriculum planning
- consultation on choosing a major
- advice on integrating research into an undergraduate program of study
- support for students considering and applying for merit-based scholarships and national fellowships
- practical advice on how to prepare for and apply to graduate and professional schools
- academic and personal advising related to academic performance
- guidance on policies and procedures concerning academic standing
- assistance with interpretation and application of academic rules and regulations
- referrals to campus tutoring resources and counseling offices

## SCHOLARSHIPS AND FELLOWSHIPS, AND POST-BACCALAUREATE STUDIES

Together with advisers at the Overseas Resource Center (<http://stanford.edu/dept/center/orc>) and the Haas Center for Public Service (<http://studentaffairs.stanford.edu/haas>), UAR advisers help prepare students to compete for merit scholarships and post-baccalaureate fellowships. UAR also administers campus nomination competitions for the Beinecke, Carnegie, Center for the Study of the Presidency, Jack Kent Cooke, Goldwater, Liebmann, Merage, Mellon Mays, Truman, and Udall scholarships. Binders containing applications of past years' winners are available for review on the first floor of Sweet Hall and in the offices of Academic Directors.

UAR offers workshops and individual consultations on planning for graduate or professional studies (education, law, medicine, business) and on how to write personal statements, how to solicit letters of recommendation, and how to prepare for interviews.

## UNDERGRADUATE RESEARCH

UAR sponsors and supports programs that encourage undergraduates to work individually with faculty on research, advanced scholarship, and creative projects. Programs are designed to serve students new to research and those with considerable research experience who are able to take on advanced, independent

projects. See <http://undergradresearch.stanford.edu> for more information.

## STUDENT GRANT PROGRAMS

UAR offers research grants to registered Stanford undergraduates. Grants support faculty-mentored research projects, and are typically used to pay for research/creative supplies, travel, and room and board/ Major Grant and Chappell Lougee Scholarship recipients may include a stipend within their budget if they are working full-time on their project over the Summer Quarter.

For the 2010-11 academic year, students have access to the following grant programs:

- Small Grants provide for student projects that explore a topic of interest or contribute to the development of future intellectual pursuits. They are often used for smaller projects, preliminary research, and follow-up expenses associated with larger projects.
- Major Grants support larger projects that normally span several quarters. Funded projects typically culminate in an honors thesis or some other substantial capstone product that demonstrates a focused and intellectually rigorous perspective on the topic of interest. Major grant proposals are subject to a review process that includes input from faculty in the relevant departments.
- The Chappell Lougee Scholarship supports sophomores who wish to undertake research in the humanities, creative arts, and qualitative social sciences. Students receive a grant for full-time research under the supervision of a faculty mentor. In addition, UAR provides guidance for students to transform their research into a creative performance, a capstone or honors project, or post-baccalaureate study.
- Angel Grants assist students in producing a finished public creative work such as an art exhibit, film, stage production, or concert.
- Conference Travel Grants support students who have been invited to present their research at a professional or scholarly conference. The grants fund travel expenses to and from the conference, and normal conference registration. Students demonstrating financial need may also include conference-associated food and lodging in their budget. Normally, Conference Travel Grants are intended to match funds made available by the faculty mentor or some other source.

For current deadlines and program details, see <http://studentgrants.stanford.edu>.

The application for any student grant consists of:

1. a student-authored project proposal, including a line-item budget
2. a letter of support written by a qualified member of the Stanford faculty

UAR may also consult student transcripts as well as outside faculty reviewers. Proposals are judged on intellectual significance, rigor and feasibility of project design, and evidence of student preparedness. The program is competitive, and not all good proposals can be funded.

UAR provides advising support for students considering a research grant, including proposal writing and project design consultation and advice on administrative policies. Students can view sample proposals at the UAR office. For more information, see <http://studentgrants.stanford.edu>.

## DEPARTMENTAL AND FACULTY SPONSORED RESEARCH OPPORTUNITIES

Departments, interdisciplinary programs, and Stanford research centers use VPUE Departmental Grants for Undergraduate Research to support programs that provide undergraduates with

mentorship and training in scholarship and research. Typically, departments pair students with a faculty member or faculty-led research group according to their mutual scholarly interests. Students conduct substantive, directed research on a particular aspect of the faculty member's research project, and they meet frequently with their faculty mentors to discuss progress and future directions for the project. For more information and the Request for Proposals, see <http://vpuedepartmentalgrants.stanford.edu>. Students should consult directly with the departments and programs of interest to learn about these opportunities.

Similarly, individual faculty members may use VPUE Faculty Grants for Undergraduate Research. Faculty grants provide funding for undergraduates to work closely with faculty on a directed research project. Students gain valuable experience with the methods of inquiry and analysis in their chosen discipline, and are able to subsequently leverage this experience in pursuit of more independent projects or theses. For more information and the Request for Proposals, see <http://vpuefacultygrants.stanford.edu>.

## CENTER FOR TEACHING AND LEARNING

*Associate Vice Provost for Undergraduate Education and Director:* Michele Marinovich

*Senior Associate Director (Science and Engineering):* Robyn Wright Dunbar

*Associate Director (Humanities):* Mariatte Denman

*Associate Director (Social Sciences and Technology):* Marcelo Clerici-Arias

*Associate Director for Academic Support:* Adina Glickman

*Tutoring and Academic Skills Specialist:* Staff

*Oral Communication Program Director and Senior Lecturer:* Doree Allen

*Oral Communication Specialist and Tutor Manager:* Lindsey Paul  
*Lecturers:* Thomas Freeland, James Wagstaffe

*Department Offices:* Sweet Hall, 4th floor

*Speaking Center:* Meyer Library 123

*Mail Code:* 94305-3087

*Center Phone:* (650) 723-1326

*Email:* [TeachingCenter@stanford.edu](mailto:TeachingCenter@stanford.edu)

*Web Site:* <http://ctl.stanford.edu>

The Center for Teaching and Learning is a University-wide resource on effective teaching and public speaking for faculty, lecturers, and teaching assistants and on effective learning and public speaking for undergraduates and graduate students. All courses listed with CTL promote acquisition of public speaking skills, enhanced learning skills, and/or teaching excellence. Courses offered by the Center for Teaching and Learning are listed under the subject code CTL on the *Stanford Bulletin's* ExploreCourses web site.

## CTL SERVICES TO UNDERGRADUATES AND GRADUATE STUDENTS

CTL provides academic coaching for undergraduates who want to enhance their study approaches and clarify their learning strategies. Through courses, individual counseling, and workshops, CTL helps students build skills that are the foundation for continuous improvement and lifelong learning. Students benefit from developing and applying individually crafted strategies that build on their existing strengths. Time management, test preparation, note taking, reading comprehension and retention, and procrastination are common topics for discussion. Contact [adinag@stanford.edu](mailto:adinag@stanford.edu) for more information.

Free tutoring is available to undergraduates in many subjects; see <http://tutoring.stanford.edu> for details on where and when tutors can be found. Students with strong academic records, especially in the subject areas that they would like to tutor, may

apply and, if accepted, are expected to take CTL's course on tutoring; the application process takes place each February.

## CTL SERVICES TO FACULTY, LECTURERS, AND TEACHING ASSISTANTS

CTL provides the Stanford community with services and resources on effective teaching. The center's goals are:

- to identify and involve successful faculty, lecturers, and TAs who are willing to share their talents with others
- to provide those who are seeking to improve their teaching with the means to do so
- to acquaint the Stanford community with important innovations and new technologies for teaching
- to prepare new faculty and TAs for their responsibilities
- to contribute to the professional development of teaching assistants
- to expand awareness of the role of teaching at research universities
- to increase the rewards for superior teaching.

CTL is also available to help departments/programs in the design of effective TA training programs.

Resources available to faculty, lecturers, and TAs include: videotaping, microteaching (simulated practice teaching), and consultation; small group and other forms of mid-quarter evaluation; workshops and lectures; a handbook on teaching and a library of teaching materials; quarterly teaching orientations; and work with individuals, groups, and departments on their specific needs. For further details, see CTL's teaching handbook or the CTL brochure, both available by calling (650) 723-1326, or see <http://ctl.stanford.edu>.

For questions or requests, email [TeachingCenter@stanford.edu](mailto:TeachingCenter@stanford.edu).

## ORAL COMMUNICATION PROGRAM

The Oral Communication Program at CTL provides opportunities for undergraduates and graduate students to develop or improve their oral communication skills.

Courses and workshops offer a comprehensive approach to speech communication, including training in the fundamental principles of public speaking and the effective delivery of oral presentations. The goal is to enhance students' general facility and confidence in oral expression. The program also provides innovative, discipline-based instruction to help students refine their personal speaking styles in small groups and classroom settings.

Those interested in individualized instruction or independent study are invited to make an appointment to use the program's Speaking Center in Meyer Library, room 123, where trained student tutors, multimedia, and instructional resource materials are available on an ongoing basis.

Students with a passion for public speaking are encouraged to apply to become oral communication tutors; the application process takes place each January.

To schedule appointments, see <http://speakinghelp.stanford.edu>. For further details, call (650) 725-4149 or 723-1326 or email [speakinghelp@stanford.edu](mailto:speakinghelp@stanford.edu).

# GRADUATE EDUCATION

*Vice Provost for Graduate Education:* Patricia J. Gumpert  
*Associate Vice Provosts for Graduate Education:* John Boothroyd, Chris M. Golde, Sheri D. Sheppard  
*Assistant Dean for Research and Graduate Policy:* Ann George  
*Director of Fellowships and Programs:* Pat Cook  
*Associate Director, Programs and Administration:* Rebecca Jantzen  
*Web site:* <http://vpge.stanford.edu>  
*Office:* Building 310  
*Mail code:* 94305-2102  
*Phone:* (650) 736-0775

The Vice Provost for Graduate Education (VPGE) plays a leadership role in initiating and managing policies and programs that enhance the quality of graduate education for master's, doctoral, and professional students across Stanford's seven schools. VPGE fosters academic innovation and supports the schools and programs that have primary responsibility for organizing and delivering graduate education. In addition to providing University-wide graduate policy direction, the VPGE office has three primary areas of program activity: administering University-wide graduate fellowship programs; advancing graduate student diversity; and promoting cross-school educational opportunities (interdisciplinary learning, and graduate professional development). The Vice Provost for Graduate Education reports to the Provost.

## GRADUATE POLICY

The Faculty Senate Committee on Graduate Studies (C-GS) formulates policy concerning the substance and process of graduate education as well as the evaluation and recording of graduate achievement, and reviews the implementation of such policy. The committee also monitors the academic quality and effectiveness of the University's graduate interdisciplinary and joint degree granting programs. Committee members include the Vice Provost for Graduate Education or her delegated staff (ex officio) and representatives from the faculty at large, administration such as the Office of the University Registrar, and students. The Graduate Student Council and the Nominations Committee of the Associated Students of Stanford University (ASSU) choose student members.

VPGE recommends, promulgates, and interprets University policies related to graduate education. VPGE oversees administrative and financial systems related to graduate student support, including policies related to requirements for research and teaching assistantships, and minimum compensation levels for those positions. For other policies related to graduate admissions and degree requirements, see relevant sections of this bulletin.

## RESEARCH POLICIES FOR GRADUATE STUDENTS

Graduate education and research are interrelated enterprises. Many Stanford graduate students are conducting research under the guidance and sponsorship of Stanford faculty members. The Dean of Research has primary responsibility for oversight of the research enterprise. Several policies in that arena are particularly relevant to graduate students. These include:

*Academic Authorship*—Guidelines related to academic authorship, such as the allocation of responsibility and credit for scholarly publications. For complete text of the guidelines, see Research Policy Handbook memo 2.8, On Academic Authorship,

at <http://rph.stanford.edu/2-8>.

*Intellectual Property*—Policies on copyrights and patents resulting from University work. Graduate students and postdoctoral fellows, as well as all faculty, staff, and visitors engaged in research, must sign the Stanford University Patent and Copyright Agreement. For complete text of the currently applicable versions of these policies, see Research Policy Handbook chapter 5, Intellectual Property, at <http://rph.stanford.edu/Chpt5>.

*Openness in Research*—Policy on openness in research, such as the principle of freedom of access by all interested persons to the underlying data, processes, and final results of research. Stanford University does not accept funding for research projects that require secrecy. For complete text of the currently applicable version of this policy, see Research Policy Handbook memo 2.6, Openness in Research, at <http://rph.stanford.edu/2-6>.

*Relationships between Students and Outside Organizations*—Summary of policies on the establishment of relationships between students and outside entities, such as private companies or nonprofit organizations, as part of or outside the student's academic program at Stanford. This covers open versus proprietary nature of the work, ownership of intellectual property, and possible conflicts of commitment and interest. For complete text of the currently applicable versions of these policies, see Research Policy Handbook memo 2.11, Relationships Between Students (Including Postdoctoral Scholars) and Outside Entities, at <http://rph.stanford.edu/2-11>.

*Research Compliance*—Seven administrative panels review and approve research projects to safeguard the rights and welfare of all human research subjects, ensure the humane care and use of laboratory animals, and protect the safety of personnel and the general public in the areas of biosafety and radiological safety. For more information, contact the Research Compliance Office, <http://researchcompliance.stanford.edu>.

*Research Misconduct*—Policy on allegations, investigations, and reporting of research misconduct. Each member of the University community has a responsibility to foster an environment which promotes intellectual honesty and integrity, and which does not tolerate misconduct in any aspect of research or scholarly endeavor. For complete text of the currently applicable version of this policy, see Research Policy Handbook memo 2.5, Research Misconduct: Policy on Allegations, Investigations and Reporting, at <http://rph.stanford.edu/2-5>.

## GRADUATE FELLOWSHIP PROGRAMS

Several University-wide graduate fellowship programs are administered by the VPGE, including the Stanford Graduate Fellowships Program in Science and Engineering (SGF) and the Stanford Interdisciplinary Graduate Fellowship (SIGF) program. VPGE also administers several smaller University-wide fellowships programs to new and continuing doctoral students that require nomination by faculty or deans.

### STANFORD GRADUATE FELLOWSHIPS PROGRAM IN SCIENCE AND ENGINEERING (SGF)

*Web site:* <http://sgf.stanford.edu>

SGF competitively awards approximately 100 two- and three-year fellowships providing tuition support and stipend to outstanding students pursuing a doctoral degree in the sciences and engineering. SGF fellows can explore labs in a variety of fields. Nominations for SGF fellowships are submitted by science and engineering departments and programs.

### STANFORD INTERDISCIPLINARY GRADUATE FELLOWSHIPS (SIGF)

*Web Site:* <http://sigf.stanford.edu>

The SIGF program awards fellowships on a competitive basis to doctoral students engaged in interdisciplinary research. The fellowships enable Stanford doctoral students to pursue questions that cross traditional disciplinary boundaries. Students in the first three years of their doctoral program are eligible to apply.

## GRADUATE STUDENT DIVERSITY

VPGE works to diversify the graduate student population by supporting recruitment and retention programs in collaboration with faculty and staff in each of the schools. VPGE funds recruitment activities to expand the pool of qualified applicants, such as visits to campus and travel grants. VPGE offers resources to groups within and across schools for activities that enhance the quality of students' educational experiences and improve retention. VPGE also works collaboratively to develop programs that cultivate interest in academic careers and diversify the pipeline for future faculty. The DARE Doctoral Fellowship Program, administered by VPGE, awards two-year fellowships on a competitive basis to Stanford doctoral students in their final two years who want to investigate and prepare for academic careers and whose presence will help to diversify the professoriate.

## CROSS-SCHOOL LEARNING OPPORTUNITIES

VPGE provides seed funding to initiatives that foster cross-school interactions for graduate students. The Stanford Graduate Summer Institute (SGSI) offers noncredit interdisciplinary short courses exclusively for Stanford graduate students and postdoctoral scholars. VPGE also seeks to facilitate enrollment in courses outside of students' home departments and schools.

Leadership, pedagogy, communication, and entrepreneurship are topics of interest to graduate students across the University. VPGE collaborates with other departments, such as the Center for Teaching and Learning, the Graduate Life Office, and the Hume Writing Center to raise the visibility and expand the breadth of these offerings.

### STANFORD GRADUATE SUMMER INSTITUTE (SGSI)

*Web site:* <http://sgsi.stanford.edu>

SGSI courses introduce graduate students to multidisciplinary and interdisciplinary thinking. Students from across the University have the opportunity to meet others outside their fields, create networks, and foster cross-disciplinary collaborations. Most SGSI courses are small and taught in an intensive workshop format at the end of Summer Quarter. Courses are non-credit bearing and free of tuition or fees.

# GRADUATE SCHOOL OF BUSINESS

*Emeriti: (Professors)* David P. Baron, William H. Beaver, Charles P. Bonini, Alain C. Enthoven,\* Robert J. Flanagan,\* J. Michael Harrison,\* Charles A. Holloway,\* Charles T. Horngren, James E. Howell, Robert K. Jaedicke, Robert L. Joss,\* James G. March, Joanne Martin, Arjay Miller, James R. Miller III, William F. Miller, David B. Montgomery, George G. C. Parker,\* Jerry I. Porras, Evan L. Porteus,\* Michael L. Ray, Henry S. Rowen, Myron S. Scholes\*, William F. Sharpe, George P. Shultz, A. Michael Spence, Venkataraman Srinivasan, James C. Van Horne, Robert B. Wilson\*; (*Associate Professor*) Andrea Shepard; (*Senior Lecturers*) David L. Bradford,\* Steven Brandt, Kirk O. Hanson; (*Lecturer*) Robert Augsburg

*Dean:* Garth Saloner

*Senior Associate Deans:* Glenn R. Carroll, Peter M. DeMarzo, Madhav Rajan

*Associate Deans:* Gale H. Bitter, Rajkumar Chellaraj, Sharon J. Hoffman, Ranga Jayaraman, Sharon A. Marine, Claudia J. Morgan, Blair Shane

*Assistant Deans:* Derrick Bolton, Pulin Sanghvi, Priya Singh, Robert Urstein

*Professors:* Jennifer L. Aaker, Anat R. Admati, William P. Barnett, Mary E. Barth, Jonathan Bendor, Lanier Benkart, Jonathan B. Berk, David W. Brady, Jeremy I. Bulow, Robert A. Burgelman, Glenn R. Carroll, Peter M. DeMarzo, J. Darrell Duffie, Yossi Feinberg, Francis J. Flynn, George Foster, Steven R. Grenadier, Deborah H. Gruenfeld, Michael T. Hannan, Chip Heath, Charles I. Jones, Ron Kasznik, Daniel P. Kessler, Roderick M. Kramer, Keith Krehbiel, Ilan Kremer, David M. Kreps, David F. Larcker, James M. Lattin, Edward P. Lazear, Charles M.C. Lee, Hau L. Lee, John G. McDonald, Maureen F. McNichols, Haim Mendelson, Dale T. Miller, Margaret A. Neale, Charles A. O'Reilly III, Paul Oyer, James M. Patell, Jeffrey Pfeffer, Paul C. Pfleiderer, Erica L. Plambeck, Madhav Rajan, Hayagreeva Rao, Stefan J. Reichelstein, Peter C. Reiss, Condoleezza Rice, D. John Roberts, Garth Saloner, Kathryn L. Shaw, Baba Shiv, Kenneth W. Shotts, Itamar Simonson, Kenneth J. Singleton, Andrzej Skrzypacz, Jesper Sørensen, Sarah A. Soule, Larissa Z. Tiedens, Lawrence W. Wein, Seungjin Whang, Stefanos Zenios, Jeffrey H. Zwiebel

*Associate Professors:* Anne Beyer, Steven Callander, Wesley Hartmann, Dirk Jenter, Uzma Khan, Jonathan Levav, Brian S. Lowery, Neil Malhotra, Benoit Monin, Elizabeth Mullen, Stefan Nagel, Harikesh S. Nair, Sridhar Narayanan, Michael Ostrovsky, Joseph D. Piotroski, Ilya A. Strebulaev, Zakary L. Tormala, S. Christian Wheeler

*Assistant Professors:* Mohsen Bayati, John L. Beshears, Konstantinos Bimpikis, Jules H. van Binsbergen, T. Renee Bowen, Bradyn Breon-Drish, Katherine Casey, John-Paul Ferguson, Pedro Gardete, Amir Goldberg, Ilan Guttman, Sharique Hasan, John W. Hatfield, Dan A. Iancu, Joy Ishii, Saumitra Jha, Arthur G. Korteweg, Peter Koudijs, Nicholas S. Lambert, Ivan Marinovic, Ian Martin, Maria Ogneva, Francisco Pérez-González, Mar Reguant-Rido, Stephan Seiler, Monic J. Sun, Robert P. Swinney, Ali Yurukoglu

*Professor (Teaching):* James A. Phillips, Jr.

*Acting Assistant Professors:* Nir Halevy, David J. Hardisty

*Courtesy Professors:* Michele Barry, Eric P. Bettinger, Nicholas Bloom, Timothy F. Bresnahan, M. Kate Bundorf, Geoffrey L. Cohen, Robert M. Daines, Joseph Grunfest, Warren H. Hausman, Ronald A. Howard, Mark G. Kelman, Larry Kramer, Jonathan D. Levin, Daniel A. McFarland, Debra E. Meyerson,

Paul R. Milgrom, Walter W. Powell, Ilya Segal, Robert I. Sutton, Paul Yock

*Lecturers:* Douglas Abbey, Matthew Abrahams, Laura K. Arrillaga-Andreessen, Rick Aubry, Kirk D. Bowman, Scott Bristol, Anne Casscells, Safra A. Catz, Jeffrey Chambers, Patricia Chang, Robert B. Chess, Michael Child, Stephen J. Ciesinski, David Demarest, Gary Dexter, David M. Dodson, R. James Ellis, Christopher M. Flink, Richard P. Francisco, Andrew S. Grove, William Guttentag, Keith Hennessey, Mary Ann Huckabay, John Hurley, Franklin P. Johnson, Jr., Efrat Kasznik, Peter B. Kelly, Dan Klein, Stuart L. Klein, Kay Kostopoulos, Mary Lang, Mark Leslie, Peter Levine, Leo E. Linbeck III, David Lockwood, R. Bruce McKern, William L. McLennan, William F. Meehan III, John P. Morgridge, Robert Pearl, John Powers, Andrew Rachleff, Jennifer Ratay, Dan Reicher, Carole Robin, Dennis M. Rohan, Howard Rosen, JD Schramm, Robert Seigel, Russell Siegelman, F. Victor Stanton, Mark A. Stevens, Myra H. Strober, Kevin Taweel, Kevin Warsh, John G. Watson, Jane Wei-Skillern, Peter C. Wendell, Lauren Zander, Amy Zegart

*Consulting Professors:* Anthony S. Bryk, H. Irving Grousbeck, Mark A. Wolfson

*Acting Instructors:* Leslie Chin, Richard Kass

*Visiting Professors:* Edward Kaplan, John Van Reenen

\* Recalled to active duty.

The mission of the Graduate School of Business is to create ideas that deepen and advance the understanding of management and, with these ideas, develop innovative, principled, and insightful leaders.

The two-year Master of Business Administration (M.B.A.) degree program is for students who aspire to contribute to society through leadership in business, government, and the nonprofit sector. The general management curriculum rests on a foundation of social science principles and management functions layered with interdisciplinary themes of leadership, entrepreneurship, global management, and social responsibility. The M.B.A. curriculum stresses breadth rather than depth, but includes options for certificates in Global Management and Public Management. A number of joint degree programs allow the M.B.A. to be combined with degrees in the Schools of Education, Law, and Medicine, as well as interdisciplinary degrees in Public Policy and Environment and Resources. The primary criteria for admission are demonstrated leadership potential, intellectual vitality, and diversity among students. No specific undergraduate major or courses are required for admission, but experience with analytic and quantitative concepts is important. Some students enter directly following undergraduate study, but most obtain one or more years of work experience.

The Stanford Sloan Program is an intensive, one-year course of study for middle management executives leading to the degree of Master of Science in Management. Participants must have demonstrated superior achievement and are normally sponsored by their company.

Those interested in college teaching and research are served by the Doctor of Philosophy program.

For detailed information on programs, curricula, and faculty, see the School's web site at <http://gsb.stanford.edu>.

# SCHOOL OF EARTH SCIENCES

Dean: Pamela A. Matson

Associate Dean, Academic Affairs: Stephan A. Graham

Associate Dean, Multicultural Affairs: Jerry M. Harris

Assistant Dean, Academic Affairs: Roni Holeyton

Assistant Dean, Multicultural Affairs: Tenea M. Nelson

Courses offered by the School of Earth Sciences are listed under the subject code EARTHSCI on the *Stanford Bulletin's* ExploreCourses web site. Courses offered by departments and programs of the school are linked on their separate sections, and are available at the ExploreCourses web site.

The School of Earth Sciences includes the departments of Geological and Environmental Sciences, Geophysics, Energy Resources Engineering (formerly Petroleum Engineering), and Environmental Earth System Science; and three interdisciplinary programs: the Earth Systems undergraduate and co-terminal M.S. program, the Emmett Interdisciplinary Graduate Program in Environment and Resources (E-IPER), and the Earth, Energy, and Environmental Sciences Graduate Program (EEES). The Earth Systems Program and E-IPER offer study in biophysical and social dimensions of environment and resources, while EEES is intended for students working across departments and disciplines within the School of Earth Sciences.

The aims of the school are:

1. to prepare students for careers in the fields of biogeochemistry, climate science, energy resource engineering, environmental science, geology, geochemistry, geomechanics, geophysics, geostatistics, hydrogeology, land science, oceanography, petroleum engineering, and petroleum geology
2. to conduct research in the Earth sciences
3. to provide opportunities for Stanford undergraduates to learn about the planet's history, to understand the energy and resource base that supports humanity, to appreciate the geological and geophysical hazards that affect human societies, and to understand the challenges and solutions related to the environment and sustainability.

To accomplish these objectives, the school offers a variety of programs adaptable to the needs of the individual student:

- four-year undergraduate programs leading to the degree of Bachelor of Science (B.S.)
- five-year programs leading to the coterminal Bachelor of Science and Master of Science (M.S.)
- graduate programs offering the degrees of Master of Science, Engineer, and Doctor of Philosophy.

Details of individual degree programs are found in the section for each department or program.

## UNDERGRADUATE PROGRAMS IN EARTH SCIENCES

Any undergraduate admitted to the University may declare a major in one of the Earth Science departments or programs by contacting the appropriate department or program office.

Requirements for the B.S. degree are listed in each department or program section. Departmental academic advisers work with students to define a career or academic goal and assure that the student's curricular choices are appropriate to the pursuit of that goal. Advisers can help devise a sensible and enjoyable course of study that meets degree requirements and provides the student with

opportunities to experience advanced courses, seminars, and research projects. To maximize such opportunities, students are encouraged to complete basic science and mathematics courses in high school or during their freshman year.

Each department offers an honors program involving research during the senior year. Each department also offers an academic minor for those undergraduates majoring in compatible fields. The Earth Systems Program also offers an honors program in Environmental Science, Technology, and Policy through the Woods Institute for the Environment.

## COTERMINAL BACHELOR'S AND MASTER'S DEGREES IN EARTH SCIENCES

The Stanford coterminal degree plan enables an undergraduate to embark on an integrated program of study leading to the master's degree before requirements for the bachelor's degree have been completed. This may result in more expeditious progress towards the advanced degree than would otherwise be possible, making the program especially important to Earth scientists because the master's degree provides an excellent basis for entry into the profession. The coterminal plan permits students to apply for admission to a master's program after earning 120 units, but no later than the quarter prior to the expected completion of the undergraduate degree.

Under the plan, the student may meet the degree requirements in the more advantageous of the following two ways: by first completing the 180 units required for the B.S. degree and then completing the three quarters required for the M.S. degree; or by completing a total of 15 quarters during which the requirements for the two degrees are completed concurrently. In either case, the student has the option of receiving the B.S. degree upon meeting all the B.S. requirements or of receiving both degrees at the end of the coterminal program. Students earn degrees in the same department or program, in two different departments, or even in different schools; for example, a B.S. in Physics and an M.S. in Geological and Environmental Sciences. Students are encouraged to discuss the coterminal program with their advisers during their junior year. Additional information is available in the individual department offices.

University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees" section of this bulletin. For University coterminal degree program rules and University application forms, see <http://studentaffairs.stanford.edu/registrar/publications#Coterm>.

## GRADUATE PROGRAMS IN EARTH SCIENCES

*Admission to the Graduate Program*—A student who wishes to enroll for graduate work in the school must be qualified for graduate standing in the University and also must be accepted by one of the school's four departments or one of the two interdisciplinary Ph.D. programs. One requirement for admission is submission of scores on the verbal and quantitative sections of the Graduate Record Exam. Admission to one department of the school does not guarantee admission to other departments.

*Faculty Adviser*—Upon entering a graduate program, the student should report to the head of the department or program who arranges with a member of the faculty to act as the student's adviser. Alternatively, in several of the departments, advisers are established through student-faculty discussions prior to admission. The student, in consultation with the adviser(s), then arranges a

course of study for the first quarter and ultimately develops a complete plan of study for the degree sought.

*Financial Aid*—Detailed information on scholarships, fellowships, and research grants is available from the school's individual departments and programs. Applications should be filed by the various dates listed in the application packet for awards that become effective in Autumn Quarter of the following academic year.

## EARTH, ENERGY, AND ENVIRONMENTAL SCIENCES GRADUATE PROGRAM (EEES)

*Director:* Kevin R. Arrigo

*Academic Oversight Committee:* Kevin Arrigo (Environmental Earth System Science), Biondo Biondi (Geophysics), Jef Caers (Energy Resources Engineering), Louis Durlofsky (Energy Resources Engineering), Scott Fendorf (Environmental Earth System Science)

*Program Offices:* Yang and Yamazaki Environment and Energy Building, Room 139

*Mail Code:* 94305-4216

*Email:* lreys@stanford.edu

Courses offered by the Earth, Energy, and Environmental Sciences Program are listed under the subject code EEES on the *Stanford Bulletin's* ExploreCourses web site.

The Earth, Energy, and Environmental Sciences Graduate Program (EEES) is not accepting new students. The program continues to provide courses and advising for students already enrolled.

The goal of Earth, Energy, and Environmental Sciences (EEES) is to complement the disciplinary Earth Science and Engineering programs offered within the departments of the School of Earth Sciences and to train graduate students to integrate knowledge from these disciplines through tools and methods needed to evaluate the linkages among physical, chemical, and biological systems of the Earth, and understand the dynamics or evolution of these integrated systems and the resources they provide.

Students in EEES must make significant headway in, and combine insights from, more than one scientific discipline. For example, a student whose goal is to understand the structure of the Earth's interior using computational methods might design a study plan that includes high-level mathematics, numerical modeling, and geophysical imaging techniques. A student interested in water management might integrate water flow analysis and modeling, geophysical imaging, geostatistics, and satellite remote sensing of changes in agricultural intensity and land use. A student interested in marine carbon cycling might use knowledge and tools from numerical modeling, marine biogeochemistry and geochemistry, oceanography, and satellite imaging. The key to the program is its academic flexibility and ability to exploit an increasingly interdisciplinary faculty, particularly in the School of Earth Sciences, but also in the greater Stanford community.

### GRADUATE PROGRAMS IN EARTH, ENERGY, AND ENVIRONMENTAL SCIENCES

The University's basic requirements for the M.S. and Ph.D. degrees are discussed in the "Graduate Degrees" section of this bulletin.

### MASTER OF SCIENCE IN EARTH, ENERGY, AND ENVIRONMENTAL SCIENCES

The objective of the M.S. degree in Earth, Energy, and Environmental Sciences is to prepare the student either for a professional career or for doctoral studies.

Students in the M.S. degree program must fulfill the following requirements:

1. Complete EARTHSCI 300, Earth Sciences Seminar, during their first quarter of enrollment.
2. Complete a 45-unit program of study, of which a minimum of 30 units must be course work, with the remainder consisting of no more than 15 research units.
3. Course work units must be divided among two or more scientific and/or engineering disciplines and can include the three core courses required for the Ph.D. degree.
4. The program of study must be approved by the research adviser and the academic oversight committee.
5. Each candidate must either present and defend the results of his or her research at a public oral presentation attended by the candidate's advisor at least two faculty members, or submit a thesis/report to the candidate's advisor and at least two faculty members.

### DOCTOR OF PHILOSOPHY IN EARTH, ENERGY, AND ENVIRONMENTAL SCIENCES

University requirements for the Ph.D. are described in the "Graduate Degrees" section of this bulletin. The Interdepartmental Program in Earth, Energy, and Environmental Sciences has the following requirements:

1. Ph.D. students must complete EARTHSCI 300, Earth Sciences Seminar, during their first quarter of enrollment.
2. Students must complete a minimum of 13 courses, including the three core courses and five courses from each of the two areas of specialization. At least half of the ten non-core classes must be at a 200 level or higher, and all must be taken for a letter grade. Students obtaining their M.S. from within the program can apply all master's units toward Ph.D. requirements. Students with an M.S. degree or other specialized training from outside EEES may be able to waive some of the non-core course requirements, depending on the nature of the prior courses or training. The number and distribution of courses to be taken by these students is determined with input from the research advisers and academic oversight committee.
3. Prior to the formation of a thesis committee, the student works with research advisers and the academic oversight committee to design a course of study with depth in at least two areas of specialization and preparation in analytical methods and skills. Students can select other courses from departments of the School of Earth Sciences and other University departments as appropriate. All courses must be approved by the student's thesis committee or by the academic oversight committee. The research advisers and academic oversight committee have primary responsibility for the adequacy of the course of study.
4. During Spring Quarter of each year, students must undergo an annual review by their thesis committee to allow the committee to monitor the progress of the student and make recommendations, where necessary.
5. Prior to taking the oral qualifying examination at or before the end of the sixth academic quarter, the student must have completed 24 units of letter-graded course work, developed a written crossdisciplinary dissertation proposal suitable for submission to a funding organization, and selected a thesis committee.
6. To be admitted to candidacy for the Ph.D. degree, the student must pass an oral qualifying examination. At least two of the minimum four-member examining committee must be faculty



within the School of Earth Sciences. During the exam, students present and defend their proposed thesis research work; the exam generally takes the form of a 20-30 minute presentation by the student, followed by 1-2 hours of questioning.

7. The research advisers and two other faculty members comprise the dissertation reading committee. Upon completion of the thesis, the student must pass a University Oral Examination in defense of the dissertation.

Additional information may be found in the *Graduate Academic Policies and Procedures* handbook at <http://gap.stanford.edu/>.

## EARTH SYSTEMS

*Director:* Robert B. Dunbar

*Associate Director, Academics:* Julie Kennedy

*Associate Director, Administration:* Deana Fabbro-Johnston

*Committee of the Whole:* Nicole Ardoin (School of Education, Woods Institute for the Environment), Kevin Arrigo (Environmental Earth System Science), Gregory Asner (Department of Global Ecology, Carnegie Institution), Barbara Block (Biology, Hopkins Marine Station, Woods Institute for the Environment), Carol Boggs (Biology), Margaret Caldwell (Law, Woods Institute for the Environment), Karen Casciotti (Environmental Earth System Science), Page Chamberlain (Environmental Earth System Science), Gretchen Daily (Biology, Woods Institute for the Environment), Jenna Davis (Civil and Environmental Engineering, Woods Institute for the Environment), Mark Denny (Biology, Hopkins Marine Station), Noah Diffenbaugh (Environmental Earth System Science, Woods Institute for the Environment), Rodolfo Dirzo (Biology), Robert B. Dunbar (Earth Systems, Environmental Earth System Science, Woods Institute for the Environment), William Durham (Anthropology), Gary Ernst (Geological and Environmental Sciences, emeritus), Walter Falcon (Freeman Spogli Institute for International Studies, emeritus, Woods Institute for the Environment), Scott Fendorf (Environmental Earth System Science, Woods Institute for the Environment), Christopher Field (Department of Global Ecology, Carnegie Institution, Woods Institute for the Environment), Christopher Francis (Environmental Earth System Science), Zephyr Frank (History), David Freyberg (Civil and Environmental Engineering, Woods Institute for the Environment), Margot Gerritsen (Energy Resources Engineering), Deborah Gordon (Biology, Woods Institute for the Environment), Steven Gorelick (Environmental Earth System Science, Woods Institute for the Environment), Elizabeth Hadly (Biology), George Hilley (Geological and Environmental Sciences), David Kennedy (History, Woods Institute for the Environment), Donald Kennedy (Biology, Freeman Spogli Institute for International Studies, emeritus, Woods Institute for the Environment), Julie Kennedy (Earth Systems, Environmental Earth System Science, Woods Institute for the Environment), Rosemary Knight (Geophysics, Woods Institute for the Environment), Jeffrey Koseff (Civil and Environmental Engineering, Woods Institute for the Environment), Anthony Kovscek (Energy Resources Engineering), Eric Lambin (Environmental Earth System Science, Woods Institute for the Environment), David Lobell (Environmental Earth System Science, Woods Institute for the Environment), Gilbert Masters (Civil and Environmental Engineering), Pamela Matson (Dean, School of Earth Sciences, Freeman Spogli Institute for International Studies, Woods Institute for the Environment), Stephen Monismith (Civil and Environmental Engineering, Woods Institute for the Environment), Harold Mooney (Biology, Woods Institute for the Environment), Rosamond Naylor (Environmental Earth System Science, Freeman Spogli Institute for International Studies, Woods Institute for the Environment), Stephen Palumbi (Biology, Hopkins Marine Station, Woods Institute for the Environment), Jonathan Payne (Geological and Environmental

Sciences), Bala Rajaratnam (Environmental Earth System Science, Statistics), Gary Schoolnik (Medicine, Woods Institute for the Environment), George Somero (Biology, Hopkins Marine Station), James Sweeney (Management Science and Engineering, Woods Institute for the Environment), Paul Switzer (Environmental Earth System Science, Emeritus, Statistics, Emeritus), Leif Thomas (Environmental Earth System Science), Barton Thompson, Junior (Law, Woods Institute for the Environment), Peter Vitousek (Biology, Interdisciplinary Program in Environment and Resources, Woods Institute for the Environment), Virginia Walbot (Biology), Mark Zoback (Geophysics)

*Program Office:* Yang and Yamazaki Environment and Energy (Y2E2) Building, Room 131

*Mail Code:* 94305-4215

*Phone:* (650) 725-7427

*Email:* [deana@stanford.edu](mailto:deana@stanford.edu) or [emburns@stanford.edu](mailto:emburns@stanford.edu)

*Web Site:* <http://earthsystems.stanford.edu>

Courses offered by the Earth Systems Program are listed under the subject code EARTHSYS on the *Stanford Bulletin's* ExploreCourses web site.

### MISSION OF THE UNDERGRADUATE PROGRAM IN EARTH SYSTEMS

The Earth Systems Program is an interdisciplinary environmental science major. Students learn about and independently investigate complex environmental problems caused by human activities in interaction with natural changes in the Earth system. Earth Systems majors become skilled in those areas of science, economics, and policy needed to tackle the globe's most pressing environmental problems, becoming part of a generation of scientists, professionals, and citizens who approach and solve problems in a new way: a systematic, interdisciplinary way.

For students to be effective contributors to solutions for such problems, their training and understanding must be both broad and deep. To this end, Earth Systems students take courses in the fundamentals of biology, calculus, chemistry, geology, and physics, as well as economics, policy, and statistics. After completing breadth training, they concentrate on advanced work in one of five focus areas: biology, energy, environmental economics and policy, land systems, or oceanography. Tracks are designed to support focus and rigor but include flexibility for specialization. Examples of specialized focus have included but are not limited to environment and human health, sustainable agriculture, energy economics, sustainable development, business and the environment, and marine policy. Along with formal course requirements, Earth Systems students complete a 9-unit (270-hour) internship. The internship provides a hands-on academic experience working on a supervised field, laboratory, government, or private sector project.

The following is an outline of the sequential topics covered and skills developed in this major.

1. *Fundamentals:* The Earth Systems Program includes courses that describe the natural workings of the physical and biological components of the Earth, as well as courses that describe the human activities that lead to change in the Earth system. Training in fundamentals includes introductory course work in geology, biology, chemistry, physics, and economics. Depending on the Earth Systems track chosen, training may also include introduction to the study of energy systems, microbiology, oceans, or soils.
2. *System Interactions:* Focus in these courses is on the fundamental interactions among the physical, biological, and human components of the Earth system. The dynamics of the interplay between natural variation and human-imposed influences must be understood to achieve effective solutions to environmental problems. Earth Systems courses that introduce students to the dynamic and multiple interactions that characterize global change problems include EARTHSYS 10, Introduction to Earth Systems, EARTHSYS 111, Biology and

Global Change, and EARTHSYS 112, Human Society and Environmental Change. Competence in understanding system-level interactions is critical to development as an Earth Systems thinker, so additional classes that meet this objective are excellent choices as electives.

3. *Skills Development*: Students take skills courses that help them to recognize, quantify, describe, and help solve complex problems that face society.

Field and laboratory methods can help students to recognize the scope and nature of environmental change. For example, training in satellite remote sensing and geographic information systems allows students to monitor and analyze large-scale spatial patterns of change. This training is either required or recommended for all tracks.

Quantification of environmental problems requires training in single and multivariable calculus, linear algebra, and statistics. Training in statistics is specific to the area of focus: geostatistics, biostatistics, econometrics.

Success in building workable solutions to environmental problems is linked to the ability to effectively communicate ideas, data, and results. Writing intensive courses (WIM) help students to communicate complex concepts to expert and non-expert audiences. All Stanford students must complete one WIM course in their major. The Earth Systems WIM courses are EARTHSYS 260 and EARTHSYS 200. Other Earth Systems courses also focus on effective written and oral communication and are recommended.

Effective solutions to environmental problems take into consideration natural processes as well as human needs. Earth Systems emphasizes the importance of interdisciplinary analysis and implementation of workable solutions through the required 9-unit internship, EARTHSYS 260, and knowledge synthesis in EARTHSYS 210, Senior Seminar.

A comprehensive list of environmental courses, as well as advice on those that focus on problem solving, is available in the program office.

The Earth Systems Program provides an advising network that includes faculty, staff, and student peer advisers.

## LEARNING OUTCOMES

The program expects majors to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the program's undergraduate degree. Students are expected to:

1. demonstrate knowledge of foundational skills and concepts relevant to interdisciplinary study of the environment.
2. analyze environmental problems at the interface of natural and human systems in an interdisciplinary fashion.
3. demonstrate the ability to communicate complex concepts and data to expert and non-expert audiences.
4. apply relevant science, economics, engineering, and policy to problem analysis and proposed solutions, both independently and as part of a team.

## BACHELOR OF SCIENCE IN EARTH SYSTEMS

The B.S. in Earth Systems (EARTHSYS) requires the completion of at least 87 units that can be divided into three levels of courses. The student must complete a series of courses comprising a broad base of specialized study which includes the Earth Systems core, as well as track-specific requirements and electives. Finally, the student must carry out a senior-level research or internship project and participate in the Senior Seminar, as well as the writing in the major (WIM) requirement.

### REQUIRED CORE

<i>Subject and Catalog Number</i>	<i>Units</i>
EARTHSYS 10. Introduction to Earth Systems	4
EARTHSYS 111. Biology and Global Change	4
EARTHSYS 112. Human Society and Environmental Change	4

EARTHSYS 210A, B, C, or D. Senior Seminar	3
EARTHSYS 260. Internship	9

## REQUIRED FOUNDATION AND BREADTH COURSES

### Biology (any one course below):

BIO 41. Genetics, Biochemistry, and Molecular Biology	5
or BIO 43. Plant Biology, Evolution, and Ecology	5
or BIOHOPK 43. Plant Biology, Evolution, and Ecology	5
or BIO 101. Ecology	3
or EARTHSYS 5. Ecology for Everyone	4
or HUMBIO 2A,B. Genetics, Evolution and Ecology; Culture Evolution, and Society	10

### Chemistry:

CHEM 31A. Chemical Principles I	4
CHEM 31B. Chemical Principles II	4
or CHEM 31X. Chemical Principles	4

### Economics:

ECON 1A. Elementary Microeconomics	5
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### Geological and Environmental Sciences:

GES 1A, B, or C. Fundamentals of Geology	4-5
or EESS 2. Earth System History	3

### Mathematics:

MATH 19. Calculus	3
MATH 20. Calculus	3
MATH 21. Calculus	4
or MATH 41. Calculus	5
MATH 42. Calculus	5
MATH 51. Linear Equations and Differential Calculus of Several Variables	5

### Probability and Statistics (any one course below):

BIOHOPK 174H. Experimental Design and Probability	3
BIO 141. Biostatistics (Same as STATS 141)	4
ECON 102A. Introduction to Statistical Methods for Social Scientists	5
EESS 160. Statistical Methods for Earth and Environmental Sciences	4
EESS 161. Geostatistics	4
STATS 60. Introduction to Statistical Methods	5
STATS 110. Statistical Methods in Engineering and Physical Sciences	4
STATS 116. Theory of Probability	3-5

### Physics:

See individual track requirements	3-8
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More extensive work in mathematics and physics may be valuable for those planning graduate study. Graduate study in ecology and evolutionary biology and in economics requires familiarity with differential equations, linear algebra, and stochastic processes. Graduate study in geology, oceanography, and geophysics may require more physics and chemistry. Students should consult their adviser for recommendations beyond the requirements specified above.

## TRACKS

### ANTHROSPHERE

#### Additional foundation and breadth courses:

ECON 50. Economic Analysis	5
ECON 155. Environmental Economics and Policy	5
One physics class from the PHYSICS 20 or 40 series or EARTHSYS 70 (seek advice from Program leadership)	3-4

Choose one course in each of the three following sub-categories, with a total of six required. At least one of the six must be a skills class marked with an asterisk (\*).

#### Economics and Environmental Policy:

ECON 51. Economic Analysis II	5
ECON 102B. Introduction to Econometrics*	5
ECON 150. Economic Policy Analysis	5
ECON 154. Economics of Legal Rules and Institutions	5
EARTHSYS 147. Controlling Climate Change in the 21st Century	3

EARTHSYS 175. The California Coast: Science, Policy, and Law	3-4	ANTHRO 115A. Environmental Crises and State Collapse: Lessons from the Past	3
MS&E 197. Ethics and Public Policy	5	ANTHRO 162. Indigenous Peoples and Environmental Problems	3-5
MS&E 243. Energy and Environmental Policy Analysis	3	ANTHRO 165. Parks and Peoples: The Benefits and Costs of Protected Area Conservation	5
MS&E 248. Economics of Natural Resources	3-4	ANTHRO 166. Political Ecology of Tropical Land Use	3-5
MS&E 294. Climate Policy Analysis	3	HUMBIO 111. Human Dimensions of Global Environmental Change	3
MS&E 295. Energy Policy Analysis	3	HUMBIO 114. Environmental Change and Emerging Infectious Diseases	3-5
<b>Social Entrepreneurship and the Environment:</b>		HUMBIO 118. Theory of Ecological and Environmental Anthropology	5
CEE 151. Negotiation	3	<b>ENERGY SCIENCE AND TECHNOLOGY</b>	
ENGR 231. Transformative Design	3-5	ADDITIONAL FOUNDATION AND BREADTH COURSES:	
GSBGEN 339. Environmental Innovation, Sustainability, and Entrepreneurship	4	PHYSICS 43. Electricity and Magnetism	4
MS&E 180. Organizational Behavior: Evidence in Action	3-4	PHYSICS 45. Light and Heat	4
MS&E 264. Sustainable Product Development and Manufacturing	3	<b>Energy Resources and Technology:</b>	
MS&E 277. Creativity and Innovation	4	CEE 176A. Energy Efficient Buildings	3-4
MS&E 288. Creating Infectious Action	3-4	CEE 176B. Electric Power: Renewables and Efficiency	3-4
ME 206A. Entrepreneurial Design for Extreme Affordability	4	EARTHSYS 101. Energy and the Environment	3
ME 221. Green Design Strategies and Metrics	2	Choose one of the following:	
ME 222. Design for Sustainability	2-3	CEE 172P. Distributed Generation and Grid Integration of Renewables	3-4
ME 377. Design Thinking Bootcamp	3-4	CEE 215. Goals and Methods of Sustainable Building Projects	3
URBANST 132. Concepts and Analytical Skills for the Social Sector*	4	CEE 226. Life Cycle Assessment for Complex Systems	3-4
URBANST 133. Social Entrepreneurship Collaboratory	4	EARTHSYS 102. Renewable Energy Sources and Greener Energy Processes	3
<b>Sustainable Development:</b>		EARTHSYS 103. Energy Resources	4-5
ANTHRO 115A. Environmental Crises and State Collapse	3	ENERGY 104. Transition to Sustainable Energy Systems	3
ANTHRO 161. Human Behavioral Ecology	3-5	ENERGY 153. Carbon Capture and Sequestration	3-4
ANTHRO 162. Indigenous Peoples and Environmental Problems	3-5	MS&E 491. Clean Energy Development	3
ANTHRO 343. Culture as Commodity	5	<b>Energy Fundamentals:</b>	
ANTHRO 349. Anthropology of Capitalism	5	ENGR 30. Engineering Thermodynamics	3
BIO 102. Demography: Health, Development, Environment	3	<b>Energy Policy (Choose one):</b>	
CEE 124. Sustainable Development Studio (must be taken for at least 3 units)	1-5	EARTHSYS 147. Controlling Climate Change in the 21st Century	3
EARTHSYS 142A. Negotiating Sustainable Development	3	MS&E 243. Energy and Environmental Policy Analysis	3
ECON 52. Economic Analysis III*	5	MS&E 294. Climate Policy Analysis	3
ECON 106. World Food Economy*	5	MS&E 295. Energy Policy Analysis	3
ECON 118. The Economics of Development	5	<b>LAND SYSTEMS</b>	
HUMBIO 118. Theory of Environmental and Ecological Anthropology	5	<b>Additional foundation and breadth courses:</b>	
MS&E 491. Clean Energy Development	3	EARTHSYS 144. Fundamentals of GIS	4
POLISCI 140. Political Economy of Development	5	PHYSICS 45. Light and Heat	4
POLISCI 143. Nongovernmental Organizations and Development in Poor Countries	5	Choose six courses, with at least one from each grouping:	
POLISCI 337T. Designing Liberation Technology	3-4	<b>Land:</b>	
URBANST 163. Land Use Control	4	BIO 125. Ecosystems of California	3
<b>BIOSPHERE</b>		BIO 144. Conservation Biology	3-4
<b>Additional foundation and breadth courses:</b>		EARTHSYS 143J. Climate Change in the West: A History of the Future	5
BIO 41. Genetics, Biochemistry, and Molecular Biology	5	ECON 106. World Food Economy	5
BIO 43. Plant Biology, Evolution, and Ecology	5	EESS 155. Science of Soils	4
or BIOHOPK 43. Plant Biology, Ecology, and Evolution	5	HISTORY 254. Popular Culture and American Nature	5
or EARTHSYS 5. Ecology for Everyone	4	<b>Water:</b>	
CHEM 33. Structure and Reactivity	4	CEE 101B. Mechanics of Fluids	4
PHYSICS 41. Mechanics	4	CEE 166A. Watersheds and Wetlands	3
or EARTHSYS 70. How the Earth Works: Physics for Earth and Environmental Scientists	3	CEE 166B. Floods and Droughts, Dams and Aqueducts	3
<b>Biogeochemistry (choose one):</b>		CEE 171. Environmental Planning Methods	3
BIO 216. Terrestrial Biogeochemistry	3	CEE 177. Aquatic Chemistry and Biology	4
EESS 143. Marine Biogeochemistry	3-4	CEE 265D. Water and Sanitation in Developing Countries	3
EESS 155. Science of Soils	4	EARTHSYS 104. The Water Course	3
<b>Conservation Biology (choose one):</b>		GES 130. Soil Physics and Hydrology	3
BIO 137. Plant Genetics	3-4	<b>Urban:</b>	
BIOHOPK 173H. Marine Conservation Biology	3	CEE 115. Goals and Methods of Sustainable Building Projects	3
HUMBIO 112. Conservation Biology	4	CEE 124. Sustainable Development Studio	3-5
<b>Ecology (choose two):</b>		CEE 176A. Energy Efficient Buildings	3-4
BIO 101. Ecology	3	URBANST 110. Introduction to Urban Studies	4
BIO 125. Ecosystems of California	3	URBANST 113. Introduction to Urban Design	5
BIO 136. Evolutionary Paleobiology	4	URBANST 163. Land Use Control	4
BIO 145. Behavioral Ecology	4	URBANST 165. Sustainable Urban and Regional Transportation Planning	4-5
BIO 164. Biosphere-Atmosphere Interactions	4		
GES 123. Invertebrate Paleobiology	4		
<b>Ecosystems and Society (choose one):</b>			

**OCEANS**

ADDITIONAL FOUNDATION AND BREADTH COURSES:

EESS 8. The Oceans: An Introduction to the Marine Environment	3
PHYSICS 41. Mechanics	4
<i>or</i> EARTHSYS 70. How the Earth Works: Physics for Earth and Environmental Scientists	3
PHYSICS 45. Light and Heat	4

**Physics of the Sea:**

CEE 164. Introduction to Physical Oceanography	4
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**Biological Oceanography (choose one):**

BIOHOPK 163H. Oceanic Biology	4
EESS 143. Marine Biogeochemistry	3-4

**Remote Sensing of the Ocean (choose one):**

EESS 141. Remote Sensing of the Ocean	4
EARTHSYS 144. Fundamentals of Geographic Information Science (GIS)	4

**Additional Requirement (choose one):**

- One quarter Stanford@SEA (EARTHSYS 323)
- One quarter abroad at the Stanford in Australia Program
- One quarter at the Hopkins Marine Station

**EARTH SYSTEM SCIENCE TRACK**

A tailored interdisciplinary course of study constructed under the guidance of Program Directors and the faculty adviser. See Associate Director of Academics for additional information.

**UPPER-DIVISION ELECTIVES**

Two to three additional courses at the 100-level or above are required. Electives allow students to personalize their curriculum by pursuing higher-level courses offered in their focus area, or by incorporating new academic perspectives. Each must be a minimum of three units and approved by an adviser.

**SUMMARY OF COURSE REQUIREMENTS AND UNITS**

Earth Systems Introduction and Core	12
Required allied courses	41-62
<b>TRACKS</b>	
Anthrosphere	18-29
Biosphere	15-22
Energy Science and Technology	18-22
Land Systems	18-29
Oceans	10-12
Upper-division electives	6-15
Senior research or internship	9
Senior Seminar	3
<b>Total units (depending on track, electives)</b>	<b>87-125</b>

**HONORS PROGRAM**

The Earth Systems honors program provides students with an opportunity to pursue individual research within a specific area or between areas of Earth Systems through a year-long mentored research project. This research must be mentored by one or more Earth Systems-affiliated faculty members and culminates in a written thesis.

To be admitted to the honors program, applicants must have a minimum GPA of 3.4 in Earth Systems course work. Potential honors students should complete the EARTHSYS 111 and EARTHSYS 112 sequence by the end of the junior year. Qualified students can apply in Spring Quarter (due by the 3rd Friday of the quarter) of the junior year, or the fourth quarter before graduation, by submitting a detailed research proposal and a brief statement of support from a faculty research adviser. Students who elect to do an honors thesis should begin planning no later than Winter Quarter of the junior year.

A maximum of 9 units is awarded for thesis research through EARTHSYS 199. Those 9 units may not substitute for any other required parts of the Earth Systems curriculum. All theses are

evaluated for acceptance by the thesis faculty adviser and one additional member of the Earth Systems Committee of the Whole.

Honors students are encouraged to present their research through the School of Earth Sciences Annual Research Review, which highlights undergraduate and graduate research in the school during the annual visit of the School of Earth Sciences external Advisory Board. Faculty advisers are encouraged to sponsor presentation of student research results at professional society meetings.

**COTERMINAL B.S. AND M.S. DEGREES IN EARTH SYSTEMS**

The Stanford coterminal degree enables an undergraduate to embark on an integrated program of study leading to the master's degree before requirements for the bachelor's degree have been completed. Undergraduates with a minimum 3.4 Stanford GPA may apply to work simultaneously toward B.S. and M.S. degrees. The M.S. degree in Earth Systems provides the student with enhanced tools to evaluate the primary literature of the discipline most closely associated with the student's track and allows an increased specialization through additional course work that may include 9 units of thesis research. Integration of earth systems concepts is furthered by participation in EARTHSYS 290, the Master's Seminar.

To apply, complete and return to the Earth Systems office an application that includes:

- the application for admission cover sheet
- a statement of purpose
- a resume
- a Stanford transcript
- two letters of recommendation, one of which must be from the master's adviser (Earth Systems Committee of the Whole member)
- a list of courses that fulfill degree requirements signed by the Associate Director, Academics, and the master's adviser (Earth Systems Committee of the Whole member).

Applications must be submitted by the quarter preceding the anticipated quarter of graduation. An application fee is assessed by the Registrar's Office for coterminal applications.

Students may either:

1. complete 180 units required for the B.S. degree and then complete the three quarters required for the M.S. degree
2. *or*, complete a total of 15 quarters during which the requirements of the two degrees are fulfilled concurrently.

The student has the option of receiving the B.S. degree after completing that degree's requirements or receiving two degrees concurrently at the end of the master's program.

It is both assumed and required that all students applying for the Earth Systems coterminal MS degree (irrespective of the undergraduate major) will have met the BS degree requirements for Earth Systems.

These specific requirements must be fulfilled to receive an M.S. degree:

1. A minimum of 45 units of course work and/or research credit (upon approval). It is expected that the majority of the student's course work will be at the 200-level or above.
2. Participation in the Master's Seminar (EARTHSYS 290).

The student must devise a program of study that shows a level of specialization appropriate to the master's level, as determined in consultation with the adviser and the Associate Director, Academics. Students applying from an undergraduate major other than Earth Systems should meet with Julie Kennedy, Deana Fabbro-Johnston, or Emily Burns to learn more about the Earth Systems MS degree program.

With the adviser's approval, up to 9 units may be in the form of research. This may culminate in the preparation of a master's thesis; however, a thesis is not required for the degree.

University requirements for the coterminal M.S. are described in the "Coterminal Bachelor's and Master's Degrees" section of this

bulletin. For University coterminal degree program rules and University application forms, see <http://studentaffairs.stanford.edu/registrar/publications#Coterm>.

## OVERSEAS STUDIES COURSES IN EARTH SYSTEMS

For course descriptions and additional offerings, see the listings in the *Stanford Bulletin's* ExploreCourses web site (<http://explorecourses.stanford.edu>) or the Bing Overseas Studies web site (<http://bosp.stanford.edu>). Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

### AUTUMN QUARTER

#### AUSTRALIA

- OSPAUSTL 10. Coral Reef Ecosystems. 3 units, Kevin Arrigo, Simon Dunn, Selina Ward, GER:DB:EngrAppSci
- OSPAUSTL 20. Coastal Resource Management. 3 units, Ron Johnstone, GER:DB:EngrAppSci
- OSPAUSTL 30. Coastal Forest Ecosystems. 3 units, Claire Baker, Norman Duke, GER:DB:EngrAppSci

#### SANTIAGO

- OSPSANTG 58. Living Chile: A Land of Extremes. 5 units, Marcela A. Bustamante, GER:DB:EngrAppSci

### WINTER QUARTER

#### SANTIAGO

- OSPSANTG 58. Living Chile: A Land of Extremes. 5 units, GER:DB:EngrAppSci

### SPRING QUARTER

#### FLORENCE

- OSPFLOR 57. Global Change and Italian Ecosystems: Management and Conservation for Mitigation. 4 units, S. Cannicci

#### PARIS

- OSPPARIS 33. The Economics of Climate Change: Policies in Theory and in Practice in the EU and the US. 5 units, Christian de Perthuis, Benoit Leguet, GER:DB:SocSci, EC:GlobalCom

#### SANTIAGO

- OSPSANTG 85. Marine Ecology of Chile and the South Pacific. 5 units, Alvaro Palma, GER:DB:NatSci

# EMMETT INTERDISCIPLINARY PROGRAM IN ENVIRONMENT AND RESOURCES (E-IPER)

*Director:* Peter Vitousek (Biology)

*Associate Director:* Helen J. Doyle

*Faculty:* Nicole Ardoin (Education, Woods Institute for the Environment), Kevin Arrigo (Environmental Earth System Science), Kenneth J. Arrow (Economics, emeritus), Gregory Asner (Geological and Environmental Sciences, Carnegie Institution), Shilajeet Banerjee (Mechanical Engineering), William Barnett (Business), Michele Barry (Medicine), Sally M. Benson (Energy Resources Engineering, Global Climate and Energy Program), Sarah L. Billington (Civil and Environmental Engineering), Douglas W. Bird (Anthropology), Rebecca Bliege Bird (Anthropology), Barbara Block (Biology), Alexandria Boehm (Civil and Environmental Engineering), Carol Boggs (Biology), Jef Caers (Energy Resources Engineering), Ken Caldeira (Geological and Environmental Sciences, Carnegie Institution), Margaret Caldwell (Law), Karen Casciotti (Environmental Earth System Science), Page Chamberlain (Environmental Earth System Science), Joshua Cohen (Political Science), Craig S. Criddle (Civil and Environmental Engineering), Larry B. Crowder (Biology), Lisa Curran (Anthropology, Woods Institute for the Environment), Gretchen C. Daily (Biology), Jennifer Davis (Civil and Environmental Engineering, Woods Institute for the Environment), Noah Diffenbaugh (Environmental Earth System Science, Woods Institute for the Environment), Rodolfo Dirzo (Biology), Robert B. Dunbar (Environmental Earth System Science), William H. Durham (Anthropology), Anne Ehrlich (Biology), Paul Ehrlich (Biology), Gary Ernst (Geological and Environmental Sciences, emeritus), Walter Falcon (Freeman Spogli Institute for International Studies, emeritus), Scott Fendorf (Environmental Earth System Science), James Ferguson (Anthropology), Christopher B. Field (Biology, Environmental Earth System Science, Carnegie Institution), Martin Fischer (Civil and Environmental Engineering), Zephyr Frank (History), David Freyberg (Civil and Environmental Engineering), Oliver Fringer (Civil and Environmental Engineering), Tadashi Fukami (Biology), Margot Gerritsen (Energy Resources Engineering), Steven Gorelick (Environmental Earth System Science), Mark Granovetter (Sociology), Elizabeth Hadly (Biology), Ursula Heise (English), Thomas Heller (Law), Henning Hillmann (Sociology), Dominique Irvine (Anthropology), Mark Jacobson (Civil and Environmental Engineering), James Holland Jones (Anthropology, Woods Institute for the Environment), Terry Karl (Political Science), David Kennedy (History), Donald Kennedy (Biology, emeritus, Woods Institute for the Environment), Julie Kennedy (Environmental Earth System Science), Herve Kieffel (Management Science and Engineering), Brian Knutson (Psychology), Jeffrey Koseff (Civil and Environmental Engineering, Woods Institute for the Environment), Anthony Kovscek (Energy Resources Engineering), Eric Lambin (Environmental Earth System Science, Woods Institute for the Environment), Raymond Levitt (Civil and Environmental Engineering), David Lobell (Environmental Earth System Science, Woods Institute for the Environment), Richard Luthy (Civil and Environmental Engineering), Janet Martinez (Law), Gilbert M. Masters (Civil and Environmental Engineering, emeritus), Michael D. Mastrandrea (Woods Institute for the Environment), Pamela Matson (Dean, School of Earth Sciences), Douglas McAdam (Sociology), Michael D. McGehee (Materials Science and Engineering), Lynn Meskell (Anthropology), Anna Michalak (Global Ecology, Carnegie Institution), Fiorenza Micheli

(Biology), Grant Miller (Medicine), Stephen Monismith (Civil and Environmental Engineering), Harold Mooney (Biology), Rosamond Naylor (Environmental Earth System Science), Leonard Ortolano (Civil and Environmental Engineering), Stephen Palumbi (Biology), Erica Plambeck (Business), Walter W. Powell (Education), Dariush Rafinejad (Management Science and Engineering), Ram Rajagopal (Civil and Environmental Engineering), Stefan J. Reichelstein (Business), Thomas N. Robinson (Medicine), Terry L. Root (Woods Institute for the Environment), Robert Sapolsky (Biology, Neurology, Neurological Sciences), Debra Satz (Philosophy), Gary Schoolnik (Medicine), Richard Scott (Sociology), Sarah A. Soule (Business), Stephen Stedman (Freeman Spogli Institute for International Studies), James Sweeney (Management Science and Engineering, Precourt Energy Efficiency Center), Barton Thompson (Law, Woods Institute for the Environment), Shripad Tuljapurkar (Biology), Peter Vitousek (Biology), Michael Wara (Law), Jeremy Weinstein (Political Science), John Weyant (Management Science and Engineering, Precourt Energy Efficiency Center), Richard White (History), Jennifer Wilcox (Energy Resources Engineering), Michael Wilcox (Anthropology), Mark Zoback (Geophysics)

*Lecturers:* Jon Christensen, Thomas Hayden

*Program Offices:* Yang and Yamazaki (Y2E2) Building, Suite 226  
Mail Code: 4210

*Phone:* (650) 723-6117

*Email:* jmason@stanford.edu

*Web Site:* <http://e-iper.stanford.edu>

Courses offered by the Emmett Interdisciplinary Program in Environment and Resources are listed under the subject code ENVRES on the *Stanford Bulletin's* ExploreCourses web site.

The Emmett Interdisciplinary Program in Environment and Resources (E-IPER) is designed to create interdisciplinary scholars and leaders who can address the world's most challenging environmental and sustainability issues. E-IPER students combine academic disciplines, including natural and earth sciences, engineering, economics, humanities, social sciences, law, health, policy, and business, to yield new insights and novel solutions to urgent global problems, such as energy use, climate change, food security, freshwater availability, depletion of ocean resources, land degradation, and biodiversity loss.

E-IPER offers a Ph.D. in Environment and Resources and, for students currently enrolled in Stanford's Graduate School of Business, Stanford Law School, and School of Medicine, a joint degree consisting of an M.S. in Environment and Resources in combination with their professional degree. Both E-IPER's Ph.D. and M.S. degrees are interdisciplinary, giving students exposure to environmental and sustainability issues and insight into new knowledge, technologies, and policies to help solve these problems. Within the guidelines of their respective degrees, E-IPER students are advised by and take classes from faculty in all seven schools of the University.

Through their original research and their work in policy and industry, E-IPER students address issues such as the science and policy of global climate change, regional food security, the mapping and valuation of ecosystem services, the development of new energy technologies, the effects of agricultural intensification and other land use changes, and conservation finance. For additional information about E-IPER students, see <http://e-iper.stanford.edu/people/students>.

E-IPER's affiliated faculty members come from all seven Stanford schools. Collectively, they represent an extraordinary diversity of environment and sustainability interests and breadth of research and policy approaches. More information about individual faculty can be found at <http://e-iper.stanford.edu/people/faculty>. More details about Stanford's interdisciplinary environmental research and policy work generally can be found on the Woods Institute for the Environment's web site.

## GRADUATE PROGRAMS IN ENVIRONMENT AND RESOURCES

The University's basic requirements for the M.S. and Ph.D. degrees are discussed in the "Graduate Degrees" section of this bulletin. The E-IPER Ph.D. and M.S. degrees are guided by comprehensive requirements created with faculty and student input and approved by E-IPER's executive committee. To access the current Ph.D. and M.S. degree requirement documents, see <http://e-iper.stanford.edu/academics>.

### MASTER OF SCIENCE IN ENVIRONMENT AND RESOURCES

Students may not apply directly for the M.S. in Environment and Resources degree. The M.S. is an option exclusively for students currently enrolled in the joint degree programs with the M.B.A. in the Graduate School of Business or the J.D. with the Stanford Law School; concurrently pursuing the M.D. in the School of Medicine; in special cases for students pursuing a Ph.D. in another Stanford department; or for E-IPER Ph.D. students who do not continue in the Ph.D. degree program.

### JOINT MASTER'S DEGREE

Students enrolled in a professional degree program in Stanford's Graduate School of Business or the Stanford Law School are eligible to apply for admission to the joint M.S. in Environment and Resources degree program (JDP). Enrollment in the JDP allows students to pursue an M.S. degree concurrently with their professional degree and to count a defined number of units toward both degrees, resulting in the award of joint M.B.A. and M.S. in Environment and Resources degrees or joint J.D. and M.S. in Environment and Resources degrees.

The joint M.B.A./M.S. degree program requires a total of 129 quarter units to be completed over approximately eight academic quarters (compared to 105 units for the M.B.A. and 45 units for the M.S. if pursued as separate degrees).

The joint J.D./M.S. degree program requires a minimum of 111 quarter units, although it is possible that students may need to take additional units to satisfy the degree requirements for both the J.D. and M.S. The joint J.D./M.S. may be completed in three years.

The student's program of study is subject to the approval of the student's faculty adviser and E-IPER staff. The joint degrees are conferred when the requirements for both the E-IPER M.S. and the professional degree programs have been met. For application information, see <http://e-iper.stanford.edu/admissions/joint-ms-application>. For additional information, see <http://e-iper.stanford.edu/academics/joint-ms-requirements>.

In addition to requirements for the professional degree, requirements for the JDP include:

1. Completion of required introductory core courses:
  - For joint M.B.A./M.S. students: ENVRES 538, Environmental Science for Managers and Policy Makers (same as OIT 538; ENVRES 539/OIT 539 also fulfills this requirement) and ENVRES 540, Environmental Science for Managers II (same as OIT 540).
  - For all other JDP students: ENVRES 310, Environmental Forum Seminar.
2. Completion and presentation of a capstone project that integrates the student's professional and M.S. degrees, as part of the required course ENVRES 290, Capstone Project Seminar in Environment and Resources.
3. Completion of a minimum of four letter-graded courses, while maintaining a 'B' average, from one joint M.S. course track:
  - Energy
  - Climate and Atmosphere
  - Cleantech
  - Land Use and Agriculture
  - Oceans and Estuaries
  - Freshwater
  - Global, Community, and Environmental Health

- Sustainable Built Environment.

Approved courses in each track are below. See also <http://e-iper.stanford.edu/academics/joint-ms/joint-ms-course-tracks>.

4. Completion of at least four additional 3-5 unit graded elective courses at the 100-level or higher, which may be taken from one or more course tracks or elsewhere in the University, while maintaining a 'B' average.
5. Among the courses fulfilling requirements 3 and 4 above, completion of at least four courses at the 200-level or above, excluding individual study courses. Individual study courses, directed reading, and independent research units may count for a maximum of 4 units for joint M.S. students (such as ENVRES 398 or ENVRES 399).

Restrictions on course work that may fulfill the Joint M.S. degree include:

1. A maximum of 5 units from courses that are identified as primarily consisting of guest lectures, such as the Energy Seminar or the Environmental Law Workshop, may be counted toward the joint M.S. degree. Additional courses in this category are listed at <http://e-iper.stanford.edu/academic/joint-ms/joint-ms-curriculum>.
2. A maximum of 12 units from approved courses related to the environmental and resource fields from the student's professional school may be applied toward the M.S. A list of approved courses from the GSB, School of Law, and School of Medicine can be found at <http://e-iper.stanford.edu/academics/joint-ms-curriculum>.

## DUAL MASTER'S DEGREE

Students in the School of Medicine, or in special cases, students pursuing a Ph.D. in another Stanford department may apply to pursue the M.S. in Environment and Resources degree. For the dual degree, students must meet the University's minimum requirements for the M.D. and complete an additional 45 units for the M.S. in Environment and Resources. Completion of the M.S. is anticipated to require at least three quarters in addition to the quarters required for the M.D. For additional information, see <http://e-iper.stanford.edu/academics/joint-ms/joint-ms-requirements>.

The student's program of study is subject to the approval of the student's faculty adviser and E-IPER staff. The two degrees are conferred when the requirements for both the E-IPER M.S. and the professional degree programs have been met. For application information, see <http://e-iper.stanford.edu/admissions/joint-ms-application>.

In addition to requirements for the M.D., requirements for the dual M.S. include:

1. Completion of a required introductory core course: ENVRES 310, Environmental Forum Seminar.
2. Completion and presentation of a capstone project that integrates the student's professional and M.S. degrees, as part of the required course ENVRES 290, Capstone Project Seminar in Environment and Resources.
3. Completion of a minimum of four graded courses, while maintaining a 'B' average, from one Joint M.S. Course Track:
  - Energy
  - Climate and Atmosphere
  - Cleantech
  - Land Use and Agriculture
  - Oceans and Estuaries
  - Freshwater
  - Global, Community, and Environmental Health
  - Sustainable Built Environment.

Approved courses in each track are below. See also <http://e-iper.stanford.edu/academics/joint-ms-curriculum>.

4. Completion of at least four additional 3-5 unit letter-graded elective courses at the 100-level or higher, which may be taken from one or more course tracks or elsewhere in the University, while maintaining a 'B' average.
5. Among the courses fulfilling requirements 3 and 4 above, completion of at least four courses at the 200-level or above,

excluding individual study courses. Individual study courses, directed reading, and independent research units may count for a maximum of 4 units for dual M.S. students (such as ENVRES 398 or ENVRES 399).

Restrictions on course work that may fulfill the Dual M.S. degree include:

1. A maximum of 5 units from courses that are identified as primarily consisting of guest lectures, such as the Energy Seminar or the Environmental Law Workshop may be counted toward the Joint M.S. degree. Additional courses in this category are listed at <http://e-iper.stanford.edu/academics/joint-ms/joint-ms-curriculum>.
2. A maximum of 12 units from courses related to the environmental and resource fields from the student's professional school may be applied toward the M.S. A list of approved courses from the GSB, School of Law, and School of Medicine can be found at <http://e-iper.stanford.edu/academics/joint-ms/joint-ms-curriculum>.

## JOINT M.S. AND DUAL M.S. COURSE TRACKS

Students should consult *Stanford Bulletin's* Explore Courses web site to determine course description, class schedule, location, eligibility, and prerequisites. Course tracks and other recommended courses are also available at <http://e-iper.stanford.edu/academics/joint-ms/joint-ms-course-tracks>.

### ENERGY

- APPPHYS 219. Solid State Physics and the Energy Challenge
- CEE 173A. Energy Resources
- CEE 176A. Energy Efficient Buildings
- CEE 176B. Electric Power: Renewables and Efficiency
- CEE 217. Renewable Energy Infrastructure
- CEE 236. Green Architecture
- CEE 241A. Infrastructure Project Development
- CEE 241B. Infrastructure Project Delivery
- CEE 256. Building Systems
- CEE 272P. Distributed Generation and Grid Integration of Renewables
- CHEMENG 454. Synthetic Biology and Metabolic Engineering
- EARTHSYS 232. Energy Cooperation in the Western Hemisphere
- EE 237. Solar Conversion
- EE 293A. Fundamentals of Energy Processes
- EE 293B. Fundamentals of Energy Processes
- ENERGY 101. Energy and the Environment
- ENERGY 102. Renewable Energy Sources and Greener Energy Processes
- ENERGY 104. Technology in the Greenhouse
- ENERGY 120. Fundamentals of Petroleum Engineering
- ENERGY 208. Large Scale Solar Technology and Policy
- ENERGY 226. Thermal Recovery Methods
- ENERGY 227. Enhanced Oil Recovery
- ENERGY 253. Carbon Capture and Sequestration
- ENERGY 269. Geothermal Reservoir Engineering
- ENERGY 291. Optimization of Energy Systems
- MS&E 198. Applied Modeling of Energy and Environmental Markets
- MS&E 243. Energy and Environmental Policy Analysis
- MS&E 295. Energy Policy Analysis
- MS&E 296. Sustainable Mobility: Improving Energy Efficiency and Reducing CO<sub>2</sub> Emissions from Transport
- MS&E 491. Real-World Clean Energy Project Development
- MATSCI 152. Electronic Materials Engineering
- MATSCI 256. Solar Cells, Fuel Cells, and Batteries
- MATSCI 302. Solar Cells

- MATSCI 316. Nanoscale Science, Engineering, and Technology
- ME 260. Fuel Cell Science and Technology
- ME 370A. Energy Systems I: Thermodynamics
- ME 370B. Energy Systems II: Modeling and Advanced Concepts
- ME 370C. Energy Systems III: Projects

### CLIMATE AND ATMOSPHERE

- BIO 117. Biology and Global Change
- BIO 247. Controlling Climate Change in the 21st Century
- BIO 264. Biosphere-Atmosphere Interactions
- CEE 172. Air Quality Management
- CEE 263A. Air Pollution Modeling
- CEE 263D. Air Pollution: From Urban Smog to Global Change
- CEE 278A. Air Pollution Physics and Chemistry
- CEE 278B. Atmospheric Aerosols
- CEE 278C. Indoor Air Quality
- EARTHSYS 143. Climate Change in the West: A History of the Future
- EARTHSYS 233. California Climate Change Law and Policy
- EARTHSYS 284. Climate and Agriculture
- EESS 215. Earth System Dynamics
- EESS 246A. Atmosphere, Ocean, and Climate Dynamics: The Atmospheric Circulation
- EESS 246B. Atmosphere, Ocean, and Climate Dynamics: The Ocean Circulation
- ENERGY 253. Carbon Capture and Sequestration
- MS&E 294. Climate Policy Analysis
- MS&E 296. Sustainable Mobility: Improving Energy Efficiency and Reducing CO<sub>2</sub> Emissions from Transport

### CLEANTECH

- APPPHYS 219. Solid State Physics and the Energy Challenge
- CHEMENG 274. Environmental Microbiology I
- CHEMENG 355. Advanced Biochemical Engineering
- CHEMENG 454. Synthetic Biology and Metabolic Engineering
- CHEMENG 456. Metabolic Biochemistry of Microorganisms
- CEE 172P. Distributed Generation and Grid Integration of Renewables
- CEE 173A. Energy Resources
- CEE 176A. Energy Efficient Buildings
- CEE 176B. Electric Power: Renewables and Efficiency
- CEE 215. Goals and Methods of Sustainable Building Projects
- CEE 226. Life Cycle Assessment for Complex Systems
- CEE 241A. Infrastructure Project Development
- CEE 241B. Infrastructure Project Delivery
- CEE 272S. Greenhouse Gas Mitigation
- CEE 275B. Process Design for Environmental Biotechnology
- ENERGY 253. Carbon Capture and Sequestration
- ENERGY 269. Geothermal Reservoir Engineering
- MS&E 264. Sustainable Product Development and Manufacturing
- MS&E 296. Sustainable Mobility: Improving Energy Efficiency and Reducing CO<sub>2</sub> Emissions from Transport
- MS&E 491. Real-World Clean Energy Project Development
- MATSCI 152. Electronic Materials Engineering
- MATSCI 302. Solar Cells
- MATSCI 316. Nanoscale Science, Engineering, and Technology
- ME 222. Design for Sustainability
- ME 260. Fuel Cell Science and Technology

### LAND USE AND AGRICULTURE

- BIO 101. Ecology

- BIO 117. Biology and Global Change
- BIO 121. Biogeography
- BIO 125. Ecosystems of California
- BIO 144. Conservation Biology
- BIO 206. Field Studies in Earth Systems
- BIO 216. Terrestrial Biogeochemistry
- BIO 264. Biosphere-Atmosphere Interactions
- BIO 280. Fundamentals of Sustainable Agriculture
- EARTHSYS 143. Climate Change in the West: A History of the Future
- EARTHSYS 233. California Climate Change Law and Policy
- EARTHSYS 273. Aquaculture and the Environment: Science, History, and Policy
- EARTHSYS 281. Concepts of Urban Agriculture
- EARTHSYS 284. Climate and Agriculture
- EESS 155. Science of Soils
- EESS 162. Remote Sensing of Land Use and Land Cover
- EESS 256. Soil Chemistry
- EESS 215. Earth System Dynamics
- URBANST 163. Land Use Control
- URBANST 165. Sustainable Urban and Regional Transportation Planning

### OCEANS AND ESTUARIES

- BIO 274S. Hopkins Microbiology Course
- BIOHOPK 263H. Oceanic Biology
- BIOHOPK 271H. Ecological and Evolutionary Physiology
- BIOHOPK 272H. Marine Ecology
- BIOHOPK 285H. Ecology and Conservation of Kelp Forest Communities
- CEE 262D. Introduction to Physical Oceanography
- CEE 272. Coastal Contaminants
- CEE 275A. Law and Science of California Coastal Policy
- EARTHSYS 208. Coastal Wetlands
- EARTHSYS 273. Aquaculture and the Environment: Science, History, and Policy
- EESS 241. Remote Sensing of the Oceans
- EESS 243. Marine Biogeochemistry
- EESS 244. Marine Ecosystem Modeling
- EESS 246A. Atmosphere, Ocean, and Climate Dynamics: The Atmospheric Circulation
- EESS 246B. Atmosphere, Ocean, and Climate Dynamics: The Ocean Circulation
- EESS 258. Geomicrobiology

### FRESHWATER

- CEE 101B. Mechanics of Fluids
- CEE 177. Aquatic Chemistry and Biology
- CEE 260A. Physical Hydrogeology
- CEE 260C. Contaminant Hydrogeology
- CEE 262A. Hydrodynamics
- CEE 262B. Transport and Mixing in Surface Water Flows
- CEE 262E. Lakes and Reservoirs
- CEE 264A. Rivers, Streams, and Canals
- CEE 265A. Sustainable Water Resources Development
- CEE 265C. Water Resources Management
- CEE 265D. Water and Sanitation in Developing Countries
- CEE 266A. Watersheds and Wetlands
- CEE 266B. Floods and Droughts, Dams and Aqueducts
- CEE 266D. Water Resources and Water Hazards Field Trips
- CEE 268. Groundwater Flow
- CEE 270. Movement and Fate of Organic Contaminants in Waters
- CEE 271A. Physical and Chemical Treatment Processes
- CEE 273. Aquatic Chemistry
- CEE 273A. Water Chemistry Laboratory
- CEE 275B. Process Design for Environmental Biotechnology



- EARTHSYS 143. Climate Change in the West: A History of the Future
- EARTHSYS 233. California Climate Change Law and Policy
- EARTHSYS 273. Aquaculture and the Environment: Science, History, and Policy

### **GLOBAL, COMMUNITY, AND ENVIRONMENTAL HEALTH**

- ANTHRO 261A. Ecology, Nature, and Society: Principles in Human Ecology
- ANTHRO 262. Indigenous Peoples and Environmental Problems
- ANTHRO 263. Conservation and Evolutionary Ecology
- ANTHRO 266. Political Ecology of Tropical Land Use
- ANTHRO 277. Environmental Change and Emerging Infectious Diseases
- ANTHRO 282. Medical Anthropology
- ANTHRO 291C. Anthropological Methods in Ecology, Environment, Evolution
- ANTHRO 362. Conservation and Evolutionary Ecology
- BIO 102. Demography: Health, Development, Environment
- BIO 117. Biology and Global Change
- CEE 260C. Contaminant Hydrogeology
- CEE 263A. Air Pollution Modeling
- CEE 263D. Air Pollution: From Urban Smog to Global Change
- CEE 265A. Sustainable Water Resources Development
- CEE 265C. Water Resources Management
- CEE 265D. Water and Sanitation in Developing Countries
- CEE 270. Movement and Fate of Organic Contaminants in Waters
- CEE 272. Coastal Contaminants
- CEE 274D. Pathogens and Disinfection
- CEE 274E. Pathogens in the Environment
- CEE 276. Introduction to Human Exposure Analysis
- CEE 276E. Environmental Toxicants
- CEE 278A. Air Pollution Physics and Chemistry
- CEE 278B. Atmospheric Aerosols
- CEE 278C. Indoor Air Quality
- EARTHSYS 165. Promoting Behavior Change
- EARTHSYS 224. Environmental Justice: Local, National, and International Dimensions
- HUMBIO 111. Human Dimensions of Global Environmental Change
- HUMBIO 151. Introduction to Epidemiology
- HUMBIO 152. Viral Lifestyles
- HUMBIO 153. Parasites and Pestilence: Infectious Public Health Challenges
- HUMBIO 166. Food and Society: Exploring Eating Behaviors in Social, Environmental, and Policy Context

### **SUSTAINABLE BUILT ENVIRONMENT**

- CEE 100. Managing Sustainable Building Projects
- CEE 136. Green Architecture
- CEE 176A. Energy Efficient Buildings
- CEE 176B. Electric Power: Renewables and Efficiency
- CEE 177P. Sustainability in Theory and Practice
- CEE 215. Goals and Methods of Sustainable Building Projects
- CEE 224A. Sustainable Development Studio
- CEE 226. Life Cycle Assessment for Complex Systems
- CEE 248. Real Estate Development
- CEE 248G. Certifying Green Buildings
- CEE 256. Building Systems
- CEE 265A. Sustainable Water Resources Development
- CEE 272P. Distributed Generation and Grid Integration of Renewables

- MS&E 296. Sustainable Mobility: Improving Energy Efficiency and Reducing CO2 Emissions from Transport
- URBANST 163. Land Use Control
- URBANST 165. Sustainable Urban and Regional Transportation Planning

### **MASTER OF SCIENCE**

In exceptional circumstances, E-IPER offers a Master of Science degree for students in E-IPER's Ph.D. program who opt to complete their training with a M.S. degree or who do not advance to candidacy for the Ph.D. degree. Admission directly to the M.S. program is not allowed.

Requirements for the M.S. include:

1. Completion of a minimum of 45 units at or above the 100-level, of which the majority of units should be at or above the 200-level.
2. Completion of the E-IPER Ph.D. core curriculum, each with a letter grade of 'B' or higher, comprising:
  - ENVRES 310. Environmental Forum Seminar
  - ENVRES 315. Environmental Research Design Seminar
  - ENVRES 320. Designing Environmental Research
  - ENVRES 330. Research Approaches to Environmental Problem Solving, taken concurrently with:
  - ENVRES 398. Directed Individual Study in Environment and Resources
3. Additional courses may be chosen from approved course lists in E-IPER's four focal areas (culture and institutions; economics and policy analysis; engineering and technology; or natural sciences) or from other courses approved by the student's lead advisers.
4. Students may take no more than 6 of the required 45 units credit/no credit and must maintain at least a 'B' average in all courses taken for the M.S. degree.
5. Directed research and independent study may count for a maximum of 8 units of the 45 unit M.S.

The M.S. degree does not have an M.S. with thesis option. Students may write a M.S. thesis, but it is not formally recognized by the University.

### **DOCTOR OF PHILOSOPHY IN ENVIRONMENT AND RESOURCES**

E-IPER's Ph.D. requirements, updated annually at <http://e-iper.stanford.edu/academics/phd>, lay out a scaffold of advising meetings, core courses, program activities, and milestones to guide students' progress. Each student works with a faculty advising team, comprising at least two faculty from different disciplines, to design a course of study that allows the student to develop and exhibit: a) familiarity with analytical tools and research approaches for interdisciplinary problem solving, and a mastery of those tools and approaches central to the student's thesis work; b) interdisciplinary breadth in each of four focal areas: culture and institutions; economics and policy analysis; engineering and technology; and natural sciences; and c) depth in at least two distinct fields of inquiry.

Program specific Ph.D. requirements are outlined in detail in the current year requirements and are summarized below:

1. Completion of the Ph.D. core course sequence: ENVRES 310, Environmental Forum Seminar; ENVRES 315, Environmental Research Design Seminar; ENVRES 320, Designing Environmental Research; and ENVRES 330, Research Approaches for Environmental Problem Solving, taken concurrently with ENVRES 398, Directed Individual Study in Environment and Resources, each with a letter grade of 'B' or higher. E-IPER Ph.D. students are also required to take EARTHSCI 300, Earth Sciences Seminar, which is required of all incoming School of Earth Sciences graduate students.
2. Completion of the breadth requirement in all four focal areas (culture and institutions; economics and policy analysis; engineering and technology; and natural sciences) through a sequence of courses, independent study, and/or demonstration

of proficiency through prior course work or experience. Specific requirements and approved courses that satisfy breadth in each of the four focal areas as of September 2011 are listed below and in the current Ph.D. requirements document. Updated course lists are available at <http://e-iper.stanford.edu/academics/phd/phd-focal-areas>. Fulfillment of the breadth requirement must be certified by the student's two lead faculty advisers and the E-IPER faculty director.

3. Fulfillment of depth in the student's chosen fields of inquiry through additional courses, research, and/or independent studies. The student's two lead faculty advisers must certify that a) the two fields of inquiry are sufficiently distinct such that work integrating the two is interdisciplinary; and b) the student's course work and independent study has provided the substantial depth of understanding normally expected at the Ph.D. level.
4. Completion of quarterly meetings with advisers during the first year, culminating in the Spring Quarter First Year Big Picture advising meeting; and at minimum, annual meetings thereafter, including the Spring Quarter Second Year Meeting of the Minds, prior to which students must formally identify their two lead advisers and two distinct fields of inquiry.
5. Submission of a candidacy plan by end of Spring Quarter of the second year, for review at the Second Year Meeting of the Minds and subject to the approval of E-IPER's faculty director. The candidacy plan should document how the student has fulfilled the program requirements to date and include a summary of research ideas and a list of faculty who might serve as qualifying exam committee members.
6. Completion of the oral qualifying exam and completion of the requirements for candidacy, including at least 25 graded graduate course units (200 level and above) with at least a 'B' average, by the end of Winter Quarter of the third year. The oral qualifying exam committee should include the student's two lead advisers and 2-3 other faculty with expertise in the student's research area. The majority of the oral qualifying exam committee should be members of the Academic Council; the chair of the committee must be an Academic Council member and may not be one of the student's two lead advisers. In exceptional cases, the committee may include a member-at-large who is not a Stanford faculty member as a fourth or fifth member.
7. Completion of a written dissertation, approved by the student's dissertation reading committee consisting of the student's lead advisers and at least one other member, and passage of the University oral examination in defense of the dissertation following the guidelines outlined in the "Graduate Degrees" section of this bulletin. The University oral examination committee comprises the student's two lead advisers, at least two additional members, and a chair who is outside of the departments of the lead advisers, all of whom are normally Academic Council members. Appointment of a non-Academic Council member must be justified and approved by the faculty director.

In addition to the requirements listed above, all Ph.D. students must:

1. Serve as a teaching assistant for at least one quarter in a course with a discussion section or with an opportunity to lecture in at least two class sessions, in any department or program, including ENVRES 320 or ENVRES 330. Seminars, including Introductory Seminars, may not be used to fulfill this requirement. Students should fulfill the teaching requirement by the end of the third year unless they obtain a firm commitment from a faculty member to TA a future course.
2. On an ongoing basis, submit grant proposals for external funding, defined as fellowship and/or research funds provided by a government agency, a private foundation, or a University entity other than E-IPER or the School of Earth Sciences.
3. Participate each year in a Spring Quarter annual review in which the student and lead advisers submit progress reports for review by the E-IPER academic guidance committee.

The following courses may be taken to satisfy the breadth requirement in E-IPER's four focal areas. Updated lists are available at <http://e-iper.stanford.edu/academics/phd/phd-focal-areas>. Students should consult the *Stanford Bulletin's* Explore Courses web site to determine the course schedule, location, eligibility, and prerequisites.

## CULTURE AND INSTITUTIONS FOCAL AREA

At least two courses are required. Students may choose a course not listed below provided it meets the criteria for this focal area's subject knowledge. Students are advised to seek approval from their lead advisers in advance and are required to obtain their advisers' signatures on the breadth certification form as verification that they have met this requirement.

- ANTHRO 247. Nature, Culture, Heritage
- ANTHRO 262. Indigenous Peoples and Environmental Problems
- CEE 265D. Water and Sanitation in Developing Countries
- CEE 275 A. Law and Science of California Coastal Policy
- CEE 277C. Environmental Governance
- EARTHYSYS 112. Human Society and Global Change
- EARTHYSYS 224. Environmental Justice: Local, National, and International Dimensions
- ECON 228. Institutions and Organizations in Historical Perspective
- EDUC 291X. Introduction to Survey Research
- EDUC 332X. Theory and Practice of Environmental Education
- EDUC 371X. Social Psychology and Social Change
- HISTORY 376. Modern Brazil
- LAW 280. Toxic Harms
- LAW 306. Law, Economics and Politics of International Trade
- LAW 338. Land Use
- LAW 437. Water Law
- LAW 455. Energy Law
- LAW 603. Environmental Law and Policy
- LAW 604. Environmental Law Workshop
- LAW 656. International Conflict: Management and Resolution
- MS&E 252. Decision Analysis I
- MS&E 383. Doctoral Seminar on Ethnographic Research
- OB 673. Social Psychology of Organizations
- OB 676. Social and Political Processes in Organizations
- POLISCI 351A. Foundations of Political Economy
- POLISCI 364. Theories of Political Institutions
- POLISCI 440A. Theories in Comparative Politics
- POLISCI 440B. Political Economy of Development
- POLISCI 440C. Methods in Comparative Politics
- POLISCI 444. Comparative Political Economy: Advanced Industrial Societies
- PSYCH 223. Social Norms
- PUBLPOL 194. Technology Policy
- PUBPOL 202. Organizations and Public Policy
- SOC 260. Formal Organizations
- SOC 314. Economic Sociology
- SOC 318. Social Movement and Collective Action
- SOC 320. Foundations of Social Psychology
- SOC 362. Organization and Environment
- SOC 363A. Seminar on Organizational Theory
- SOC 363B. Seminar on Organizational Theory: Institutional Analysis
- SOC 366. Organization Studies: Theories and Analysis
- SOC 367. Institutional Analysis of Organizations
- SOC 377. Comparing Institutional Forms: Public, Private, and Nonprofit

## **ECONOMICS AND POLICY ANALYSIS FOCAL AREA**

One of the prescribed course series listed below, or at least one intermediate course and one advanced course as defined below, satisfies the minimum breadth requirement. Note that any necessary prerequisites (e.g., ECON 50, 51) are additions to the possible sequences below. Students are advised to seek approval from their lead advisers in advance and are required to obtain their advisers' signatures on the breadth certification form as verification that they have met this requirement.

### **CORE ECONOMICS SERIES (REGULAR OR "N" SERIES FOR NON-ECONOMICS PHD STUDENTS)**

- ECON 202. Core Economics: Modules 1&2
- ECON 203. Core Economics: Modules 5&6
- ECON 204. Core Economics: Modules 9&10

*or*

### **PUBLIC POLICY SERIES**

- PUBPOL 301A. Microeconomics
- PUBPOL 301B. Cost-Benefit Analysis and Evaluation

*or*

### **MANAGEMENT SCIENCE & ENGINEERING SERIES**

- MS&E 241. Economic Analysis
  - MS&E 341. Advanced Economic Analysis
- or* at least one intermediate course and at least one advanced course from the lists below:

### **INTERMEDIATE COURSES**

- ECON 106. World Food Economy
- ECON 118. Development Economics
- ECON 155. Environmental Economics and Policy
- MS&E 248. Economics of Natural Resources
- PUBLPOL 202. Organizations and Public Policy
- PUBLPOL 204. Economic Policy Analysis
- PUBLPOL 302B. Introduction to Economic Analysis of Law

### **ADVANCED COURSES**

- ECON 250. Environmental Economics
- ECON 251. Natural Resource and Energy Economics
- MS&E 243. Energy and Environmental Policy Analysis

Students who choose economics and/or policy analysis as a field of inquiry are encouraged, and may be required by their advisers, to complete one of the prescribed series in addition to taking one or more of the advanced courses listed above.

## **ENGINEERING AND TECHNOLOGY FOCAL AREA**

At least one course is required. This list represents examples of appropriate courses only; students may choose a course not listed below provided it meets the criteria for this focal area's subject knowledge. Students are advised to seek approval from their lead advisers in advance and are required to obtain their advisers' signatures on the breadth certification form as verification that they have met this requirement.

- CEE 101B. Mechanics of Fluids
- CEE 161A. Rivers, Streams, and Canals
- CEE 172. Air Quality Management
- CEE 176A. Energy Efficient Buildings
- CEE 176B. Electric Power: Renewables and Efficiency
- CEE 177. Aquatic Chemistry and Biology
- CEE 201D. Computations in Civil and Environmental Engineering
- CEE 207A. Energy Resources
- CEE 210. Building Information Modeling
- CEE 215. Goals and Methods of Sustainable Building Projects
- CEE 229. Engineering and Policy Responses to Climate Change Impacts on Seaports

- CEE 260A. Physical Hydrogeology
- CEE 262B. Transport and Mixing in Surface Water Flows
- CEE 263A. Air Pollution Modeling
- CEE 264A. Rivers, Streams, and Canals
- CEE 265A. Sustainable Water Resources Development
- CEE 266B. Floods and Droughts, Dams and Aqueducts
- CEE 270. Movement and Fate of Organic Contaminants in Surface Waters and Groundwater
- CEE 275A. Law and Science of California Coastal Policy
- EE 293A. Fundamentals of Energy Processes
- EE 293B. Fundamentals of Energy Processes
- EESS 211. Fundamentals of Modeling
- HISTORY 401A. Spatial History
- MS&E 250A. Engineering Risk Analysis

## **NATURAL SCIENCES FOCAL AREA**

At least two courses are required. Students may choose a course not listed below provided it meets the criteria for this focal area's subject knowledge. Students are advised to seek approval from their lead advisers in advanced and are required to obtain their advisers' signatures on the breadth certification form as verification that they have met this requirement.

- BIO 101. Ecology
- BIO 102. Demography: Health, Development, Environment
- BIO 117. Biology and Global Change
- BIO 121. Biogeography
- BIO 136. Evolutionary Paleobiology
- BIO 139. Biology of Birds
- BIO 144. Conservation Biology
- BIO 175. Tropical Ecology and Conservation
- BIO 216. Terrestrial Biogeochemistry
- BIO 227. Foundations of Community Ecology
- BIO 264. Biosphere-Atmosphere Interactions
- BIOHOPK 263H. Oceanic Biology
- BIOHOPK 266H. Molecular Ecology
- BIOHOPK 272H. Marine Ecology
- CEE 164. Introduction to Physical Oceanography
- CEE 266A. Watersheds and Wetlands
- CEE 272. Coastal Contaminants
- CEE 274A,B. Environmental Microbiology I,II
- CEE 274P. Environmental Health Microbiology
- CEE 275A. Law and Science of California Coastal Policy
- EARTHSYS 208. Coastal Wetlands
- EARTHSYS 242. Remote Sensing of Land Use and Land Cover
- EARTHSYS 247. Controlling Climate Change in the 21st Century
- EESS 143. Marine Biogeochemistry
- EESS 155. Science of Soils
- EESS 164. Fundamentals of Geographic Information Science (GIS)
- EESS 215. Earth Systems Dynamics
- EESS 220. Physical Hydrogeology
- EESS 240. Advanced Oceanography
- EESS 241. Remote Sensing of the Oceans
- EESS 246A. Atmosphere, Ocean and Climate Dynamics: The Atmospheric Circulation
- EESS 246B. Atmosphere, Ocean and Climate Dynamics: The Ocean Circulation
- EESS 256. Soil and Water Chemistry
- EESS 258. Geomicrobiology
- EESS 259. Environmental Microbial Genomics
- EESS 284. Climate and Agriculture
- GEOPHYS 104. The Water Course
- GEOPHYS 130. Biological Oceanography
- GES 170. Environmental Geochemistry

# ENERGY RESOURCES ENGINEERING

*Emeriti: (Professors)* Khalid Aziz (recalled to active duty), John W. Harbaugh, André Journel\* (recalled to active duty)

*Chair:* Louis J. Durlofsky

*Professors:* Sally M. Benson, Louis J. Durlofsky, Roland N. Horne, Anthony R. Kavscek, Franklin M. Orr, Jr.

*Associate Professors:* Jef Caers, Margot Gerritsen, Tapan Mukerji, Hamdi Tchelepi

*Assistant Professor:* Jennifer Wilcox

*Courtesy Professors:* Stephan A. Graham, Mark Jacobson

*Lecturers:* Louis M. Castanier, Denis V. Voskov

*Consulting Professors:* Alexandre Boucher, Warren K. Kourt, Robert G. Lindblom, Kiran Pande, Victor Pereyra, Marco R. Thiele

*Acting Assistant Professor:* Adam R. Brandt

\* Joint appointment with Geological and Environmental Sciences

*Department Office:* GESB 065

*Mail Code:* 94305-2220

*Phone:* (650) 723-4744

*Email:* ere@sesmail.stanford.edu

*Web Site:* <http://pangea.stanford.edu/ERE>

Courses offered by the Department of Energy Resources Engineering are listed under the subject code ENERGY on the *Stanford Bulletin's* ExploreCourses web site.

The Department of Energy Resources Engineering (ERE) awards the following degrees: the Bachelor of Science, Master of Science, Engineer, and Doctor of Philosophy in Energy Resources Engineering. The department also awards the Master of Science, Engineer, and Doctor of Philosophy in Petroleum Engineering. Consult the ERE student services office to determine the relevant program.

Energy resources engineers are concerned with the design of processes for energy recovery. Included in the design process are characterizing the spatial distribution of hydrocarbon and geothermal reservoir properties, drilling wells, designing and operating production facilities, selecting and implementing methods for enhancing fluid recovery, examining the environmental aspects of petroleum and geothermal exploration and production, monitoring reservoirs, and predicting recovery process performance. The program also has a strong interest in related energy topics such as renewable energy, global climate change, CO<sub>2</sub> sequestration, clean energy conversions (e.g., "clean coal"), and energy systems. The Energy Resources Engineering curriculum provides a sound background in basic sciences and their application to practical problems to address the complex and changing nature of the field. Course work includes the fundamentals of chemistry, computer science, engineering, geology, geophysics, mathematics, and physics. Applied courses cover most aspects of energy resources engineering and some related fields such as geothermal engineering and geostatistics. The curriculum emphasizes the fundamental aspects of fluid flow in the subsurface. These principles apply equally well to optimizing oil recovery from petroleum reservoirs, geothermal energy production and remediating contaminated groundwater systems.

Faculty and graduate students conduct research in areas including: enhanced oil recovery by thermal means, gas injection, and the use of chemicals; geostatistical reservoir characterization and mathematical modeling; geothermal engineering; natural gas engineering; production optimization; data assimilation and uncertainty modeling; properties of petroleum fluids; well test analysis; carbon sequestration; clean energy conversions; and energy system modeling and optimization. Undergraduates are encouraged to participate in research projects.

The department is housed in the Green Earth Sciences Building. It operates laboratories for research in enhanced oil recovery processes, geological carbon storage operations, clean energy conversions, and geothermal engineering. Students have access to a variety of computers, computing platforms and software for research and course work.

## MISSION OF THE UNDERGRADUATE PROGRAM IN ENERGY RESOURCES ENGINEERING

The mission of the Energy Resources Engineering major is to provide students with the engineering skills and foundational knowledge needed to flourish as technical leaders within the energy industry. Such skills and knowledge include resource assessment, choices among energy alternatives, and carbon management, as well as the basic scientific background and technical skills common to engineers. The curriculum is designed to prepare students for immediate participation in many aspects of the energy industry and graduate school.

## LEARNING OUTCOMES

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to:

1. apply skills developed in fundamental courses to engineering problems.
2. research, analyze, and synthesize solutions to an original and contemporary energy problem.
3. work independently and as part of a team to develop and improve engineering solutions.
4. apply written, visual, and oral presentation skills to communicate scientific knowledge.

## BACHELOR OF SCIENCE IN ENERGY RESOURCES ENGINEERING

The four-year program leading to the B.S. degree provides a foundation for careers in many facets of the energy industry. The curriculum includes basic science and engineering courses that provide sufficient depth for a wide spectrum of careers in the energy and environmental fields.

One of the goals of the program is to provide experience integrating the skills developed in individual courses to address a significant design problem. In ENERGY 199, taken in the senior year, student teams identify and propose technical solutions for an energy-resource related problem of current interest.

## PROGRAM

The requirements for the B.S. degree in Energy Resources Engineering are similar, but not identical, to those described in the "School of Engineering" section of this bulletin. Students must satisfy the University general education, writing, and language requirements. The normal Energy Resources Engineering undergraduate program automatically satisfies the University General Education Requirements (GERs) in the Disciplinary Breadth areas of Natural Sciences, Engineering and Applied Sciences, and Mathematics.

Engineering fundamentals courses and Energy Resources Engineering depth and elective courses must be taken for a letter grade.

The Energy Resources Engineering undergraduate curriculum is designed to prepare students for participation in the energy industry or for graduate studies, while providing requisite skills to evolve as the energy landscape shifts over the next half century. The program provides a background in mathematics, basic sciences, and engineering fundamentals such as multiphase fluid flow in the subsurface. In addition, the curriculum is structured with flexibility that allows students to explore energy topics of particular individual interest and to study abroad.

In brief, the unit and subject requirements are:

<i>Subject</i>	<i>Minimum Units</i>
Energy Resources Core	16
Energy Resources Depth	18
Mathematics	25
Engineering Fundamentals and Depth	19-23
Science	29-30
Technology in Society	3-5
University Requirements: IHUM, GERs, Writing, Language	60-70
<b>Total</b>	<b>170-187</b>

The following courses constitute the normal program leading to a B.S. in Energy Resources Engineering. The program may be modified to meet a particular student's needs and interests with the advisor's prior approval.

## REQUIRED CORE IN ENERGY RESOURCES ENGINEERING

The following courses constitute the core program in Energy Resources Engineering:

ENERGY 101. Energy and the Environment	3
ENERGY 104. Transition to Sustainable Energy Systems	3
ENERGY 120. Fundamentals of Petroleum Engineering	3
ENERGY 160. Modeling Uncertainty in the Earth Sciences	3
ENERGY 199. Senior Project and Seminar in Energy Resources (WIM)	4
<b>Total</b>	<b>16</b>

### MATHEMATICS:

- MATH 41. Single Variable Calculus
  - and MATH 42. Single Variable Calculus
- or MATH 19. Calculus
  - and MATH 20. Calculus
  - and MATH 21. Calculus
- MATH 51. Linear Algebra and Differential Calculus of Several Variables
  - or CME 100. Vector Calculus for Engineers
- MATH 52. Integral Calculus of Several Variables
  - or CME 104. Linear Algebra and Partial Differential Equations for Engineers
- MATH 53. Ordinary Differential Equations with Linear Algebra
  - or CME 102. Ordinary Differential Equations for Engineers

### SCIENCE:

- CHEM 31A. Chemical Principles
- CHEM 31B. Chemical Principles II
  - or CHEM 31X may be substituted for CHEM 31A,B
- CHEM 33. Structure and Reactivity
- GES 1. Introduction to Geology
- PHYSICS 41. Mechanics
- PHYSICS 43. Electricity and Magnetism
- PHYSICS 45. Light and Heat
- PHYSICS 46. Light and Heat Laboratory

### ENGINEERING FUNDAMENTALS:

- CS 106A. Programming Methodology
- CS 106B. Programming Abstractions
  - or CS 106X may be substituted for CS 106A,B
- ENGR 14. Applied Mechanics: Statics
- ENGR 30. Engineering Thermodynamics
- ENGR 60. Engineering Economy
- ME 70. Introductory Fluids Engineering
  - or CHEMENG 120A
- Technology in Society, 1 course

## EARTH AND ENERGY DEPTH CONCENTRATION

Choose courses from the list below for a total of at least 18 units. At least one course must be completed in each category. Courses must be planned in consultation with the student's academic advisor. Appropriate substitutions are allowed with the consent of the advisor.

### FLUID FLOW AND THE SUBSURFACE

- ENERGY 120A. Flow Through Porous Media Laboratory
- ENERGY 121. Fundamentals of Multiphase Flow
- ENERGY 130. Well Log Analysis
- ENERGY 175. Well Test Analysis
- ENERGY 180. Production Engineering
- ENGR 62. Introduction to Optimization

### 3D MODELING OF SUBSURFACE STRUCTURES

- ENERGY 125. Modeling and Simulation for Geoscientists and Engineers
- ENERGY 141. Practice of 3D Subsurface Modeling
- ENERGY 146. Reservoir Characterization
- GEOPHYS 112. Exploring the Geosciences with Matlab
- GEOPHYS 182. Reflection Seismology
- GES 151. Sedimentary Geology

### EARTH AND ENERGY SYSTEMS

- ENERGY 102. Renewable Energy Resources
- ENERGY 153. Carbon Capture and Sequestration
- ENERGY 269. Geothermal Reservoir Engineering
- ENERGY 191. Optimization of Energy Systems
- ENERGY 301. The Energy Seminar
- CEE 64. Air Pollution
- CEE 70. Environmental Science and Technology
- CEE 173B. The Coming Energy Revolution
- CEE 176B. Electric Power
- GEOPHYS 104. The Water Course
- GEOPHYS 150. Geodynamics
- MATSCI 156. Solar Cells, Fuel Cells, and Batteries: Materials for the Energy S

## HONORS PROGRAM

The program in Energy Resources Engineering leading to the Bachelor of Science with Honors provides an opportunity for independent study and research on a topic of special interest and culminates in a written report and oral presentation.

The Honors Program is open to students with a grade point average (GPA) of at least 3.5 in all courses required for the ERE major and minimum of 3.0 in all University course work. Qualified students intending to pursue honors must submit an Honors Program Application to the Undergraduate Program Director no later than the eighth week of their ninth quarter, but students are encouraged to apply to the program during Winter Quarter of their junior year. The application includes a short form, an unofficial transcript, and a 2-3 page research proposal prepared by the student and endorsed by a faculty member who will serve as the research advisor.

Upon approval, students enroll in the Honors Program via Axxess. Students must enroll in a total of 9 units of ENERGY 193; these units may be spread out over the course of the senior year, and may include previous enrollment units for the same research project. Research undertaken for the Honors Program cannot be used as a substitute for regularly required courses. A formal written report must be submitted to the student's research advisor no later than the fourth week of the student's final quarter, and the report must be read, approved, and signed by the student's faculty advisor and a second member of the faculty. Each honors candidate must make an oral presentation of his or her research results.

## MINOR IN ENERGY RESOURCES ENGINEERING

The minor in Energy Resources Engineering requires the following three courses plus three additional electives. Courses

must be planned in consultation with an ERE advisor. Appropriate substitutions are allowed with the consent of the advisor.

*Required courses—*

ENERGY 101. Energy and the Environment	3
ENERGY 120. Fundamentals of Petroleum Engineering	3
ENERGY 160. Modeling Uncertainty in the Earth Sciences	3

*Elective courses (at least 3 courses from the list below)—*

- ENERGY 102. Renewable Energy Resources
- ENERGY 104. Transition to Sustainable Energy Systems
- ENERGY 121. Fundamentals of Multiphase Flow
- ENERGY 125. Modeling and Simulation
- ENERGY 130. Well Log Analysis
- ENERGY 141. Seismic Reservoir Characterization
- ENERGY 146. Reservoir Characterization
- ENERGY 153. Carbon Capture and Sequestration
- ENERGY 269. Geothermal Reservoir Engineering
- ENERGY 175. Well Test Analysis
- ENERGY 180. Production Engineering
- GEOPHYS 182. Reflection Seismology
- GES 151. Sedimentary Geology

## COTERMINAL B.S. AND M.S. PROGRAM IN ENERGY RESOURCES ENGINEERING

The coterminal B.S./M.S. program offers an opportunity for Stanford University students to pursue a graduate experience while completing the B.S. degree in any relevant major. Energy Resources Engineering graduate students generally come from backgrounds such as chemical, civil, or mechanical engineering; geology or other earth sciences; or physics or chemistry. Students should have a background at least through MATH 53 and CS 106 before beginning graduate work in this program.

The two types of M.S. degrees, the course work only degree and the research degree, as well as the courses required to meet degree requirements, are described below in the M.S. section. Both degrees require 45 units and may take from one to two years to complete depending on circumstances unique to each student.

Requirements to enter the program are: two letters of recommendation from faculty members or job supervisors, a statement of purpose, scores from the GRE general test, and a copy of Stanford University transcripts. While the department does not require any specific GPA or GRE score, potential applicants are expected to compete favorably with graduate student applicants.

A Petroleum Engineering or Energy Resources Engineering master's degree can be used as a terminal degree for obtaining a professional job in the petroleum or energy industries, or in any related industry where analyzing flow in porous media or computer simulation skills are required. It can also be a stepping stone to a Ph.D. degree, which usually leads to a professional research job or an academic position.

Students should apply to the program any time after they have completed 105 undergraduate units, and in time to take ENERGY 120, the basic introductory course in Autumn Quarter of the year they wish to begin the program. Contact the Department of Energy Resources Engineering to obtain additional information.

The University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees" section of this bulletin. For University coterminal degree program rules and University application forms, also see <http://studentaffairs.stanford.edu/registrar/publications#Coterm>.

## GRADUATE PROGRAMS IN ENERGY RESOURCES ENGINEERING

The Energy Resources Engineering department offers two distinct degree programs at both the M.S and Ph.D. levels. One program leads to the degrees of M.S. or Ph.D. in Petroleum Engineering, and the other leads to the degrees of M.S. or Ph.D. in Energy Resources Engineering. The Engineer degree, which is offered in either Petroleum Engineering or Energy Resources

Engineering, is an extended form of the M.S. degree with additional course work and research.

The University's basic requirements for M.S., Engineer, and Ph.D. degrees are discussed in the "Graduate Degrees" section of this bulletin.

The following are minimum requirements for a student in the Department of Energy Resources Engineering to remain in good academic standing regarding course work:

1. no more than one incomplete grade at any time
2. a cumulative grade point average (GPA) of 3.0
3. a grade point average (GPA) of 2.7 each quarter
4. a minimum of 15 units completed within each two quarter period (excluding Summer Quarter).

Unless otherwise stated by the instructor, incomplete grades in courses within the department are changed to 'NP' (not passed) at the end of the quarter after the one in which the course was given. This one quarter limit is a different constraint from the maximum one-year limit allowed by the University.

Academic performance is reviewed each quarter by a faculty committee. At the beginning of the next quarter, any student not in good academic standing receives a letter from the committee or department chair stating criteria that must be met for the student to return to good academic standing. If the situation is not corrected by the end of the quarter, possible consequences include termination of financial support, termination of departmental privileges, and termination from the University.

Students funded by research grants or fellowships from the department are expected to spend at least half of their time (a minimum of 20 hours per week) on research. Continued funding is contingent upon satisfactory research effort and progress as determined by the student's adviser. After Autumn Quarter of the first year, students receive a letter from the department chair concerning their research performance. If problems are identified and they persist through the second quarter, a warning letter is sent. Problems persisting into a third quarter may lead to loss of departmental support including tuition and stipend. Similar procedures are applied in subsequent years.

A balanced master's degree program including engineering course work and research requires a minimum of one maximum-tuition academic year beyond the baccalaureate to meet the University residence requirements. Most full-time students spend at least one additional summer to complete the research requirement. An alternative master's degree program based only on course work is available, also requiring at least one full tuition academic year to meet University residence requirements.

M.S. students who anticipate continuing in the Ph.D. program should follow the research option. M.S. students receiving financial aid normally require two academic years to complete the degree. Such students must take the research option.

The degree of Engineer requires a comprehensive maximum-tuition, two-year program of graduate study. This degree permits more extensive course work than the master's degree, with an emphasis on professional practice. All Engineer degree students receiving financial aid are limited to a 10-unit course load per quarter and need at least ten quarters of work to complete the degree.

The Ph.D. degree is awarded primarily on the basis of completion of significant, original research. Extensive course work and a minimum of 90 units of graduate work beyond the master's degree are required. Doctoral candidates planning theoretical work are encouraged to gain experimental research experience in the M.S. program. Ph.D. students receiving financial assistance are limited to 10 units per quarter and often require more than three years to complete the Ph.D. beyond the M.S. degree.

In special cases, the M.S., Engineer, and Ph.D. degrees may be awarded with field designations for students who follow programs of study in the particular fields of (1) geostatistics, (2) geothermal, or (3) environment. For example, students may be awarded the degree Master of Science in Energy Resources Engineering (Geothermal).

# MASTER OF SCIENCE IN PETROLEUM ENGINEERING

The objective is to prepare the student for professional work in the energy industry, or for doctoral studies, through completion of fundamental courses in the major field and in related sciences as well as independent research.

Students entering the graduate program are expected to have an undergraduate-level engineering or physical science background. Competence in computer programming in a high-level language (CS 106X or the equivalent) and knowledge of engineering and geological fundamentals (ENERGY 120, 130, and GES 151) are prerequisites for taking most graduate courses.

The candidate must fulfill the following requirements:

1. Register as a graduate student for at least 45 units.
2. Submit a program proposal for the Master's degree approved by the adviser during the first quarter of enrollment.
3. Complete 45 units with a grade point average (GPA) of at least 3.0. This requirement is satisfied by taking the core sequence, selecting one of the seven elective sequences, an appropriate number of additional courses from the list of technical electives, and completing 6 units of master's level research. Students electing the course work only M.S. degree are strongly encouraged to select an additional elective sequence in place of the research requirement. Students interested in continuing for a Ph.D. are expected to choose the research option and enroll in 6 units of ENERGY 361. All courses must be taken for a letter grade.
4. Students entering without an undergraduate degree in Petroleum Engineering must make up deficiencies in previous training. Not more than 10 units of such work may be counted as part of the minimum total of 45 units toward the M.S. degree.

Research subjects include certain groundwater hydrology and environmental problems, energy industry management, flow of non-Newtonian fluids, geothermal energy, natural gas engineering, oil and gas recovery, pipeline transportation, production optimization, reservoir characterization and modeling, carbon sequestration, reservoir engineering, reservoir simulation, and transient well test analysis.

## RECOMMENDED COURSES AND SEQUENCES

The following list is recommended for most students. With the prior special consent of the student's adviser, courses listed under technical electives may be substituted based on interest or background.

### CORE SEQUENCE

<i>Subject and Catalog Number</i>	<i>Units</i>
ENERGY 175. Well Test Analysis	3
or ENERGY 130. Well Log Analysis	3
ENERGY 221. Fundamentals of Multiphase Flow	3
ENERGY 222. Reservoir Engineering*	3
ENERGY 246. Reservoir Characterization and Flow Modeling with Outcrop Data	3
ENERGY 251. Thermodynamics of Equilibria†	3
CME 200. Linear Algebra with Application to Engineering Computations	3
CME 204. Partial Differential Equations in Engineering	3
<b>Total</b>	<b>21</b>

\* Students taking the Environmental sequence may substitute ENERGY 227.

† Optional for students taking the Geostatistics and Reservoir Modeling sequence.

### ELECTIVE SEQUENCE

Choose one of the following:

#### CRUSTAL FLUIDS:

GES 230. Physical Hydrogeology	4
GES 231. Contaminant Hydrogeology	4
GEOPHYS 200. Fluids and Tectonics	3
<b>Total</b>	<b>11</b>

### ENVIRONMENTAL:

ENERGY 227. Enhanced Oil Recovery	3
GES 231. Contaminant Hydrogeology	4

Plus two out of the following courses:

ENERGY 240. Geostatistics	3-4
ENERGY 260. Environmental Problems in Petroleum Engineering	3
CEE 270. Movement, Fate, and Effect of Contaminants in Surface Water and Groundwater	3
CEE 273. Aquatic Chemistry	3
CEE 274A. Environmental Microbiology	3
GES 230. Physical Hydrogeology	4
<b>Total</b>	<b>13-14</b>

### ENHANCED RECOVERY:

ENERGY 225. Theory of Gas Injection Processes	3
ENERGY 226. Thermal Recovery Methods	3
ENERGY 227. Enhanced Oil Recovery	3
<b>Total</b>	<b>9</b>

### GEOSTATISTICS AND RESERVOIR MODELING:

ENERGY 240. Geostatistics for Spatial Phenomena	3-4
ENERGY 241. Practice of Geostatistics	3-4
GEOPHYS 182. Reflection Seismology	3
or GEOPHYS 262. Rock Physics	3
<b>Total</b>	<b>9-11</b>

### GEO THERMAL:

ENERGY 269. Geothermal Reservoir Engineering	3
or ENERGY 293A. Fundamentals of Energy Processes	3
CHEMENG 120B. Energy and Mass Transport	4
ME 131A. Heat Transfer	3
<b>Total</b>	<b>10</b>

### RESERVOIR PERFORMANCE:

ENERGY 223. Reservoir Simulation	3-4
ENERGY 280. Oil and Gas Production Engineering	3
GEOPHYS 202. Reservoir Geomechanics	3
<b>Total</b>	<b>9-11</b>

### SIMULATION AND OPTIMIZATION:

ENERGY 223. Reservoir Simulation	3-4
ENERGY 224. Advanced Reservoir Simulation	3
ENERGY 284. Optimization	3
<b>Total</b>	<b>9-10</b>

### RENEWABLE ENERGY:

ENERGY 102. Renewable Energy Sources	3
ENERGY 293A. Fundamentals of Energy Processes	3-4
ENERGY 293B. Fundamentals of Energy Processes	3-4
<b>Total</b>	<b>9-11</b>

### RESEARCH SEQUENCE

ENERGY 361. Master's Degree Research in Petroleum Engineering*	6
<b>Total units required for M.S. degree</b>	<b>45</b>

\* Students choosing the company sponsored course-work-only for the M.S. degree may substitute an additional elective sequence in place of the research.

### TECHNICAL ELECTIVES

Technical electives from the following list of advanced-level courses usually complete the M.S. program. In unique cases, when justified and approved by the adviser prior to taking the course, courses listed here may be substituted for courses listed above in the elective sequences.

ENERGY 130. Well Log Analysis	3
ENERGY 224. Advanced Reservoir Simulation	3
ENERGY 230. Advanced Topics in Well Logging	3
ENERGY 260. Environmental Aspects of Petroleum Engineering	3
ENERGY 267. Engineering Valuation and Appraisal of Oil and Gas Wells, Facilities and Properties	3
ENERGY 269. Geothermal Reservoir Engineering	3
ENERGY 273. Special Production Engineering Topics in Petroleum Engineering	1-3
ENERGY 280. Oil and Gas Production	3
ENERGY 281. Applied Mathematics in Reservoir Engineering	3
ENERGY 284. Optimization	3

ENERGY 301. The Energy Seminar	1
CME 204. Partial Differential Equations to Engineering	3
ENERGY 293A. Fundamentals of Energy Processes	3-4
ENERGY 293B. Fundamentals of Energy Processes	3-4
GEOPHYS 182. Reflection Seismology	3
GEOPHYS 190. Near Surface Geophysics	3
GEOPHYS 202. Reservoir Geomechanics	3

## MASTER OF SCIENCE IN ENERGY RESOURCES ENGINEERING

The objective of the M.S. degree in Energy Resources Engineering is to prepare the student either for a professional career or for doctoral studies. Students in the M.S. degree program must fulfill the following:

- Complete a 45-unit program of study. The degree has two options:
  - a course work degree, requiring 45 units of course work
  - a research degree, of which a minimum of 39 units must be course work, with the remainder consisting of no more than 6 research units.
- Course work units must be divided among two or more scientific and/or engineering disciplines and can include the core courses required for the Ph.D. degree.
- All courses must be taken for a letter grade.
- The program of study must be approved by the academic adviser and the department graduate program committee.
- Students taking the research-option degree are required to complete an M.S. thesis, approved by the student's thesis committee.

## RECOMMENDED COURSES AND SEQUENCES

The following list is recommended for most students. With the prior consent of the student's adviser, courses listed under technical electives may be substituted based on interest or background.

### CORE SEQUENCE

Subject and Catalog Number	Units
ENERGY 221. Fundamentals of Multiphase Flow	3
ENERGY 246. Reservoir Characterization and Flow Modeling	3
CME 200. Linear Algebra with Application to Engineering Computations	3
CME 204. Partial Differential Equations in Engineering	3
CS 106X. Programming Methodology and Abstractions	3
ENERGY 293A. Fundamentals of Energy Processes	3
ENERGY 293B. Fundamentals of Energy Processes	3
MS&E 248. Economics of Natural Resources	3
Total	24

### SUBJECT SEQUENCE ALTERNATIVES

<i>Geothermal—</i>	
ENERGY 223. Reservoir Simulation	3
ENERGY 269. Geothermal Reservoir Engineering	3
CHEMENG 120B. Energy and Mass Transport	4
GES 217. Faults, Fractures, and Fluid Flow	3
ME 131. Heat Transfer	3
ME 370. Energy Systems I	3
Total	15

<i>Low Carbon Energy (select 15 units from the following)—</i>	
ENERGY 104. Technology in the Greenhouse	3
ENERGY 223. Reservoir Simulation	3
ENERGY 251. Thermodynamics of Equilibria	3
ENERGY 252. Chemical Kinetics Modeling	3
ENERGY 269. Geothermal Reservoir Engineering	3
ENERGY 291. Optimization of Energy Systems	3
CHEMENG 130. Separation Processes	3
GES 170. Environmental Geochemistry	4
GES 171. Geochemical Thermodynamics	3

ME 370A. Energy Systems I: Thermodynamics	3
ME 370B. Energy Systems II: Modeling & Advanced Concepts	4
MATSCI 156. Solar Cells, Fuel Cells, and Batteries	4
CEE 272P. Distributed Generation and Grid Integration of Renewables	3
Total	15

*Modeling Natural Resources (select 15 units from the following)—*

ENERGY 240. Geostatistics for Spatial Phenomena	3
ENERGY 241. Seismic Reservoir Characterization	3
ENERGY 260. Modeling Uncertainty in the Earth Sciences	3
ENERGY 284. Optimization: Deterministic and Stochastic Approaches	3
GEOPHYS 200. Fluids and Flow in the Earth: Computational Methods	3
GEOPHYS 262. Rock Physics	3
Total	15

*Oil and Gas—*

ENERGY 104. Technology in the Greenhouse	3
ENERGY 222. Advanced Reservoir Engineering	3
ENERGY 223. Reservoir Engineering	3
ENERGY 240. Geostatistics for Spatial Phenomena or ENERGY 260. Modeling Uncertainty in the Earth Sciences	3
ENERGY 251. Thermodynamics of Equilibria	3
Total	15

### TECHNICAL ELECTIVES

- ENERGY 104. Technology in the Greenhouse
- ENERGY 120. Fundamentals of Petroleum Engineering
- ENERGY 130. Well Log Analysis I
- Any 200-level ENERGY course
- ENERGY 301. The Energy Seminar
- CEE 176A. Energy Efficient Buildings
- CEE 176B. Electric Power: Renewables and Efficiency
- CME 206. Introduction to Numerical Methods for Engineering
- CME 212. Introduction to Large Scale Computing in Engineering
- EARTHSYS 247. Controlling Climate Change in the 21st Century
- ECON 250. Natural Resource and Energy Economics
- ECON 251. Environmental Economics
- GES 217. Faults, Fractures, and Fluid Flow
- MATSCI 316. Nanoscale Science, Engineering, and Technology
- ME 131A. Heat Transfer
- ME 150. Internal Combustion Engines
- ME 260. Fuel Cell Science Technology
- ME 370A. Energy Systems I: Thermodynamics
- ME 370B. Energy Systems II: Modeling and Advanced Concepts
- MS&E 248. Economics of Natural Resources

## ENGINEER IN PETROLEUM ENGINEERING OR ENERGY RESOURCES ENGINEERING

The objective of the Engineer degree program is to broaden training through additional work in engineering and the related sciences and by additional specialization.

Basic requirements include completion of 90 units of course work including 15 units of research (ENERGY 362), and including all course requirements of the department's master's degree (39 units, excluding research). If the candidate has received credit for research in the M.S. degree, this credit ordinarily would be transferable to the Engineer degree, in which case a total of 9 additional research units would be required. No more than 10 of the 90 required units can be applied to overcoming deficiencies in undergraduate training.

At least 30 units in Engineering and closely allied fields must be taken in advanced work, that is, work beyond the master's



degree requirements and in addition to research (ENERGY 362). These may include courses from the Ph.D. degree list below or advanced-level courses from other departments with prior consent of the adviser. All courses must be taken for a letter grade. The student must have a grade point average (GPA) of at least 3.0 in courses taken for the degree of Engineer. A thesis based on 15 units of research must be submitted and approved by the adviser and one other faculty member.

## DOCTOR OF PHILOSOPHY IN PETROLEUM ENGINEERING OR ENERGY RESOURCES ENGINEERING

The Ph.D. degree is conferred upon demonstration of high achievement in independent research and by presentation of the research results in a written dissertation and oral defense.

In addition to University and the Department of Energy Resources Engineering basic requirements for the doctorate, the Petroleum Engineering Ph.D. and Energy Resources Engineering Ph.D. degrees have the following requirements:

1. Students must complete a minimum of 36 course units and 54 research units (a total of 90 units) beyond the M.S. degree. At least half of the classes must be at a 200 level or higher and all must be taken for a letter grade. Students with an M.S. degree or other specialized training from outside ERE are generally expected to include ENERGY 221, 223, and 240, or their equivalents. The number and distribution of courses to be taken is determined with input from the research advisers and department graduate program committee.
2. To achieve candidacy (usually during or at the end of the first year of enrollment), the student must complete 24 units of letter-graded course work beyond the M.S. degree, develop a written Ph.D. research proposal, and choose a dissertation committee.
3. The research adviser(s) and two other faculty members comprise the dissertation reading committee. Upon completion of the dissertation, the student must pass a University oral examination in defense of the dissertation.
4. Complete 135 units of total graduate work (usually 90 units beyond the M.S. degree).
5. Act as a teaching assistant at least once, and enroll in ENERGY 359.

36 units of course work is a minimum; in some cases the research adviser may specify additional requirements to strengthen the student's expertise in particular areas. The 36 units of course work does not include required teaching experience (ENERGY 359) nor required research seminars. Courses must be taken for a letter grade, and a grade point average (GPA) of at least 3.25 must be maintained.

The dissertation must be submitted in its final form within five calendar years from the date of admission to candidacy. Candidates who fail to meet this deadline must submit an Application for Extension of Candidacy for approval by the department chair if they wish to continue in the program.

Ph.D. students entering the department are required to hold an M.S. degree in a relevant science or engineering discipline. Students wishing to follow the Ph.D. program in Petroleum Engineering must hold an M.S. degree (or equivalent) in Petroleum Engineering. Students following the Ph.D. program in Energy Resources Engineering must hold an M.S. degree (or equivalent), although it need not be in Energy Resources Engineering.

### PH.D. DEGREE QUALIFICATION

The procedure for the Ph.D. qualification differs depending upon whether the student entered the department as an M.S. or Ph.D. student. In either case, previous written and oral exams have been replaced by a written Ph.D. proposal followed by a proposal defense.

*For students who complete an M.S. in the Energy Resources Engineering Department at Stanford*—In the second year of the

M.S. degree program, the student formally applies to the Ph.D. program. The student is considered for admission to the Ph.D. program along with external applicants. The admission decision is based upon course work and research progress. During or before the third quarter as a Ph.D. student, generally corresponding to Spring Quarter in the third year at Stanford, the student must pass a Qualifying Examination by presenting a Ph.D. proposal to a committee of three faculty members. This entails a written document, including material such as a literature review and proposed work outline, and an oral presentation. Following the presentation, the student is questioned on the research topic and general field of study. The student can pass, pass with qualifications requiring more classes or teaching assistantships, or fail. A student who substantially changes topics between the M.S. and Ph.D. may ask his/her advisor to petition for an extra quarter before presenting the Ph.D. proposal.

*For students who enter directly into the Ph.D. program after receiving an M.S. from another university*—After the second quarter at Stanford, a faculty committee evaluates the student's progress. If a student is found to be deficient in course work and/or research, a written warning is issued. After the third quarter, the faculty committee decides whether or not funding should be continued for the student. Students denied funding after the third quarter are advised against proceeding with the Ph.D. proposal, though the student may choose to proceed under personal funding. Direct entry Ph.D. students must present their Ph.D. proposal (qualifying exam) before the end of their fourth quarter at Stanford (not counting Summer Quarter).

### COURSE WORK

The 36 units of course work may include graduate courses in Energy Resources Engineering (numbered 200 and above) and courses chosen from the following list. Other courses may be substituted with prior approval of the adviser. In general, non-technical courses are not approved.

Students who enter directly into the Ph.D. program after receiving an M.S. degree from another university are expected to show expertise in the core courses required for Stanford's M.S. degree in Energy Resources Engineering, either by including those courses in their Ph.D. degree or by showing that they have taken equivalent courses during their M.S. degree.

For a Ph.D. in Energy Resources Engineering, 12 of the 36 required course units must be completed from the following list of courses. If the student has not taken ENERGY 293A,B or their equivalent during the M.S., then these courses must be taken during the Ph.D. (they will satisfy 6 of the required 12 units).

- ENERGY 104. Technology in the Greenhouse
- ENERGY 252. Chemical Kinetics Modeling
- ENERGY 253. Carbon Capture and Sequestration
- ENERGY 260. Modeling Uncertainty in the Earth Sciences
- ENERGY 269. Geothermal Reservoir Engineering
- ENERGY 291. Optimization of Energy Systems
- ENERGY 293A. Fundamentals of Energy Processes
- ENERGY 239B. Fundamentals of Energy Processes
- ENERGY 301. The Energy Seminar (may be repeated for credit no more than 3 times)
- CEE 176A. Energy Efficient Buildings
- CEE 176B. Electric Power: Renewables and Efficiency
- CEE 272P. Distributed Generation and Grid Integration of Renewables
- CEE 268. Groundwater Flow
- EESS 221/CEE 260C. Contaminant Hydrogeology
- CHEMENG 130. Separation Processes
- CHEMENG 340. Molecular Thermodynamics
- EARTHYSYS 247. Controlling Climate Change in the 21st Century
- ECON 250. Environmental Economics
- ECON 251. Natural Resource and Energy Economics
- GES170. Environmental Geochemistry

- GES 171. Geochemical Thermodynamics
- GES 217. Faults, Fractures, and Fluid Flow
- ME 131A. Heat Transfer
- ME 150. Internal Combustion Engines
- ME 260. Fuel Cell Technology
- ME 370A. Energy Systems I: Thermodynamics
- ME 370B. Energy Systems II: Modeling and Advanced Concepts
- MATSCI 156. Solar Cells, Fuel Cells, and Batteries
- MATSCI 316. Nanoscale Science, Engineering, and Technology
- MS&E 248. Economics of Natural Resources

### MATH AND APPLIED MATH

#### Subject and Catalog Number

Subject and Catalog Number	Units
AA 210A. Fundamentals of Compressible Flow	3
AA 214A. Numerical Methods in Fluid Mechanics	3
AA 214B. Numerical Computation of Compressible Flow	3
CHEMENG 300. Applied Mathematics in Chemical Engineering	3
CEE 268. Groundwater Flow	3-4
CME 108. Introduction to Scientific Computing	3-4
CME 200. Linear Algebra with Application to Engineering Computations	3
CME 204. Partial Differential Equations in Engineering	3
CME 206. Introduction to Numerical Methods for Engineering	3
CME 302. Numerical Linear Algebra	3
CME 306. Numerical Solution of Partial Differential Equations	3
CS 106X. Programming Methodology and Abstractions	5
CS 193D. Professional Software Development with C++	3
MATH 106. Functions of a Complex Variable	3
MATH 113. Linear Algebra and Matrix Theory	3
MATH 114. Linear Algebra and Matrix Theory II	3
MATH 115. Functions of a Real Variable	3
MATH 131. Partial Differential Equations I	3
MATH 132. Partial Differential Equations II	3
MATH 220A,B,C. Partial Differential Equations of Applied Mathematics	3 ea.
ME 331A,B. Classical Dynamics	3 ea.
ME 335A,B,C. Finite Element Analysis	3 ea.
STATS 110. Statistical Methods in Engineering and Physical Sciences	4
STATS 116. Theory of Probability	4
STATS 200. Introduction to Statistical Inference	3
STATS 202. Data Analysis	3

### SCIENCE

GES 231. Contaminant Hydrogeology	4
GES 253. Petroleum Geology and Exploration	3
GEOPHYS 182. Reflection Seismology	3
GEOPHYS 190. Near Surface Geophysics	3
GEOPHYS 262. Rock Physics	3

### ENGINEERING

CHEMENG 110. Equilibrium Thermodynamics	3
CHEMENG 120A. Fluid Mechanics	3
CHEMENG 120B. Energy and Mass Transport	3
CHEMENG 310A. Microscale Transport in Chemical Engineering	3
ENGR 298. Seminar in Fluid Mechanics	1

## PH.D. MINOR IN PETROLEUM ENGINEERING OR ENERGY RESOURCES ENGINEERING

To be recommended for a Ph.D. degree with Petroleum Engineering or Energy Resources Engineering as a minor subject, a student must take 20 units of graduate-level lecture courses in the department. These courses must include ENERGY 221 and 222 for the Petroleum Engineering minor, or ENERGY 293A and 293B for the Energy Resources Engineering minor. The remaining courses should be selected from ENERGY 175, 223, 224, 225, 227, 240, 241, 251, 252, 253, 269, 280, 281, and 284.

## ENVIRONMENTAL EARTH SYSTEM SCIENCE

*Chair:* Scott Fendorf

*Associate Chair:* Kevin Arrigo

*Professors:* Kevin Arrigo, C. Page Chamberlain, Robert Dunbar, Scott Fendorf, Christopher Field,\* Steven Gorelick, Eric Lambin,\*\* Pamela Matson,\*\* Rosamond Naylor \*\*\*

*Associate Professors:* Christopher Francis

*Assistant Professors:* Karen Casciotti, Noah Diffenbaugh,\*\* David Lobell, \*\*\* Balakanapathy Rajaratnam, \*\*\* Leif Thomas

*Courtesy Professors:* Gregory Asner, Ken Caldeira, Anna Michalak, Peter Vitousek

*Visiting Professors:* Paul Moorcroft; Keith R. Smettem; Rodrigo Vargas

\* Joint appointment with Biology

\*\* Joint appointment with Woods Institute for the Environment

\*\*\*Joint appointment with Statistics

+ Joint appointment with the Freeman Spogli Institute for International Studies

*Department Offices:* Yang and Yamazaki Environment and Energy Building, Room 140

*Phone:* 650-721-5723

*Mail Code:* 94305-4216

*Email:* lreys@stanford.edu

*Web Site:* <http://eess.stanford.edu>

Courses offered by the Department of Environmental Earth System Science are listed under the subject code EESS on the *Stanford Bulletin's* ExploreCourses web site.

Environmental Earth System Science studies the planet's oceans, lands, and atmosphere as an integrated system, with an emphasis on changes occurring during the current period of overwhelming human influence, the Anthropocene. Faculty and students within the department use the principles of biology, chemistry, and physics to study problems involving processes occurring at the Earth's surface, such as climate change and global nutrient cycles, providing a foundation for problem solving related to environmental sustainability and global environmental change.

## GRADUATE PROGRAMS IN ENVIRONMENTAL EARTH SYSTEM SCIENCE

The University's basic requirements for the M.S. and Ph.D. degrees are discussed in the "Graduate Degrees" section of this bulletin.

## MASTER OF SCIENCE IN ENVIRONMENTAL EARTH SYSTEM SCIENCE

The purpose of the master's program is to continue a student's training in one of the earth science disciplines and to prepare students for a professional career or doctoral studies.

The University's requirements for M.S. degrees are outlined in the "Graduate Degrees" section of this bulletin. Additional departmental requirements include the following:

1. Completion of core course work:
  - EESS 211. Fundamentals of Modeling
  - EESS 212. Measurements in Earth Systems
  - EESS 215. Earth System Dynamics
  - EARTHSCI 300. Earth Sciences Seminar.
2. Enrollment in EESS 301, Topics in Environmental Earth System Science, each quarter during the academic year.
3. A minimum of 45 units of course work at the 100 level or above.

4. Half of the courses used to satisfy the 45-unit requirement must be intended primarily for graduate students, usually at the 200 level or above.
5. No more than 15 units of thesis research may be used to satisfy the 45-unit requirement.
6. Some students may be required to make up background deficiencies in addition to these basic requirements.
7. By the end of Winter Quarter of the first year in residence, a student must complete at least three courses taught by a minimum of two different department faculty members.
8. Serve as a teaching assistant in at least two quarters during their graduate career.

The department's graduate coordinator, in coordination with the departmental faculty, appoints an academic adviser prior to registration with appropriate consideration of the student's background, interests, and professional goals. In consultation with the adviser, the student plans a program of course work for the first year. The faculty adviser is charged with designing the curriculum in consultation with the student specific to the research topic. Each student must complete a thesis describing his or her research. Thesis research should begin during the first year of study at Stanford and should be completed before the end of the second year of residence. Early during the thesis research period, and after consultation with the student, the thesis adviser appoints a second reader for the thesis who must be approved by the graduate coordinator; the thesis adviser is the first reader. The two readers jointly determine whether the thesis is acceptable for the M.S. degree in the department.

## MASTER OF SCIENCE, COURSE WORK ONLY OPTION

The course-work-only M.S. for EESS Ph.D. students requires 45 unduplicated units of which all 45 must be course work (non-research, non-independent study, non-thesis units). All required units must be in courses at the 100-level or above, 50 percent of those units must be in graduate-level courses (generally, at the 200-level or above). No units are awarded for course work completed elsewhere (i.e., not eligible to transfer-in units). All 45 units can be applied to the 135 unit requirement for the Ph.D. The remaining 90 units can consist of all research units.

## DOCTOR OF PHILOSOPHY IN ENVIRONMENTAL EARTH SYSTEM SCIENCE

The objectives of the doctoral program are to enable students to develop the skills needed to conduct original investigations in environmental and earth system sciences, to interpret the results, and to present the data and conclusions in a publishable manner. Graduates should develop strong communication skills and leadership skills with the ability to teach and communicate effectively with the public.

The University's requirements for the Ph.D. degree are outlined in the "Graduate Degrees" section of this bulletin. A summary of additional department requirements follows:

1. Completion of core course work:
  - EESS 211. Fundamentals of Modeling
  - EESS 212. Measurements in Earth Systems
  - EESS 215. Earth System Dynamics
  - EARTHSCI 300. Earth Sciences Seminar.
2. Enrollment in EESS 301. Topics in Environmental Earth System Science, each quarter during the academic year.
3. By the end of Winter Quarter of their first year in residence, students must complete at least three courses taught by a minimum of two different departmental faculty members.
4. Completion of required courses in their individual program or in their specialized area of study with a grade point average (GPA) of 3.0 (B) or higher, or demonstrate that they have completed the equivalents elsewhere.

5. Completion of a minimum of four letter grade courses of at least three units each from four different faculty members on the Academic Council in the University.
6. Serve as a teaching assistant in at least four quarters during their graduate career.
7. During Spring Quarter of each year, students must undergo an annual review by their thesis committee to allow the committee to monitor the progress of the student and make recommendations, where necessary.
8. Qualify for candidacy for the Ph.D. by the end of the sixth quarter in residence, excluding summers. Department procedures require selection of a faculty thesis adviser, preparation of a written research proposal, approval of this proposal by the thesis adviser, selection of a committee for the Ph.D. qualifying examination, and approval of the membership by the graduate coordinator and chair of the department. The research examination consists of three parts: oral presentation of a research proposal; examination on the research proposal; and examination on subject matter relevant to the proposed research. The exam should take place prior to May 1 so that its outcome is known at the time of the annual spring evaluation of graduate students.

Upon qualifying for Ph.D. candidacy, the student and thesis adviser, who must be a department faculty member, choose a research committee that includes a minimum of two faculty members in the University in addition to the adviser. Annually, in the month of March or April, the candidate must organize a meeting of the full research committee to present a progress report covering the past year and provide expected goals for the coming year.

Under the supervision of the research advisory committee, the candidate must prepare a doctoral dissertation that is a contribution to knowledge and is the result of independent research; curriculum must also be developed with the supervision of the committee, which should be designed to provide a rigorous foundation for the research area. The format of the dissertation must meet University guidelines. The student is urged to prepare dissertation chapters that, in scientific content and format, are readily publishable.

The doctoral dissertation is defended in the University oral examination. The department appoints the research adviser and two other members of the research committee to be readers of the draft dissertation. The readers are charged to read the draft and to certify in writing to the department that it is adequate to serve as a basis for the University oral examination. Upon obtaining this written certification, the student is permitted to schedule the University oral examination.

## GEOLOGICAL AND ENVIRONMENTAL SCIENCES

*Emeriti:* (Professors) Robert Coleman, Robert R. Compton, Marco T. Einaudi, W. Gary Ernst,\* John W. Harbaugh, James C. Ingle, Jr.,\* Andre G. Journel,\* Juhn G. Liou,\* Ronald J. P. Lyon, Michael McWilliams, J. Michael Moldowan,\* George A. Parks, Irwin Remson

*Chair:* Jonathan F. Stebbins

*Associate Chair:* Donald R. Lowe

*Professors:* Dennis K. Bird, Gordon E. Brown, Jr., Stephan A. Graham, Keith Loague, Donald R. Lowe, Gail A. Mahood, Elizabeth L. Miller, David D. Pollard, Jonathan F. Stebbins

*Assistant Professors:* George Hilley, Katherine Maher, Wendy Mao, Jonathan Payne, Jessica Warren

*Professors (Research):* Atila Aydin, Martin J. Grove

*Courtesy Professors:* Page Chamberlain, Elizabeth Hadly, Simon L. Klemperer, Anders R. Nilsson, Alfred M. Spormann

*Lecturer:* Bob Jones

*Consulting Professors:* Brent R. Constantz, Thomas L. Holzer, Carolyn Lampe, Jack J. Lissauer, Leslie B. Magoon, Mark S.

Marley, Timothy R. McHargue, Kristian E. Meisling, Kenneth Peters

*Consulting Associate Professor:* Jorge A. Vazquez

*Visiting Professors:* Craig M. Bethke, Rodney Ewing, Andrew Hurst, Jeffrey Lee, Gregory V. Lowry, Dorothy J. Merritts, Knut Bertil P. Persson, Robert J. Stern, Robert C. Walter

\* Recalled to active duty

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*Mail Code:* 94305-2115

*Phone:* (650) 723-0848

*Web Site:* <http://ges.stanford.edu/>

Courses offered by the Department of Geological and Environmental Sciences are listed under the subject code GES on the *Stanford Bulletin's* ExploreCourses web site.

The geological and environmental sciences are naturally interdisciplinary, and include: the study of earth materials, earth processes, and how they have changed over Earth's 4.56 billion year history. More specifically, courses and research within the department address: the chemical and physical makeup and properties of minerals, rocks, soils, sediments, and water; the formation and evolution of Earth and other planets; the processes that deform Earth's crust and shape Earth's surface; the stratigraphic, paleobiological, and geochemical records of Earth history including changes in climate, oceans, and atmosphere; present-day, historical, and long-term feedbacks between the geosphere and biosphere, and the origin and occurrence of our natural resources.

The department's research is critical to the study of natural hazards (earthquakes, volcanic eruptions, landslides, and floods), environmental and geological engineering, surface and groundwater management, the assessment, exploration, and extraction of energy, mineral and water resources, ecology and conservation biology, remediation of contaminated water and soil, geological mapping and land use planning, and human health and the environment.

A broad range of instrumentation for elemental and radiogenic/stable isotope analysis is available, including ion microprobe, electron microprobe, thermal and gas source mass spectrometry, inductively coupled plasma mass spectrometry and nuclear magnetic resonance. The Center for Materials Research and facilities at the SLAC National Accelerator Laboratory, Stanford Synchrotron Radiation Laboratory (SSRL), and the U.S. Geological Survey in nearby Menlo Park are also available for the department's research. Branner Library, devoted exclusively to the Earth Sciences, represents one of the department's most important resources. The department also maintains rock preparation (crushing, cutting, polishing), mineral separation, and microscopy facilities.

## MISSION OF THE UNDERGRADUATE PROGRAM IN GEOLOGICAL AND ENVIRONMENTAL SCIENCES

The purpose of the undergraduate program in Geological and Environmental Sciences is to provide students with a broad background in the fundamentals of the Earth sciences and the quantitative, analytical, and communications skills necessary to conduct research and think critically about questions involving the Earth. The major provides excellent preparation for graduate school and careers in geological and environmental consulting, land use planning, law, teaching, and other professions in which an understanding of the Earth and a background in science are important.

## LEARNING OUTCOMES

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to develop and demonstrate:

1. an understanding of fundamental concepts in Earth science.
2. the ability to collect, analyze, and interpret geological and environmental data using a variety of techniques to test hypotheses.
3. the ability to address real geological and/or environmental problems in the field.
4. the ability to communicate scientific knowledge orally, visually, and in writing.

## BACHELOR OF SCIENCE IN GEOLOGICAL AND ENVIRONMENTAL SCIENCES

The major consists of five interrelated components:

1. *Earth Sciences Fundamentals*—Students must complete a set of core courses that introduce the properties of Earth materials, the processes that change the Earth, and the timescales over which those processes act. These courses provide a broad foundational knowledge that can lead to specialization in many different disciplines of the geological and environmental sciences.
2. *Quantitative and Analytical Skills*—Students must complete adequate course work in mathematics, chemistry, and physics or biology. In addition, they learn analytical techniques specific to the Earth sciences through the laboratory component of courses.
3. *Advanced Course Work and Research*—Students gain breadth and depth in upper-level electives and are encouraged to apply these skills and knowledge to problems in the Earth sciences through directed research.
4. *Field Research Skills*—Most GES courses include field trips and/or field-based projects. In addition, students must complete at least six weeks of field research through departmental offerings or through a faculty-directed field research project that involves learning and application of field techniques, field mapping, and the preparation of a written report.
5. *Communication Skills*—To fulfill the Writing in the Major requirement, students take a writing-intensive senior seminar (GES 150), in which they give both oral and written presentations that address current research in the earth sciences.

The major requires at least 80 units; letter grades are required in all courses if available. Students interested in the GES major should consult with the undergraduate program coordinator for information about options within the curriculum.

## COURSE SEQUENCE (80-104 UNITS TOTAL)

### CORE REQUIREMENT

Students are required to take all of the following (28-30 units):

<i>Subject and Catalog Number</i>	<i>Units</i>
GES 1A, 1B, or 1C.. Introduction to Geology	4-5
GES 4. Evolution and Extinction: Introduction to Historical Geology	4
GES 90. Introduction to Geochemistry	3-4
GES 102. Earth Materials: Introduction to Mineralogy	3
GES 102L. Introductory Mineralogy Laboratory	1
GES 103. Earth Materials: Rocks in Thin Section	3
GES 104. Earth Materials: Introduction to Petrology	3
GES 104L. Introductory Petrology Laboratory	1
GES 105. Introduction to Field Methods	3
GES 150. Senior Seminar: Issues in the Earth Sciences (WIM)	3
GES 190, other field course, or field research (see below for more information)	6

### BREADTH IN THE DISCIPLINE REQUIREMENT

To gain understanding of the breadth of subject areas within the geological and environmental sciences, students are required to take one course from each of the following seven groups (22-28 units).

Courses marked with an asterisk (\*) are offered in alternate years.

**ENVIRONMENTAL GEOLOGY AND SURFACE PROCESSES**

The chemical and physical properties of the solid, aqueous, and gaseous phases comprising Earth's surface environment, their natural compositional variations and biogeochemical interactions, and the processes that affect their distribution and stability.

EESS 155. Science of Soils	4
GES 130. Soil Physics and Hydrology	3
GES 131. Hydrologically-Driven Landscape Evolution	3
GES 170. Environmental Geochemistry	4

**STRUCTURAL GEOLOGY AND TECTONICS**

The nature, description, and modeling of deformation of earth materials in response to tectonic forces. Processes of plate tectonics, mountain building, and sedimentary basin formation. The origin and evolution of geologic structures including folds, faults, fabrics, and fractures.

GES 110. Structural Geology and Tectonics	5
GES 111. Fundamentals of Structural Geology	3

**EARTH MATERIALS AND GEOCHEMISTRY**

The materials that comprise the Earth and how they can be used to deduce geological processes over time. The fundamental chemical and geologic processes responsible for the abundance and distribution of elements and their isotopes.

GES 163. Introduction to Isotope Geochemistry	3
*GES 180. Igneous Processes	4
*GES 185. Volcanology	3-4
GES 107. Journey to the Center of the Earth	3

**SEDIMENTARY SYSTEMS**

The processes of weathering, erosion, transportation, and deposition, interpretation of depositional environments, the formation and evolution of sediments and sedimentary basins, and the evolution of sedimentary systems over geologic time.

GES 151. Sedimentary Geology and Petrology	4
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**BIOGEOSCIENCES**

The origin and evolution of life on Earth, the influence of biological processes on Earth's surface environments, and the role of geological processes in shaping large-scale evolutionary patterns.

*GES 123. Paleobiology	3
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**GEOPHYSICS**

The integration of physics, mathematics, and geology to study Earth processes using remote sensing, modeling, experiments, and direct observations.

*GEOPHYS 110. Earth on the Edge: Introduction to Geophysics	3
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**GEOSPATIAL STATISTICS AND COMPUTER SCIENCE**

Statistical techniques specific to the geosciences that facilitate analysis of three- and four-dimensional data; computer programming and modeling.

CS 106A. Programming Methodology	3-5
EARTHSCI 211. Computer Programming in C++ for Earth Scientists and Engineers	3
EESS 161. Statistical Methods for Earth and Environmental Sciences: Geostatistics	3-4
EESS 164. Fundamentals of Geographic Information Science (GIS)	4
ENERGY 125. Modeling and Simulation for Geoscientists and Engineers	3
ENERGY 160. Modeling Uncertainty in the Earth Sciences	3
GEOPHYS 112. Exploring Geosciences with MATLAB	3
*GEOPHYS 140. Introduction to Remote Sensing	3

**DEPTH IN THE DISCIPLINE REQUIREMENT (10 UNITS)**

To allow students to go into greater depth in the major, students must complete at least 10 units of electives drawn primarily from

the list above and other upper-level courses in GES (including graduate-level courses). Additional courses in Geophysics, EESS, and ERE may be counted towards the elective units if they allow a student to pursue a topic in depth; these options should be discussed with an adviser. A maximum of 3 elective units may be fulfilled by GES 192, 197, 198, or advanced seminars. Honors research (GES 199) may fulfill up to 4 elective units.

**REQUIRED SUPPORTING MATHEMATICS (5-15 UNITS)**

This requirement may also be fulfilled by Advanced Placement credit. Choose one of the following equivalent series:

MATH 19. Calculus	3
MATH 20. Calculus	3
MATH 21. Calculus	4
<i>or</i>	
MATH 41. Calculus	5
MATH 42. Calculus	5

Choose at least one of the following (the entire series is recommended for students who plan to pursue graduate studies in the sciences or engineering):

MATH 51. Multivariate Mathematics	5
MATH 52. Multivariate Mathematics	5
MATH 53. Multivariate Mathematics	5

**REQUIRED SUPPORTING COGNATE SCIENCES (15-21 UNITS)**

Advanced placement credit may be accepted for these courses as determined by the relevant departments.

**CHEMISTRY**

CHEM 31A,B. Chemical Principles I/II	8
<i>or</i> CHEM 31X. Chemical Principles	4
CHEM 135. Physical Chemical Principles	3
<i>or</i> CHEM 171. Physical Chemistry	3
<i>or</i> GES 171. Geochemical Thermodynamics	3

In addition to chemistry, students may choose between introductory sequences in biology and physics. This choice should be made after discussion with an adviser and based on a student's interests.

**PHYSICS**

Choose one of the following series:

PHYSICS 21. Mechanics and Heat	3
PHYSICS 22. Mechanics and Heat Lab	1
PHYSICS 23. Electricity and Optics	3
PHYSICS 24. Electricity and Optics Lab	1

<i>or</i>	
PHYSICS 41 (formerly 53). Mechanics	4
PHYSICS 45 (formerly 51). Light and Heat	4
PHYSICS 46 (formerly 52). Light and Heat Lab	1

<i>or</i>	
PHYSICS 41 (formerly 53). Mechanics	4
PHYSICS 43 (formerly 55). Electricity and Magnetism	3
PHYSICS 44 (formerly 56). Electricity and Magnetism Lab	1

**BIOLOGY**

BIO 41. Genetics, Biochemistry, and Molecular Biology	5
BIO 42. Cell Biology and Animal Physiology	5
<i>or</i> BIO 43. Plant Biology, Evolution, and Ecology	5
<i>or</i> BIO 101. Ecology	3

**FIELD RESEARCH**

Field research skills are a critical component of the undergraduate curriculum in GES. The conventional and most straightforward way for undergraduates to meet the field requirement is to take the two GES courses (GES 105 and GES 190) that are offered every year:

- GES 105, Introduction to Field Mapping, is a two-week introduction to field techniques and geologic mapping that is taught every year in the White Mountains of eastern California prior to the start of Autumn Quarter in September. This course

gives students the tools to undertake geologic research in the field. GES 105 is required of all GES majors and is the framework upon which all subsequent undergraduate field-related instruction is based.

- GES 190, Research in the Field, gives GES undergraduates additional training in field research. This course provides undergraduates with a team-based experience of collecting data to answer research questions and is directed by faculty and graduate students. Offered in June and/or September.

By taking GES 105 and two iterations of GES 190, GES undergraduates develop the broad experience and confidence necessary to go out and evaluate a geological or environmental geology question by collecting field-based data. The main goal is that, upon graduation, GES undergraduates will be able to plan and execute independent field research.

It is also possible to customize GES 190 or substitute non-Stanford courses to allow flexibility in fulfilling the field requirement. One or two GES 190 requirements can be satisfied through customized courses with two possible approaches:

1. The first approach involves working on a project during the summer with a graduate student or professor. This may fulfill one GES 190 requirement. To receive credit for GES 190, a proposal must be filed at the end of Winter Quarter with the field program committee which evaluates it for suitability.
2. A second approach is to take a modified version of an existing field-based course such as Stanford at Sea/Australia/Hawaii. This may also fulfill one GES 190 requirement.

In both cases, to receive credit for GES 190, a proposal must be filed at the end of Winter Quarter with the field program committee which evaluates it for suitability. Students subsequently enroll in GES 190 with a specific instructor or their faculty mentor who evaluates the final report from the fieldwork.

GES 190 can also be satisfied by enrolling in a single four-to-six week geology field camp offered by another institution. This externally administered experience can substitute for two GES 190 courses, subject to approval by the Undergraduate Curriculum Committee.

## COGNATE COURSES

Many courses offered within the School of Earth Sciences, as well as courses in other schools with a significant Earth sciences component, may be used in satisfaction of optional requirements for the Geological and Environmental Sciences degree. Undergraduates should discuss the options available to them with the undergraduate program coordinator; graduate students should discuss options with their advisers.

The following courses outside the School of Earth Sciences are particularly applicable:

- BIO 121. Biogeography
- BIO 136. Evolutionary Paleobiology
- BIOHOPK 182H. Stanford at Sea
- CEE 63. Weather and Storms
- CEE 64. Air Pollution: From Urban Smog to Global Change
- CEE 101A. Mechanics of Materials
- CEE 101B. Mechanics of Fluids
- CEE 101C. Geotechnical Engineering
- CEE 161A. Rivers, Streams, and Canals
- CEE 164. Introduction to Physical Oceanography
- CEE 166A. Watersheds and Wetlands
- CEE 173A. Energy Resources

## HONORS PROGRAM

The honors program provides an opportunity for year-long independent study and research on a topic of special interest, culminating in a written thesis. Students select research topics in consultation with the faculty adviser of their choosing. Research undertaken for the honors program may be of a theoretical, field, or experimental nature, or a combination of these approaches. The honors program is open to students with a GPA of at least 3.5 in

GES courses and 3.0 in all University course work. Modest financial support is available from several sources to help defray laboratory and field expenses incurred in conjunction with honors research. Interested students must submit an application, including a research proposal, to the department by the end of their junior year.

Upon approval of the research proposal and entrance to the program, course credit for the honors research project and thesis preparation is assigned by the student's faculty adviser within the framework of GES 199; the student must complete a total of 9 units over the course of the senior year. Up to 4 units of GES 199 may be counted towards the elective requirement, but cannot be used as a substitute for regularly required courses.

Both a written and oral presentation of research results are required. The thesis must be read, approved, and signed by the student's faculty adviser and a second member of the faculty. In addition, honors students must participate in the GES Honors Symposium in which they present their research to the broader community. Honors students in GES are also eligible for the Firestone medal, awarded by Undergraduate Advising and Research for exceptional theses.

## ENGINEERING GEOLOGY AND HYDROGEOLOGY UNDERGRADUATE SPECIALIZED CURRICULUM

The Engineering Geology and Hydrogeology curriculum is intended for undergraduates interested in the application of geological and engineering data and principles to the study of rock, soil, and water to recognize and interpret geological and environmental factors affecting engineering structures and groundwater resources. Students learn to characterize and assess the risks associated with natural geological hazards, such as landslides and earthquakes, and with groundwater flow and contamination. The curriculum prepares students for graduate programs and professional careers in engineering, environmental geology, geology, geotechnical engineering, and hydrogeology. Students interested in this curriculum should contact a faculty adviser: Professor Loague, Pollard, or Hilley.

GES majors who elect the Engineering Geology and Hydrogeology curriculum are expected to complete a core course sequence and a set of courses in supporting sciences and mathematics. The core courses come from Earth Sciences and Engineering. Any substitutions for core courses must be approved by the faculty adviser and through a formal petition to the undergraduate program director. In addition, four elective courses, consistent with the core curriculum and required of all majors, are to be chosen with the advice and consent of the adviser. Typically, electives are chosen from the list below. Letter grades are required if available.

## COURSE SEQUENCE (91-102 UNITS TOTAL)

### REQUIRED GEOLOGICAL AND ENVIRONMENTAL SCIENCES (37-39 UNITS)

<i>Subject and Catalog Number</i>	<i>Units</i>
GES 1A,B,C. Introduction to Geology	4-5
GES 102. Earth Materials: Introduction to Mineralogy	3
GES 104. Earth Materials: Introduction to Petrology	3
GES 111. Fundamentals of Structural Geology	3
GES 115. Engineering Geology and Global Change	3
EESS 164. Fundamentals of GIS	4
GES 150. Senior Seminar: Issues in the Earth Sciences (WIM)	3
ENERGY 160. Modeling Uncertainty in the Earth Sciences	3
or EESS 161. Statistical Methods for the Earth and Environmental Sciences: Geostatistics	3-4
EESS 220. Physical Hydrogeology	4
GEOPHYS 190. Applied Geophysical Methods	3

## REQUIRED ENGINEERING (20 UNITS)

CEE 101A. Mechanics of Materials	4
CEE 101B. Mechanics of Fluids	4
CEE 101C. Geotechnical Engineering	4
CS 106A. Programming Methodology	5
ENGR 14. Applied Mechanics: Statics	3

## REQUIRED SUPPORTING SCIENCES AND MATHEMATICS (23-27 UNITS)

CHEM 31A,B. Chemical Principles I/II or CHEM 31X. Chemical Principles	8
MATH 51. Multivariate Mathematics	4
MATH 52. Multivariate Mathematics	5
MATH 53. Multivariate Mathematics	5
PHYSICS 41. Mechanics	4

## SUGGESTED ELECTIVES (11-16 UNITS)

Choose four courses from the following list or, with faculty approval, four related courses:

CEE 101D. Computations in Civil and Environmental Engineering	3
CEE 180. Structural Analysis	4
CEE 270. Movement, Fate, and Effects of Contaminants in Surface Waters and Groundwater	3
CEE 293. Foundation Engineering	3
CEE 296. Experimental Soil Mechanics	2
EESS 221. Contaminant Hydrogeology	4
ENGR 30. Engineering Thermodynamics	3
ENGR 50. Introductory Science of Materials	4
GEOPHYS 112. Exploring Geosciences with MATLAB	1-3
GES 102L. Introduction Mineralogy Laboratory	1
GES 104L. Introduction Petrology Laboratory	1
GES 130. Soil Physics and Hydrology	3
GES 131. Hydrologically-Driven Landscape Evolution	3
GES 217. Characterization and Hydraulics of Rock Fracture	3
GES 237. Surface and Near-Surface Hydrologic Response	3
MATH 103. Matrix Theory and its Applications	3
MATSCI 151. Microstructure and Mechanical Properties	3-4
ME 80. Strength of Materials	3

## MINOR IN GEOLOGICAL AND ENVIRONMENTAL SCIENCES

The minor in GES consists of a small set of required courses plus 12 elective units. A wide variety of courses may be used to satisfy these elective requirements. All courses must be taken for a letter grade.

### REQUIRED COURSES

GES 1A, 1B, or 1C. Introduction to Geology	4-5
GES 4. Evolution and Extinction: Introduction to Historical Geology	4
GES 102. Earth Materials: Introduction to Mineralogy	3
GES 104. Earth Materials: Introduction to Petrology	3

### ELECTIVES (12 UNITS)

Students must take a minimum of 12 additional units drawn primarily from the Breadth in the Discipline list in the GES major; a majority of units must be from classes within the GES department. Up to 3 units of Stanford Introductory Seminars in GES may be counted.

Students pursuing a minor in GES are encouraged to participate in the senior seminar (GES 150) and in field research (GES 105).

## COTERMINAL B.S. AND M.S. DEGREES IN GEOLOGICAL AND ENVIRONMENTAL SCIENCES

The coterminal B.S./M.S. program offers students the opportunity to pursue graduate research and an M.S. degree concurrently with or subsequent to their B.S. studies. The M.S. degree can serve as an entrance to a professional degree in

subdisciplines within the Earth sciences such as engineering geology and environmental geology, or to graduate course work and research as an intermediate step in pursuit of the Ph.D. Regardless of professional goals, coterminal B.S./M.S. students are treated as members of the graduate community and are expected to meet all of the standards set for regular M.S. students. Applicants must have earned no fewer than 120 units toward graduation, and must submit their application no later than the quarter prior to the expected completion of their undergraduate degree, normally the Winter Quarter prior to Spring Quarter graduation. The application includes a statement of purpose, a current Stanford transcript, official Graduate Record Examination (GRE) scores, letters of recommendation from two members of the Stanford faculty (at least one of whom must be in the GES department), and a list of courses in which they intend to enroll to fulfill the M.S. degree requirements. Specific research interests should be noted in the statement of purpose and discussed with a member of the GES faculty prior to submission of the application. Coterminal students must complete a thesis describing research results.

The University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees" section of this bulletin. For University coterminal degree program rules and University application forms, also see <http://studentaffairs.stanford.edu/registrar/publications#Coterm>.

Students must meet all requirements for both the B.S. and M.S. degrees. Students may either:

1. complete 180 units required for the B.S. degree and then complete three full-time quarters (45 units at the 100-level or above) for the M.S. degree
2. or, complete a total of fifteen quarters during which the requirements of the two degrees are fulfilled concurrently.

At least half of the courses used to satisfy the 45-unit requirement must be designated as being primarily for graduate students, normally at the 200-level or above. No more than 15 units of thesis research may be used to satisfy the 45-unit requirement. Further information about this program may be obtained from the GES office.

## GRADUATE PROGRAMS IN GEOLOGICAL AND ENVIRONMENTAL SCIENCES

Graduate Studies in the Department of Geological and Environmental Sciences (GES) involve academic course work and independent research. Students are prepared for careers as professional scientists in research, education, or the application of the earth sciences to mineral, energy, and water resources. Programs lead to the M.S., Engineer, and Ph.D. degrees. Course programs in the areas of faculty interest are tailored to the student's needs and interests with the aid of his or her research adviser. Students are encouraged to include in their program courses offered in other departments in the School of Earth Sciences as well as in other departments in the University. Diplomas designate degrees in Geological and Environmental Sciences and may also indicate the following specialized fields of study: Geostatistics and Hydrogeology.

*Admission*—For admission to graduate work in the department, the applicant must have taken the Aptitude Test (verbal, quantitative, and analytical writing assessment) of the Graduate Record Examination. In keeping with University policy, applicants whose first language is not English must submit TOEFL (Test of English as a Foreign Language) scores from a test taken within the last 18 months. Individuals who have completed a B.S. or two-year M.S. program in the U.S. or other English-speaking country are not required to submit TOEFL scores. Previously admitted students who wish to change their degree objective from M.S. to Ph.D. must petition the GES Admissions Committee.

## MASTER OF SCIENCE IN GEOLOGICAL AND ENVIRONMENTAL SCIENCES

*Objectives*—The purpose of the master’s program in Geological and Environmental Sciences is to continue a student’s training in one of a broad range of earth science disciplines and to prepare students for either a professional career or doctoral studies.

*Procedures*—The graduate coordinator of the department appoints an academic adviser during registration with appropriate consideration of the student’s background, interests, and professional goals. In consultation with the adviser, the student plans a program of course work for the first year. The student should select a thesis adviser within the first year of residence and submit to the thesis adviser a proposal for thesis research as soon as possible. The academic adviser supervises completion of the department requirements for the M.S. program (as outlined below) until the research proposal has been accepted; responsibility then passes to the thesis adviser. The student may change either thesis or academic advisers by mutual agreement and after approval of the graduate coordinator.

*Requirements*—The University’s requirements for M.S. degrees are outlined in the “Graduate Degrees” section of this bulletin. Practical training (GES 385) may be required by some programs, with adviser approval, depending on the background of the student. Additional department requirements include the following:

1. A minimum of 45 units of course work at the 100 level or above.
  - a. Half of the courses used to satisfy the 45-unit requirement must be intended as being primarily for graduate students, usually at the 200 level or above.
  - b. No more than 15 units of thesis research may be used to satisfy the 45-unit requirement.
  - c. Some students may be required to make up background deficiencies in addition to these basic requirements.
2. By the end of Winter Quarter of their first year in residence, students must complete at least three courses taught by a minimum of two different GES faculty members.
3. Each student must have a research adviser who is a faculty member in the department and is within the student’s thesis topic area or specialized area of study.
4. Each student must complete a thesis describing his or her research. Thesis research should begin during the first year of study at Stanford and should be completed before the end of the second year of residence.
5. Early during the thesis research period, and after consultation with the student, the thesis adviser appoints a second reader for the thesis, who must be approved by the graduate coordinator; the thesis adviser is the first reader. The two readers jointly determine whether the thesis is acceptable for the M.S. degree in the department.

## ENGINEER DEGREE IN GEOLOGICAL AND ENVIRONMENTAL SCIENCES

The Engineer degree is offered as an option for students in applied disciplines who wish to obtain a graduate education extending beyond that of an M.S., yet do not have the desire to conduct the research needed to obtain a Ph.D. A minimum of two years (six quarters) of graduate study is required. The candidate must complete 90 units of course work, no more than 10 of which may be applied to overcoming deficiencies in undergraduate training. The student must prepare a substantial thesis that meets the approval of the thesis adviser and the graduate coordinator.

## DOCTOR OF PHILOSOPHY IN GEOLOGICAL AND ENVIRONMENTAL SCIENCES

*Objectives*—The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship, high attainment in a particular field of knowledge, and the ability to conduct

independent research. To this end, the objectives of the doctoral program are to enable students to develop the skills needed to conduct original investigations in a particular discipline or set of disciplines in the earth sciences, to interpret the results, and to present the data and conclusions in a publishable manner.

*Requirements*—The University’s requirements for the Ph.D. degree are outlined in the “Graduate Degrees” section of this bulletin. Practical training (GES 385) may be required by some programs, with adviser approval, depending on the background of the student. A summary of additional department requirements is presented below:

1. Ph.D. students must complete the required courses in their individual program or in their specialized area of study with a grade point average (GPA) of 3.0 (B) or higher, or demonstrate that they have completed the equivalents elsewhere. Ph.D. students must complete a minimum of four letter-grade courses of at least 3 units each from four different faculty members on the Academic Council in the University. By the end of Winter Quarter of their first year in residence, students must complete at least three courses taught by a minimum of two different GES faculty members.
2. Each student must qualify for candidacy for the Ph.D. by the end of the sixth quarter in residence, excluding summers. Department procedures require selection of a faculty thesis adviser, preparation of a written research proposal, approval of this proposal by the thesis adviser, selection of a committee for the Ph.D. qualifying examination, and approval of the membership by the graduate coordinator and chair of the department. The research examination consists of three parts: oral presentation of a research proposal, examination on the research proposal, and examination on subject matter relevant to the proposed research. The exam should be scheduled prior to May 1, so that the outcome of the exam is known at the time of the annual spring evaluation of graduate students.
3. Upon qualifying for Ph.D. candidacy, the student and thesis adviser, who must be a department faculty member, choose a research committee that includes a minimum of two faculty members in the University in addition to the adviser. Annually, in the month of March or April, the candidate must organize a meeting of the research committee to present a brief progress report covering the past year.
4. Under the supervision of the research advisory committee, the candidate must prepare a doctoral dissertation that is a contribution to knowledge and is the result of independent research. The format of the dissertation must meet University guidelines. The student is strongly urged to prepare dissertation chapters that, in scientific content and format, are readily publishable.
5. The doctoral dissertation is defended in the University oral examination. The research adviser and two other members of the research committee are determined to be readers of the draft dissertation. The readers are charged to read the draft and to certify in writing to the department that it is adequate to serve as a basis for the University oral examination. Upon obtaining this written certification, the student is permitted to schedule the University oral examination.

## PH.D. MINOR IN GEOLOGICAL AND ENVIRONMENTAL SCIENCES

Candidates for the Ph.D. degree in other departments who wish to obtain a minor in Geological and Environmental Sciences must complete, with a GPA of 3.0 (B) or better, 20 units in the geosciences in lecture courses intended for graduate students. The selection of courses must be approved by the student’s GES adviser and the department chair.



# GEOPHYSICS

*Emeriti:* Jon Claerbout, Antony Fraser-Smith,\* Robert Kovach, Amos Nur, Joan Roughgarden,\*\* George A. Thompson

*Chair:* Greg Beroza

*Associate Chair:* Biondo Biondi

*Professors:* Greg Beroza, Biondo Biondi, Jerry M. Harris, Simon Klemperer, Rosemary J. Knight, Paul Segall, Norman H. Sleep, Howard Zebker,\* Mark D. Zoback

*Assistant Professors:* Eric Dunham, Jesse Lawrence

*Professor (Research):* Gerald M. Mavko

*Courtesy Professors:* Stephan A. Graham, Wendy Mao, David D. Pollard

*Consulting Professors:* Dimitri Bevc, Jonathan Glen, Antoine Guitton, Peter Hennings, Dave Nichols, Shuki Ronen

*Consulting Associate Professor:* Stewart Levin

*Blaustein Visiting Assistant Professor:* Adam Pidlisecky & Associate Professor Chandong Chang

*Senior Research Scientists:* Robert Clapp, Jack Dvorkin, Tiziana Vanorio

*Research Associate:* Youli Quan

\* Joint appointment with Electrical Engineering

\*\* Joint appointment with Biological Sciences

*Department Offices:* Mitchell Building, Third Floor

*Mail Code:* 94305-2215

*Phone:* (650) 724-3293

*Email:* tilich@stanford.edu

*Web Site:* <http://pangea.stanford.edu/GP>

Courses offered by the Department of Geophysics are listed under the subject code GEOPHYS on the *Stanford Bulletin's* ExploreCourses web site.

Geophysics is the branch of Earth science concerned with exploring and analyzing active processes of the Earth through physical measurement. The undergraduate and graduate programs are designed to provide a background of fundamentals in science, and courses to coordinate these fundamentals with the principles of geophysics. The program leading to the Bachelor of Science (B.S.) in Geophysics permits many electives and a high degree of flexibility for each student. Graduate programs provide specialized training for professional work in resource exploration, research, and education, and lead to the degrees of Master of Science and Doctor of Philosophy.

The Department of Geophysics is housed in the Ruth Watis Mitchell Earth Sciences Building. It has numerous research facilities, among which are a state-of-the-art broadband seismic recording station, high pressure and temperature rock properties and rock deformation laboratories, various instruments for field measurements including seismic recorders, nine dual frequency GPS receivers, and field equipment for measuring in-situ stress at great depth. Current research activities include crustal deformation; earthquake seismology and earthquake mechanics; reflection, refraction, and tomographic seismology; rock mechanics, rock physics; seismic studies of the continental lithosphere; remote sensing; environmental geophysics; and synthetic aperture radar studies.

## MISSION OF THE UNDERGRADUATE PROGRAM IN GEOPHYSICS

The mission of the undergraduate program in Geophysics is to expose students to a broad spectrum of geophysics, including resource exploration, environmental geophysics, seismology, and tectonics. Students in the major obtain a solid foundation in the essentials of mathematics, physics, and geology, and build upon that foundation with advanced course work in Geophysics to develop the in-depth knowledge they need to pursue advanced graduate study and professional careers in government or the private sector.

## LEARNING OUTCOMES

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to:

1. understand the physics and geology that form the basis for geophysical observation and measurement.
2. understand Earth structure and evolution.
3. identify the physical processes governing the behavior of common geophysical systems.
4. be able to explain the principles of applying geophysical methods to societally relevant problems, including natural hazards, resource exploration and management, and environmental issues.
5. be able to quantitatively describe the behavior of natural systems and the principles of geophysical measurement with physics-based mathematical models.
6. investigate these models by solving the governing equations with a combination of analytical and computational methods.
7. make their own observations with a variety of geophysical instruments, and reduce, model, and interpret their data and uncertainties.
8. effectively communicate their scientific knowledge through written and oral presentations.
9. be able to interpret and evaluate the published literature and oral and poster presentations at national meetings.

## GRADUATE PROGRAMS IN GEOPHYSICS

University requirements for the M.S. and Ph.D. are described in the "Graduate Degrees" section of this bulletin. Lecture course units applied to graduate degree program requirements must be taken for a letter grade if the course is offered for a letter grade.

*Transfer Credit*—An incoming student with a relevant Master of Science degree may apply for a departmental waiver of up to 12 units of the 30 lecture units required for the Ph.D. degree (see the "Doctor of Philosophy in Geophysics" section of this Bulletin), for certain courses as approved by the Departmental Graduate Faculty Adviser. Credit for courses generally requires that students identify an equivalent Stanford course and obtain the signature of the Stanford faculty responsible for that course, stating its equivalence.

## BACHELOR OF SCIENCE IN GEOPHYSICS

The following courses are required for the B.S. degree in Geophysics. A written report on original research or an honors thesis is also required through participation in GEOPHYS 196 (Undergraduate Research) and GEOPHYS 199 (Senior Seminar) in Autumn Quarter of the senior year. Seniors in Geophysics who expect to do graduate work should take the Graduate Record Examination (GRE) early in their final undergraduate year.

## CURRICULUM

### GEOPHYSICS CORE COURSES (24-26 UNITS)

Students must take all of the following:

- GEOPHYS 110. Earth on the Edge: Introduction to Geophysics, 3 units
- GEOPHYS 120. Ice, Water, Fire, 3 units
- GEOPHYS 130. Introductory Seismology, 3 units
- GEOPHYS 150. Geodynamics: Our Dynamic Earth, 3 units
- GEOPHYS 160. Introduction to SES Computing, 2 units  
or equivalent knowledge
- GEOPHYS 190. Near-Surface Geophysics, 3 units
- GEOPHYS 196. Undergraduate Research, 5 units
- GEOPHYS 199. Senior Seminar: Issues in Earth Sciences (WIM), 3 units
- GEOPHYS 201. Frontiers of Geophysical Research, 1 unit

**GEOPHYSICS BREADTH COURSES (12-14 UNITS)**

Choose four upper-level courses, one from each of the following four areas:

- Resources, hazards, and the environment
  - GEOPHYS 182. Reflection Seismology, 3 units
  - GEOPHYS 183. Reflection Seismology Interpretation, 3 units
  - GEOPHYS 185. Rock Physics for Reservoir Characterization, 3 units
  - ENERGY 120. Fundamentals of Petroleum Engineering, 3 units
  - GES 131. Hydrologically-Driven Landscape Evolution, 3 units
- Whole-earth Geophysics
  - GEOPHYS 184. Journey to the Center of the Earth, 3 units
  - GEOPHYS 140. The Earth from Space: Introduction to Remote Sensing, 3 units
  - GEOPHYS 170. Global Tectonics, 3 units
  - GEOPHYS 186. Tectonophysics, 3 units
- Numerical and computational methods
  - GEOPHYS 187. Environmental Soundings Image Estimation, 3 units
  - GEOPHYS 281. Geophysical Inverse Problems, 3 units
  - CME 200. Linear Algebra with Applications to Engineering Computations, 3 units
  - CME 204. Partial Differential Equations in Engineering, 3 units
  - CME 206. Introduction to Numerical Methods for Engineering, 3 units
  - CME 211. Computer Programming in C++ for Earth Scientists and Engineers, 3 units
  - EE 102A. Signal Processing and Linear Systems I, 4 units
  - ENERGY 160. Modeling Uncertainty, 3 units
- Geophysical fluid dynamics
  - GEOPHYS 181. Fluids and Flow, 3 units
  - CEE 164. Introduction to Physical Oceanography, 4 units
  - EESS 146A. Atmosphere, Ocean, and Climate Dynamics: The Atmospheric Circulation, 3 units
  - EESS 220. Physical Hydrogeology, 4 units
  - ENERGY 121. Fundamentals of Multiphase Flow, 3 units
  - GES 130. Soil Physics and Hydrogeology, 3 units

**SUPPORTING MATHEMATICS COURSES**

Students must take all of the following (15-20 units):

- CME 100. Vector Calculus for Engineers, 5 units
- CME 102. Ordinary Differential Equations for Engineers, 5 units
- CME 104. Linear Algebra and Partial Differential Equations for Engineers, 5 units
- MATH 51 (recommended: 51M), 52, and 53 plus one of CME 104, CME 108, or GEOPHYS 112 may substitute for the CME series)

**SUPPORTING SCIENCE COURSES**

Students must take all of the following (16-25 units):

- GES 1A, B, or C Introduction to Geology, 4-5 units
- CHEM 31A,B Chemical Principles I & II, 8 units  
or CHEM 31X Chemical Principles, 4 units  
or a score of 4-5 on the Chemistry AP exam
- PHYSICS 41. Mechanics, 4 units
- PHYSICS 43. Electricity and Magnetism, 4 units
- PHYSICS 45. Light and Heat, 4 units
- plus one additional PHYSICS class (4 units)
- PHYSICS 110. Intermediate Mechanics, 4 units  
or PHYSICS 120. Intermediate Electricity & Magnetism, 4 units  
or CEE 101A. Mechanics of Materials, 4 units  
or EE 141. Engineering Electromagnetics, 4 units  
or ME 80. Mechanics of Deformable Bodies, 4 units

- plus one additional approved geology class (4 units) typically chosen from among:
  - GES 102. Earth Materials: Introduction to Mineralogy, 3 units
  - GES 110. Structural Geology and Tectonics, 5 units
  - GES 111A. Fundamentals of Structural, 3 units
  - GES 151. Sedimentary Geology and Petrography: Depositional Systems, 4 units

**HONORS PROGRAM**

The department offers a program leading to the B.S. degree in Geophysics with honors. The guidelines are:

1. Select a research project, either theoretical, field, or experimental, that has the approval of an adviser.
2. Submit a proposal to the department, which decides on its suitability as an honors project. Necessary forms are in the department office.
3. Course credit for the project is assigned by the adviser within the framework of GEOPHYS 205.
4. The decision whether a given independent study project does or does not merit an award of honors is made jointly by the department and the student's adviser. This decision is based on the quality of both the honors work and the student's other work in Earth sciences.
5. The work done on the honors program cannot be used as a substitute for regularly required courses.

**MINOR IN GEOPHYSICS**

The Geophysics minor provides students with a general knowledge of Geophysics in addition to a background in the related fields of physics, mathematics, and geology. The minor consists of one required class (3 units), two electives (6 units), and prerequisites in mathematics and physics. Minors require no fewer than 20 units and no more than 36 units.

**CURRICULUM**

1. GEOPHYS 110
2. Three additional approved upper-level (100 or higher) Geophysics lecture courses, typically chosen from GEOPHYS 120, 130, 140, 150, 170, 184, 190
3. Supporting science:
  - a. PHYSICS 20 series (21,22,23,24), or 41 and either 43 or 45
  - b. GES 1A or 1B or 1C
  - c. CME 100 or MATH 51.

**COTERMINAL B.S./M.S. PROGRAM IN GEOPHYSICS**

The Department offers a coterminal M.S. degree for students wishing to obtain more specialized training in Geophysics than is normally possible during study for the B.S. degree alone. An M.S. degree should be considered as the professional degree in Geophysics, and is aimed at students wishing to work in a related industry, or students desiring more focused academic study in the field than the B.S. program allows.

The coterminal M.S. degree in Geophysics is offered in conjunction with any relevant undergraduate program at Stanford. Geophysics students often enter the department with degrees in Earth sciences, mathematics, physics, chemistry, or other natural science or engineering fields. Any of these are suitable for the coterminal Geophysics program, and interested students are encouraged to discuss their own background with a Geophysics faculty member.

The requirements for entry into the coterminal M.S. program are submission of a transcript, a statement of purpose, and at least one letter of recommendation. Applications with a letter of recommendation from a Geophysics faculty are generally considered the strongest. Additional letters from other academic or work-related persons also strengthen the application. There are

no specific GPA requirements for entry, but the Department looks for proven performance in a rigorous undergraduate curriculum as a prerequisite for admission.

Undergraduates with at least junior-level standing may apply, and applications should be submitted by the Autumn Quarter of the senior year. The graduation requirements to obtain the degree are identical to those for the regular Geophysics master's degree. Contact the Department of Geophysics student services officer for additional information.

University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees" section of this bulletin. For University coterminal degree program rules and University application forms, see <http://studentaffairs.stanford.edu/registrar/publications#Coterm>.

## MASTER OF SCIENCE IN GEOPHYSICS

*Objectives*—To enhance the student's training for professional work in geophysics through the completion of fundamental courses, both in the major fields and in related sciences, and to begin independent work and specialization.

*Requirements for the Degree*—The candidate must complete 45 units from the following groups of courses:

1. Complete 15 units of Geophysics lecture courses with at least 9 units numbered 200 or higher.
2. Complete six units numbered 100 or higher and three units of 200-level, non-Geophysics lecture courses in earth sciences.
3. Complete one to four electives selected from courses numbered 100 or higher from mathematics, chemistry, engineering, physics, relevant biology, computer science, ecology, hydrology, or Earth science. At least one course must be numbered 200 or higher.
4. At least 9, but not more than 18, of the 45 units must be independent work on a research problem resulting in a written report accepted and archived by the candidate's faculty adviser. Normally, this research is undertaken as part of the candidate's participation in multiple quarters of research seminar (GEOPHYS 385 series). A summer internship is encouraged as a venue for research, but no academic credit is given.
5. Submit a program proposal for approval by a faculty adviser in the first quarter of enrollment.
6. Each candidate must present and defend the results of his or her research at a public oral presentation attended by at least two faculty members; and turn in a thesis/report to adviser.
7. Students are required to attend department seminars.

## DOCTOR OF PHILOSOPHY IN GEOPHYSICS

*Objectives*—The Ph.D. degree is conferred upon evidence of high attainment in Geophysics and ability to conduct an independent investigation and present the results of such research.

*Requirements for the Degree*—A minimum of 135 units of graduate study at Stanford must be satisfactorily completed. Required courses must be taken for a letter grade, if offered. Students are required to attend the department seminars, and to complete sufficient units of independent work on a research problem to meet the 135-unit University requirement. 12 units must be met by participation in the GEOPHYS 385 series, or equivalent series in other departments with approval of the adviser and graduate coordinator. Students are encouraged to participate in the GEOPHYS 385 series from more than one faculty member or group and relevant equivalent series in other departments. Students with a Master's degree may waive up to 12 units for approved courses.

ENGR 102W/202W, Technical Writing, is recommended but not required.

The student's record must indicate outstanding scholarship, and deficiencies in previous training must be removed. Experience as a teaching assistant (quarter-time for at least two academic quarters)

is required for the Ph.D. degree. For more information, see the *Geophysics Administrative Guide*, section I.4.1.

The student must pass the departmental oral examination by the end of the sixth academic quarter (third academic quarter for students with an M.S. degree); prepare under faculty supervision a dissertation that is a contribution to knowledge and the result of independent work expressed in satisfactory form; and pass the University oral examination.

The Ph.D. dissertation must be submitted in its final form within five calendar years from the date of admission to candidacy. Upon formal acceptance into a research group, the student and faculty adviser form a supervising committee consisting of at least three members who are responsible for overseeing satisfactory progress toward the Ph.D. degree. At least two committee members must be Geophysics faculty members. The committee conducts the department oral examination, and meets thereafter annually with the student to review degree progress. The Geophysics faculty monitors progress of all students who have not yet passed their department oral examination by carrying out an annual performance appraisal at a closed faculty meeting.

*Course requirements*—

1. *Geophysics*\*—12 units, lecture courses numbered 200 and above, from 4 different Geophysics faculty with different research specializations
2. *Additional Geophysics*—3 units, lecture courses numbered 150 and above
3. *School of Earth Sciences (non-Geophysics)*—3 units, lecture courses numbered 100 or above
4. *Mathematics (numbered 100 or above), Science, and Engineering (non-School of Earth Sciences)*—6 units, lecture courses numbered 200 or above
5. *Any of the above categories*—6 units, lecture courses numbered 200 or above
6. *Total*: 30 units.

\* These units marked cannot be waived.

*Ph.D. Department Examination Requirement*—

1. One research proposal (10-20 pages) with a completed component that outlines a plan of research for 2-3 years
2. Second scientific proposal or paper (4-10 pages) with a professor in another area
3. An oral presentation with the student's advising committee on both the research proposal (~30-40 min) and the second proposal/paper (~10 min), with questions by the committee constituting the qualifying exam.

The purpose of the second research project is to add breadth to Ph.D. study, and give the student the ability and confidence to teach or advise work in multiple areas. Both research projects must be in Geophysics or related disciplines. The two projects should be clearly distinct: neither the same methodology applied to two different datasets, nor two distinct methodologies applied to the same fundamental problem. The second project should clearly stand alone as a separate piece of work. The two projects must be supervised by different faculty in separate research groups, except in rare cases, as approved by the departmental graduate faculty adviser. The quality of each research project should be consistent with publication of a short journal article (typically achieved by additional work beyond the qualifying exam); although occasionally an extensive term paper deserving of presentation to the second project research group may be approved. The expected level of work on the second project should be about one academic quarter of full time effort.

# SCHOOL OF EDUCATION

*Emeriti: (Professors)* J. Myron Atkin, John Baugh, Edwin M. Bridges, Robert C. Calfee, Larry Cuban, Elliot W. Eisner, James Greeno, Michael Kamil, Michael W. Kirst, Henry M. Levin, Richard Lyman (President emeritus), James G. March, William F. Massy, Milbrey McLaughlin, Nel Noddings, Ingram Olkin, Denis C. Phillips, Thomas Rohlen, Richard J. Shavelson, Lee S. Shulman, George D. Spindler, Myra H. Strober, Carl E. Thoresen, David B. Tyack, Decker F. Walker, Hans Weiler

*Dean:* Claude Steele

*Associate Dean for Faculty Affairs:* Francisco O. Ramirez

*Associate Dean for Student Affairs:* Eamonn Callan

*Senior Associate Dean for Administration:* Stephen Olson

*Associate Dean for External Relations:* Rebecca T. Smith

*Assistant Dean for Academic Services:* Priscilla Fiden

*Assistant Dean for Information Technology and CTO:* Paul Kim

*Professors:* Arnetha Ball, Joanna Boaler, Hilda Borko, Eamonn Callan, Martin Carnoy, Geoffrey Cohen, William Damon, Linda Darling-Hammond, Claude Goldenberg, Pamela Grossman, Patricia J. Gumpert, Edward Haertel, Kenji Hakuta, Connie Juel, John D. Krumboltz, David F. Labaree, Teresa D. LaFromboise, Susanna Loeb, Raymond P. McDermott, Jonathan Osborne, Amado M. Padilla, Roy Pea, Walter Powell, Francisco O. Ramirez, Daniel Schwartz, Deborah J. Stipek, Guadalupe Valdés, John Willinsky, Sam Wineburg

*Associate Professors:* H. Samy Alim, Anthony L. Antonio, Brigid J. Barron, Eric Bettinger, Bryan Brown, Prudence Carter, Daniel McFarland, Debra Meyerson, Sean Reardon, David Rogosa, Mitchell Stevens

*Assistant Professors:* Jennifer Adams, Nicole M. Ardoin, Maren Songmy Aukerman, Paulo Blikstein, Leah Gordon, Aki Murata, Jelena Obradović

*Professors (Teaching):* Shelley Goldman, Rachel Lotan

*Associate Professors (Teaching):* Ira Lit, Susan O'Hara, Christine Min Wotipka

*Professor (Research):* David Plank

*Assistant Professor (Research):* Michelle Reininger

*Courtesy Professors:* Stephen Barley, Albert Camarillo, Carol Dweck, Paula England, Eric Hanushek, William Koski, Clifford Nass, Brad Osgood, John Rickford, Cecilia Ridgeway, Caroline Winterer

*Courtesy Associate Professors:* Stephen Cooper, Robert Reich

*Courtesy Assistant Professor:* Shashank Joshi

*Consulting Associate Professors:* Suki Hoagland, Thomas Keating

*Senior Lecturers:* Denise Pope, Ann Porteus

*School Offices:* School of Education, Room 101

*Mail Code:* 94305-3096

*Phone:* (650) 723-2109

*Email:* info@suse.stanford.edu

*Web Site:* <http://ed.stanford.edu>

Courses offered by the School of Education are listed under the subject code EDUC on the *Stanford Bulletin's* ExploreCourses web site.

Aiming towards the ideal of enabling all people to achieve maximum benefit from their educational experiences, the School of Education seeks to continue as a world leader in ground-breaking, cross-disciplinary inquiries that shape educational practices, their conceptual underpinnings, and the professions that serve the enterprise. The School of Education prepares scholars, teachers, teacher educators, policy analysts, evaluators, researchers, administrators, and other educational specialists. Two graduate degrees with specialization in education are granted by the University: Master of Arts and Doctor of Philosophy. While no

undergraduate majors are offered, the school offers a number of courses for undergraduates, an undergraduate minor and undergraduate honors program, and a variety of tutoring programs.

The School of Education is organized into three program area committees: Curriculum Studies and Teacher Education (CTE); Developmental and Psychological Sciences (DAPS); and Social Sciences, Humanities, and Interdisciplinary Policy Studies in Education (SHIPS).

In addition, several cross-area programs are sponsored by faculty from more than one area. These programs include the doctoral Learning Sciences and Technology Design Program (LSTD); two master's level programs: the Stanford Teacher Education Program (STEP) and the Learning, Design, and Technology Program (LDT); and the undergraduate honors and minor programs.

These program area committees function as administrative units that act on admissions, plan course offerings, assign advisers, and determine program requirements. Various concentrations exist within most of these areas. Faculty members are affiliated primarily with one area but may participate in several programs. While there is a great deal of overlap and interdisciplinary emphasis across areas and programs, students are affiliated with one area committee or program and must meet its degree requirements.

Detailed information about admission and degree requirements, faculty members, and specializations related to these area committees and programs can be found in the publication *School of Education Guide to Graduate Studies* and at <http://ed.stanford.edu>.

The School of Education offers an eight-week summer session for admitted students only. The school offers no correspondence or extension courses, and in accordance with University policy, no part-time enrollment is allowed. Work in an approved internship or as a research assistant is accommodated within the full-time program of study.

## UNDERGRADUATE PROGRAMS IN EDUCATION

The School of Education offers a minor and an honors program at the undergraduate level. Further information about these programs can be found at <http://ed.stanford.edu/suse/>.

Regardless of whether they are enrolled in one of these undergraduate programs, undergraduates are also welcome in many graduate-level courses.

## GRADUATE PROGRAMS IN EDUCATION

The School of Education offers Master of Arts and Doctor of Philosophy degrees in several programs described below. University and School of Education requirements must be met for each degree. The University requirements are detailed in the "Graduate Degrees" section of this bulletin. Students are urged to read this section carefully, noting residency, tuition, and registration requirements. A student who wishes to enroll for graduate work in the School of Education must be admitted to graduate standing by one of the school's area committees and with the approval of the Associate Dean of Student Affairs.

Complete information about admissions procedures and requirements is available from Graduate Admissions, or at <http://ed.stanford.edu/>. All applicants, except coterminal applicants, must submit scores from the Graduate Record Examination General Test (verbal, quantitative, and analytical or analytical writing areas); TOEFL scores are also required from those whose first language is not English. Applicants to the Stanford Teacher Education Program are also required to submit specific test scores or acceptable equivalents as required by the California Commission on Teacher Credentialing; see the section on STEP below. Test information is available at <http://ed.stanford.edu/> in the admissions section.

# HONORS PROGRAM IN EDUCATION (UNDERGRADUATE)

An honors program is available to undergraduates to supplement their regular majors outside the school. This program permits interested undergraduates at Stanford to build on the training received in their major field of study by pursuing additional courses and a research thesis in a related area of education.

Students apply for entry during the junior year. Application information can be found at <http://ed.stanford.edu/academics/undergraduate/honors>. The current Director is Mitchell L. Stevens, Associate Professor of Education.

At least one course must be taken from each of the following areas:

1. *Educational policy and history in the U.S.*—qualifying courses include:
  - EDUC 165. History of Higher Education in the U.S.
  - EDUC 201. History of Education in the United States
  - EDUC 202. Introduction to Comparative and International Education
2. *Contemporary problem areas*—qualifying courses include:
  - EDUC 149. Theory and Issues in the Study of Bilingualism
  - EDUC 179. Urban Youth and Their Institutions: Research and Practice
  - EDUC 197. Education, Gender, and Development
3. *Foundational disciplines*—qualifying courses include:
  - EDUC 110. Sociology of Education: The Social Organization of Schools
  - EDUC 204. Introduction to Philosophy of Education

Students are also required to enroll in EDUC 140, Honors Research with their advisor, and in EDUC 199A,B,C, Undergraduate Honors Seminar, during the senior year.

Near the end of Spring Quarter, successful candidates for honors orally present brief reports of their work and findings at a mini-conference. All honors students in Education are expected to attend this conference.

# MINOR IN EDUCATION (UNDERGRADUATE)

The Stanford University School of Education awards an undergraduate minor in the field of Education. The minor is structured to provide a substantial introduction to education through a broad-based and focused study of educational research, theory and practice. The goals of the minor are to allow undergraduates to develop an understanding of the core issues facing educators and policymakers, to make connections to their major programs of study, and to provide rigorous preparation for graduate studies in education.

Students interested in pursuing an undergraduate minor in Education begin by contacting the minor director (Jennifer Lynn Wolf, [jlwolf@stanford.edu](mailto:jlwolf@stanford.edu)), who is responsible for advising all candidates and approving each student's minor plan of study. Applications for the minor are due no later than the second quarter of the junior year.

The Education Minor requires three core courses to ensure coverage of the disciplines of the field, while allowing flexibility for students wanting to pursue specific interests within Education. In order to graduate with a minor in Education, students must complete the minor program of study as described here, for a total of not less than 20 units and not more than 30 units, with a minimum of six courses.

# COURSE REQUIREMENTS AND DISTRIBUTION

1. All minor students are required to take the minor core course:
  - EDUC 101. Introduction to Teaching and Learning, addressing foundational issues in teaching, learning, and education.
2. All students are also required to take two foundational courses, such as the following:
  - EDUC 103B. Sociocultural Theory and Practices
  - EDUC 110. Sociology of Education
  - EDUC 201. History of Education in the United States
  - EDUC 203. The Anthropology of Education
  - EDUC 204. Introduction to Philosophy of Education
3. Each student identifies a subfield of study in which to take at least three elective courses. Established subfields of study within the School of Education include: Teaching and Learning; Education Research and Policy; and Educational Technology. Suitable elective courses include:
  1. *Subfield 1: Teaching and Learning*—
    - EDUC 103A. Tutoring: Seeing a Child through Literacy
    - EDUC 111. The Young Adult Novel: A Literature for and About Adolescents
    - EDUC 116X. Service Learning as an Approach to Teaching
    - EDUC 149. Theory and Issues in the Study of Bilingualism
    - EDUC 165. History of Higher Education in the U.S.
    - EDUC 171. Early Childhood Education Practicum
    - EDUC 208. Curriculum Construction
    - EDUC 218. Topics in Learning and Cognition
    - EDUC 223. Good Districts and Good Schools: Research, Policy and Practice
    - EDUC 256. Psychological and Educational Resilience Among Children and Youth
    - EDUC 283. Child Development in and Beyond Schools
  2. *Subfield 2: Education Research and Policy*—
    - EDUC 104X. The Conduct of Research with and in Communities
    - EDUC 119X. Writing about Education
    - EDUC 122X. Collaborations for International Environmental Education
    - EDUC 123X. Contexts that Promote Youth Development
    - EDUC 113X. Gender and Sexuality in the Schools
    - EDUC 277. Education of Immigrant Students: Psychological Perspectives
    - EDUC 197. Education, Gender and Development
    - EDUC 223. Good Districts and Good Schools: Research, Policy & Practice
  3. *Subfield 3: Educational Technology*—
    - EDUC 106. Interactive Media and Education
    - EDUC 124. Collaborative Design and Research of Technology: Integrated Curriculum
    - EDUC 208. Curriculum Construction
    - EDUC 218. Topics in Learning and Cognition
    - EDUC 283. Child Development in and Beyond Schools
    - EDUC 303X. Designing Learning Spaces
    - EDUC 333A. Understanding Learning Environments
    - EDUC 333B. Imagining the Future of Learning
    - EDUC 342. Child Development and New Technologies
4. Course work completed for the Education Minor must meet the following criteria:
  - All courses must be taken for a letter grade.
  - All courses must be completed with a minimum GPA of 3.0.

- Courses used to fulfill the minor may not be used to fulfill any other department degree requirements (major or minor).
- All courses must be taken at Stanford University.

## COTERMINAL BACHELOR'S AND MASTER'S PROGRAM IN EDUCATION

The School of Education admits a small number of students from undergraduate departments within the University into a coterminal bachelor's and master's program. For information about the coterminal option through the Stanford Teacher Education Program (STEP), see the details under STEP below. Students in this program receive the bachelor's degree in their undergraduate major and the master's degree in Education. Approval of the student's undergraduate department and admission to the School of Education M.A. program are required. Undergraduates may apply when they have completed at least 120 units toward graduation (UTG). The number of units required for the M.A. degree depends on the program requirements within the School of Education; the minimum is 45 units.

Applicants may download the coterminal application from the School of Education web site <http://ed.stanford.edu/admissions/application-reqs>.

University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees" section of this bulletin. For University coterminal degree program rules and University application forms, see <http://studentaffairs.stanford.edu/registrar/publications#Coterm>.

## MASTER OF ARTS IN EDUCATION

The M.A. degree is conferred by the University upon recommendation of the faculty of the School of Education. The minimum unit requirement is 45 quarter units earned at Stanford as a graduate student. Students must maintain a grade point average (GPA) of 3.0 or better in courses applicable to the degree, and a minimum of 27 units must be taken in the School of Education. Students typically enroll in 15 to 18 units per quarter. They must enroll in at least 11 units of work each quarter unless their program makes special provision for a lower quarterly minimum. Master's students should obtain detailed program requirements from the Master's Program Officer, located in the Office of Academic Services in the School of Education. Some programs require a final project or scholarly paper. Additional detailed information regarding program content, entrance, and degree requirements is available at <http://ed.stanford.edu>. Before the program begins, each student is assigned a faculty adviser from the appropriate area committee to begin early planning of a coherent program.

Master of Arts degrees are offered for the following specializations:

- Curriculum and Teacher Education. (The program in CTE is not a credentialing program; see STEP below.)
- International Comparative Education
- International Educational Administration and Policy Analysis
- Joint Degree Program with Graduate School of Business (M.B.A./M.A.)
- Joint Degree Program with Law School (J.D./M.A.)
- Learning, Design, and Technology
- Policy, Organization, and Leadership Studies

In addition, an M.A. degree with a teaching credential is offered in the Stanford Teacher Education Program.

## STANFORD TEACHER EDUCATION PROGRAM (STEP)

STEP is a twelve-month, full-time program leading to a Master of Arts and a preliminary California teaching credential. STEP offers two Master of Arts programs to prepare college graduates for careers as teachers in single- or multiple-subject classrooms. STEP-Secondary prepares humanities and sciences students to become teachers of English, languages (French, German, Japanese, Mandarin, Spanish), mathematics, science (biology, chemistry, earth science, physics), and history/social science. STEP-Elementary prepares students to be teachers in California multiple-subject classrooms. STEP seeks to prepare and support teachers to work with diverse learners to achieve high intellectual, academic, and social standards by creating equitable and successful schools and classrooms.

The 12-month STEP year begins in June with a Summer Quarter of intensive academic preparation and placement in a local summer school. During the academic year, students continue their course work and begin a year-long field placement under the guidance of expert teachers in local schools. The master's degree and teaching credential require a minimum of 45 quarter units, taken during four quarters of continuous residency.

Stanford undergraduates who enroll in STEP through the coterminal program must have their B.A. conferred prior to commencing the four quarters of the STEP program. Students complete their undergraduate degree prior to beginning in the STEP year, which concludes in a master's degree and a recommendation for a California teaching credential.

Applicants to the secondary program are required to pass the California Basic Educational Skills Test (CBEST) and must demonstrate subject matter competence in one of two ways: (1) by passing the California Subject Examination for Teachers (CSET) in their content area; or (2) by completing a California state-approved subject matter preparation program. Applicants to the elementary program are required to pass the California Basic Educational Skills Test (CBEST), the California Multiple Subject Examination for Teachers (CSET), and the Reading Instruction Competence Assessment Test (RICA) after admission to the program.

Further information regarding admission requirements, course work, and credential requirements is available at <http://ed.stanford.edu> and in the *School of Education Guide to Graduate Studies*.

## DOCTORAL DEGREES IN EDUCATION

The School of Education offers the Doctor of Philosophy (Ph.D.) degree in all program area committees. The degree is conferred by the University upon recommendation by the faculty of the School of Education and the University Committee on Graduate Studies. The Ph.D. requires a minimum of 135 units of course work and research completed at Stanford beyond the baccalaureate degree. Students may transfer up to 45 units of graduate course work. Students must consult with the doctoral programs officer if they intend to transfer prior course work. Students must maintain a grade point average (GPA) of 3.0 (B) or better in courses applicable to the degree.

Students should note that admission to the doctoral program does not constitute admission to candidacy for the degree. Students must qualify and apply for candidacy by the end of their second year of study and should obtain information about procedures and requirements during their first year from the doctoral programs officer in Cubberley 135.

The Ph.D. degree is designed for students who are preparing for research work in public school systems, branches of government, or specialized institutions; teaching roles in education in colleges or universities, and research connected with such teaching; or other careers in educational scholarship and research.

Ph.D. students must complete a minor in another discipline taught outside the school, or hold an acceptable master's degree outside the field of education, or complete an approved individually designed distributed minor that combines relevant advanced work taken in several disciplines outside the school.

Upon admission, the admitting area committee assigns an initial adviser from its faculty who works with the student to establish an appropriate and individualized course of study, a relevant minor, and project research plans. Other faculty members may also be consulted in this process. Details about administrative and academic requirements for each area committee and the School of Education, along with the expected time frame to complete program milestones, are given in the publication *School of Education Doctoral Degree Handbook*, available for download at <http://ed.stanford.edu/suse/programs-degrees/publications.html>.

The following doctoral specializations, with their sponsoring area and concentration, are offered:

- Anthropology of Education (SHIPS)
- Developmental and Psychological Sciences (DAPS)
- Economics of Education (SHIPS)
- Educational Linguistics (SHIPS)
- Educational Policy (SHIPS)
- Elementary Education (CTE)
- Higher Education (SHIPS)
- History/Social Science Education (CTE)
- History of Education (SHIPS)
- International Comparative Education (SHIPS)
- Learning Sciences and Technology Design (CTE, DAPS, SHIPS)
- Literacy, Language, and English Education (CTE)
- Mathematics Education (CTE)
- Organizational Studies (SHIPS)
- Philosophy of Education (SHIPS)
- Race, Inequality, and Language in Education (SHIPS)
- Science Education (CTE)
- Sociology of Education (SHIPS)
- Teacher Education (CTE)

## PH.D. MINOR IN EDUCATION

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Candidates for the Ph.D. degree in other departments or schools of the University may elect to minor in Education. Requirements include a minimum of 20 quarter units of graduate course work in Education and a field of concentration. Students choosing to minor in Education should meet with the Associate Dean for Student Affairs to determine a suitable course of study early in their program.

# SCHOOL OF ENGINEERING

*Dean:* James D. Plummer

*Senior Associate Deans:* Laura L. Breyfogle (External Relations), (Stanford Center for Professional Development), Curtis W. Frank (Faculty and Academic Affairs), Clare Hansen-Shinnerl (Administration), Brad Osgood (Student Affairs)

*Associate Dean:* Noé P. Lozano (Diversity Programs)

*Assistant Dean:* Sally Gressens (Graduate Student Affairs)

## **Faculty Teaching General Engineering Courses**

*Professors:* Stacey F. Bent, Roger Howe, Chaitan Khosla, Reginald Mitchell, Drew Nelson, Brad Osgood, Channing R. Robertson (Emeritus), Stephen M. Rock, Sheri Sheppard, Robert Sinclair, Stuart Thompson, Simon Wong

*Associate Professors:* Eric Darve, Ashish Goel, Paul McIntyre, Benjamin Van Roy, Olav Solgaard

*Assistant Professors:* Charles E. Eesley, Sarah Heilshorn, Adrian Lew, Nicolas A. Melosh, Christina Smolke, Clifford L. Wang, Xiaolin Zheng

*Professors (Teaching):* Thomas H. Byers, Robert E. McGinn, Eric Roberts

*Associate Professor (Teaching):* Mehran Sahami

*Senior Lecturer:* Vadim Khayms, Claude Reichard

*Lecturers:* Steve Blank, Jerry Cain, David Evans, Royal Kopperud, David Jaffe, Mary McDevitt, R. Ann Miura-Ko, Evelin Sullivan, Matt Vassar

*Consulting Professor:* Paul Mitiguy

*Consulting Associate Professors:* Brendan Boyle

*Consulting Assistant Professors:* Stuart Brown, Scott Doorley

*Academic Research & Program Officer:* Tina Seelig

*Other Teaching:* Keith Schwarz, Noé Lozano

*Mail Code:* 94305-4027

*Phone:* (650) 723-5984

*Web Site:* <http://soe.stanford.edu>

Courses offered by the School of Engineering are listed under the subject code ENGR on the *Stanford Bulletin's* ExploreCourses web site.

The School of Engineering offers undergraduate programs leading to the degree of Bachelor of Science (B.S.), programs leading to both B.S. and Master of Science (M.S.) degrees, other programs leading to a B.S. with a Bachelor of Arts (B.A.) in a field of the humanities or social sciences, dual-degree programs with certain other colleges, and graduate curricula leading to the degrees of M.S., Engineer, and Ph.D.

The school has nine academic departments: Aeronautics and Astronautics, Bioengineering, Chemical Engineering, Civil and Environmental Engineering, Computer Science, Electrical Engineering, Management Science and Engineering, Materials Science and Engineering, and Mechanical Engineering. These departments and one interdisciplinary program, the Institute for Computational and Mathematical Engineering, are responsible for graduate curricula, research activities, and the departmental components of the undergraduate curricula.

In research where faculty interest and competence embrace both engineering and the supporting sciences, there are numerous programs within the school as well as several interschool activities, including the Army High Performance Computing Research Center, Biomedical Informatics Training Program, Center for Integrated Systems, Center for Work, Technology, and Organization, Center on Polymer Interfaces and Macromolecular Assemblies, Collaboratory for Research on Global Projects, Center for Position, National Center for Physics-Based Simulation in Biology, Navigation, and Time, the Energy Modeling Forum, the NIH Biotechnology Graduate Training Grant in Chemical

Engineering, and the Stanford Technology Ventures Program. Energy Resources Engineering (formerly Petroleum Engineering) is offered through the School of Earth Sciences.

The School of Engineering's Hasso Plattner Institute of Design (<http://dschool.stanford.edu>) brings together students and faculty in engineering, business, education, medicine, and the humanities to learn design thinking and work together to solve big problems in a human-centered way.

The Woods Institute for the Environment (<http://environment.stanford.edu>) brings together faculty, staff, and students from the schools, institutes and centers at Stanford to conduct interdisciplinary research, education, and outreach to promote an environmentally sound and sustainable world.

The School of Engineering has a summer internship program in China for undergraduate and graduate students. For more information, see <http://soe.stanford.edu/chinaintern>. The department also has an exchange program available to graduate students whose research would benefit from collaboration with Chinese academic institutions.

Instruction in Engineering is offered primarily during Autumn, Winter, and Spring quarters of the regular academic year. During the Summer Quarter, a small number of undergraduate and graduate courses are offered.

## UNDERGRADUATE PROGRAMS IN THE SCHOOL OF ENGINEERING

The principal goals of the undergraduate engineering curriculum are to provide opportunities for intellectual growth in the context of an engineering discipline, for the attainment of professional competence, and for the development of a sense of the social context of technology. The curriculum is flexible, with many decisions on individual courses left to the student and the adviser. For a student with well-defined educational goals, there is often a great deal of latitude.

In addition to the special requirements for engineering majors described below, all undergraduate engineering students are subject to the University general education, writing, and foreign language requirements outlined in the first pages of this bulletin. Depending on the program chosen, students have the equivalent of from one to three quarters of free electives to bring the total number of units to 180.

The School of Engineering's *Handbook for Undergraduate Engineering Programs* is the definitive reference for all undergraduate engineering programs. It is available online at <http://ughb.stanford.edu> and provides detailed descriptions of all undergraduate programs in the school, as well as additional information about extracurricular programs and services. Because it is revised in the summer, and updates are made to the web site on a continuing basis, the handbook reflects the most up-to-date information on School of Engineering programs for the academic year.

**Accreditation**—The Accreditation Board for Engineering and Technology (ABET) accredits college engineering programs nationwide using criteria and standards developed and accepted by U.S. engineering communities. At Stanford, the following undergraduate programs are accredited: Chemical Engineering, Civil Engineering, Electrical Engineering, Environmental Engineering, and Mechanical Engineering. In ABET-accredited programs, students must meet specific requirements for engineering science, engineering design, mathematics, and science course work. Students are urged to consult the School of Engineering *Handbook for Undergraduate Engineering Programs* and their adviser.

Accreditation is important in certain areas of the engineering profession; students wishing more information about accreditation should consult their department office or the office of the Senior



Associate Dean for Student Affairs in 135 Huang Engineering Center.

*Policy on Satisfactory/No Credit Grading and Minimum Grade Point Average*—All courses taken to satisfy major requirements (including the requirements for mathematics, science, engineering fundamentals, Technology in Society, and engineering depth) for all engineering students (including both department and School of Engineering majors) must be taken for a letter grade if the instructor offers that option.

For departmental majors, the minimum combined GPA (grade point average) for all courses taken in fulfillment of the Engineering Fundamentals requirement and the Engineering Depth requirement is 2.0. For School of Engineering majors, the minimum GPA on all engineering courses taken in fulfillment of the major requirements is 2.0.

## ADMISSION

Any students admitted to the University may declare an engineering major if they elect to do so; no additional courses or examinations are required for admission to the School of Engineering.

## RECOMMENDED PREPARATION

### FRESHMEN

Students who plan to enter Stanford as freshmen and intend to major in engineering should take the highest level of mathematics offered in high school. (See the “Mathematics” section of this bulletin for information on advanced placement in mathematics.) High school courses in physics and chemistry are strongly recommended, but not required. Additional elective course work in the humanities and social sciences is also recommended.

### TRANSFER STUDENTS

Students who do the early part of their college work elsewhere and then transfer to Stanford to complete their engineering programs should follow an engineering or pre-engineering program at the first school, selecting insofar as possible courses applicable to the requirements of the School of Engineering, that is, courses comparable to those described under “Undergraduate Programs.” In addition, students should work toward completing the equivalent of Stanford’s foreign language requirement and as many of the University’s General Education Requirements (GERs) as possible before transferring. Some transfer students may require more than four years (in total) to obtain the B.S. degree. However, Stanford affords great flexibility in planning and scheduling individual programs, which makes it possible for transfer students, who have wide variations in preparation, to plan full programs for each quarter and to progress toward graduation without undue delay.

Transfer credit is given for courses taken elsewhere whenever the courses are equivalent or substantially similar to Stanford courses in scope and rigor. The policy of the School of Engineering is to study each transfer student’s preparation and make a reasonable evaluation of the courses taken prior to transfer by means of a petition process. Inquiries may be addressed to the Office of Student Affairs in 135 Huang Engineering Center. For more information, see the transfer credit section of the *Handbook for Undergraduate Engineering Programs* at <http://ughb.stanford.edu>.

## DEGREE PROGRAM OPTIONS

The School of Engineering offers two types of B.S. degrees: Bachelor of Science in Engineering and Bachelor of Science for Individually Designed Majors in Engineering (IDMENs). There are eight Engineering B.S. subplans that have been proposed by cognizant faculty groups and pre-approved by the Undergraduate Council: Aeronautics and Astronautics; Architectural Design; Atmosphere/Energy; Bioengineering; Biomechanical Engineering; Biomedical Computation; Engineering Physics; and Product

Design. The B.S. for an Individually Designed Major in Engineering has also been approved by the council.

Curricula for majors offered by the departments of Chemical Engineering, Civil and Environmental Engineering, Computer Science, Electrical Engineering, Management Science and Engineering, Materials Science and Engineering, and Mechanical Engineering have the following components: 36-45 units of mathematics and science (see Basic Requirements 1 and 2 at the end of this section); engineering fundamentals (three course minimum, at least one of which must be unspecified by the department, see Basic Requirement 3); Technology in Society (TIS) (one course minimum, see Basic Requirement 4); engineering depth (courses such that the total number of units for Engineering Fundamentals and Engineering Depth is between 60 and 72). ABET accredited majors must meet a minimum number of Engineering Science and Engineering Design units; (see Basic Requirement 5). Curricular requirements for departmental majors are being revised at the time of publication. Consult the 2011-12 *Handbook for Undergraduate Engineering Programs* at <http://ughb.stanford.edu> for the most up-to-date listing of curricular requirements.

## DUAL AND COTERMINAL PROGRAMS

A Stanford undergraduate may work simultaneously toward two bachelor’s degrees or toward a bachelor’s and a master’s degree, that is, B.A. and M.S., B.A. and M.A., B.S. and M.S., or B.S. and M.A. The degrees may be granted simultaneously or at the conclusion of different quarters. Five years are usually required for a dual or coterminal program or for a combination of these two multiple degree programs. For further information, inquire with the School of Engineering’s student affairs office, 135 Huang Engineering Center, or with department contacts listed in the *Handbook for Undergraduate Engineering Programs*, available at <http://ughb.stanford.edu>.

*Dual B.A. and B.S. Degree Program*—To qualify for both degrees, a student must:

1. complete the stated University and department requirements for each degree
2. complete 15 full-time quarters, or 3 full-time quarters after completing 180 units
3. complete a total of 225 units (180 units for the first bachelor’s degree plus 45 units for the second bachelor’s degree)

*Coterminal Bachelor’s and Master’s Degree Program*—A Stanford undergraduate may be admitted to graduate study for the purpose of working simultaneously toward a bachelor’s degree and a master’s degree, in the same or different disciplines. To qualify for both degrees, a student must:

1. complete, in addition to the 180 units required for the bachelor’s degree, the number of units required by the graduate department for the master’s degree which in no event is fewer than the University minimum of 45 units
2. complete the requirements for the bachelor’s degree (department, school, and University) and apply for conferral of the degree at the appropriate time
3. complete the department and University requirements for the master’s degree and apply for conferral of the degree at the appropriate time

A student may complete the bachelor’s degree before completing the master’s degree, or both degrees may be completed in the same quarter.

Admission to the coterminal program requires admission to graduate status by the pertinent department. Admission criteria vary from department to department.

*Procedure for Applying for Admission to Coterminal Degree Programs*—A Stanford undergraduate may apply to the pertinent graduate department using the University coterminal application form after completing 120 bachelor’s degree units. Application deadlines vary by department, but in all cases the student must apply early enough to allow a departmental decision at least one quarter in advance of the anticipated date of conferral of the bachelor’s degree.

Students should refer to the University Registrar's Office or its web site for details about when courses begin to count toward the master's degree requirements and when graduate tuition is assessed; this may affect the decision about when to apply for admission to graduate status.

The University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees" section of this bulletin. For University coterminal degree program rules and University application forms, also see <http://studentaffairs.stanford.edu/registrar/publications#Coterm>.

## BACHELOR OF SCIENCE IN THE SCHOOL OF ENGINEERING

Departments within the School of Engineering offer programs leading to the B.S. degree in the following fields: Chemical Engineering, Civil Engineering, Computer Science, Electrical Engineering, Environmental Engineering, Management Science and Engineering, Materials Science and Engineering, and Mechanical Engineering. The School of Engineering itself offers interdisciplinary programs leading to the B.S. degree in Engineering with specializations in Aeronautics and Astronautics, Architectural Design, Atmosphere/Energy, Bioengineering, Biomechanical Engineering, Biomedical Computation, Engineering Physics, and Product Design. In addition, students may elect a B.S. in an Individually Designed Major in Engineering.

The departments of Chemical Engineering, Civil and Environmental Engineering, Computer Science, Electrical Engineering, and Mechanical Engineering, as well as the faculty overseeing the Architectural Design, Atmosphere/Energy, Bioengineering, Biomechanical Engineering, Biomedical Computing, and Engineering Physics majors, offer qualified students opportunities to do independent study and research at an advanced level with a faculty mentor in order to receive a Bachelor of Science with honors. An honors option is also available to students pursuing an independently designed major, with the guidance and approval of their adviser.

*Petroleum Engineering*—Petroleum Engineering is offered by the Department of Energy Resource Engineering in the School of Earth Sciences. Consult the "Energy Resources Engineering" section of this bulletin for requirements. School of Engineering majors who anticipate summer jobs or career positions associated with the oil industry should consider enrolling in ENGR 120, Fundamentals of Petroleum Engineering.

*Programs in Manufacturing*—Programs in manufacturing are available at the undergraduate, master's, and doctorate levels. The undergraduate programs of the departments of Civil and Environmental Engineering, Management Science and Engineering, and Mechanical Engineering provide general preparation for any student interested in manufacturing. More specific interests can be accommodated through Individually Designed Majors in Engineering (IDMENS).

### BASIC REQUIREMENTS

*Basic Requirement 1 (Mathematics)*—Engineering students need a solid foundation in the calculus of continuous functions, linear algebra, an introduction to discrete mathematics, and an understanding of statistics and probability theory. Students are encouraged to select courses on these topics. To meet ABET accreditation criteria, a student's program must include the study of differential equations. Courses that satisfy the math requirement are listed at <http://ughb.stanford.edu> in the *Handbook for Undergraduate Engineering Programs*.

*Basic Requirement 2 (Science)*—A strong background in the basic concepts and principles of natural science in such fields as biology, chemistry, geology, and physics is essential for engineering. Most students include the study of physics and chemistry in their programs. Courses that satisfy the science requirement are listed at <http://ughb.stanford.edu> in the *Handbook for Undergraduate Engineering Programs*.

*Basic Requirement 3 (Engineering Fundamentals)*—The Engineering Fundamentals requirement is satisfied by a nucleus of technically rigorous introductory courses chosen from the various engineering disciplines. It is intended to serve several purposes. First, it provides students with a breadth of knowledge concerning the major fields of endeavor within engineering. Second, it allows the incoming engineering student an opportunity to explore a number of courses before embarking on a specific academic major. Third, the individual classes each offer a reasonably deep insight into a contemporary technological subject for the interested non-engineer.

The requirement is met by taking three courses from the following list, at least one of which is chosen by the student rather than by the department:

- ENGR 10. Introduction to Engineering Analysis
- ENGR 14. Introduction to Solid Mechanics
- ENGR 15. Dynamics
- ENGR 20. Introduction to Chemical Engineering (Same as CHEMENG 20)
- ENGR 25. Biotechnology (Same as CHEMENG 25)
- ENGR 25E. Energy: Chemical Transformations for Production, Storage, and Use (Same as CHEMENG 25E)
- ENGR 30. Engineering Thermodynamics
- ENGR 40. Introductory Electronics<sup>1</sup>
- ENGR 40N. Engineering Wireless Networks
- ENGR 40P. Physics of Electrical Engineering
- ENGR 50/50E/50M. Introduction to Materials Science, Nanotechnology/Energy/or Biomaterials Emphasis
- ENGR 60. Engineering Economics
- ENGR 62. Introduction to Optimization (Same as MS&E 111)
- ENGR 70A/CS 106A. Programming Methodology
- ENGR 70B or X/CS 106B or X. Programming Abstractions (or Accelerated)
- ENGR 80. Introduction to Bioengineering (Same as BIOE 80)
- ENGR 90. Environmental Science and Technology (Same as CEE 70)

<sup>1</sup> ENGR 40 and 50 may be taken on video at some of Stanford's Overseas Centers.

*Basic Requirement 4 (Technology in Society)*—It is important for the student to obtain a broad understanding of engineering as a social activity. To foster this aspect of intellectual and professional development, all engineering majors must take one course devoted to exploring issues arising from the interplay of engineering, technology, and society. Courses that fulfill this requirement are listed online at <http://ughb.stanford.edu> in the *Handbook for Undergraduate Engineering Programs*.

*Basic Requirement 5 (Engineering Topics)*—In order to satisfy ABET (Accreditation Board for Engineering and Technology) requirements, a student majoring in Chemical, Civil, Electrical, Environmental, or Mechanical Engineering must complete one and a half years of engineering topics, consisting of a minimum of 68 units of Engineering Fundamentals and Engineering Depth appropriate to the student's field of study. In most cases, students meet this requirement by completing the major program core and elective requirements. A student may need to take additional courses in Depth in order to fulfill the minimum requirement. Appropriate courses assigned to fulfill each major's program are listed online at <http://ughb.stanford.edu> in the *Handbook for Undergraduate Engineering Programs*.

*Experimentation*—Chemical Engineering, Civil Engineering, Electrical Engineering, Environmental Engineering, Materials Science and Engineering, and Mechanical Engineering must include experimental experience appropriate to the discipline. Lab courses taken in the sciences, as well as experimental work taken in courses within the School of Engineering, will fulfill this requirement.

## BACHELOR OF ARTS AND SCIENCE (B.A.S.) IN THE SCHOOL OF ENGINEERING

This degree is available to students who complete both the requirements for a B.S. degree in engineering and the requirements for a major or program ordinarily leading to the B.A. degree. For more information, see the "Undergraduate Degrees" section of this bulletin.

## MINOR IN THE SCHOOL OF ENGINEERING

An undergraduate minor in some Engineering programs may be pursued by interested students; see the *Handbook for Undergraduate Engineering Programs*, or consult with a department's undergraduate program representative or the Office of Student Affairs, Huang Engineering Center, Suite 135.

General requirements and policies for a minor in the School of Engineering are:

1. A set of courses totaling not less than 20 and not more than 36 units, with a minimum of six courses of at least 3 units each.
2. The set of courses should be sufficiently coherent as to present a body of knowledge within a discipline or subdiscipline.
3. Prerequisite mathematics, statistics, or science courses, such as those normally used to satisfy the school's requirements for a department major, may not be used to satisfy the requirements of the minor; conversely, engineering courses that serve as prerequisites for subsequent courses must be included in the unit total of the minor program.
4. Courses used for the major and/or minor core must not be duplicated within any other of the student's degree programs; that is, students may not overlap (double-count) courses for completing major and minor requirements except in the case of prerequisite courses as noted in #3.

Departmentally based minor programs are structured at the discretion of the sponsoring department, subject only to requirements 1, 2, 3, and 4 above. Interdisciplinary minor programs may be submitted to the Undergraduate Council for approval and sponsorship. A general Engineering minor is not offered.

## AERONAUTICS AND ASTRONAUTICS (AA) MINOR

The Aero/Astro minor introduces undergraduates to the key elements of modern aerospace systems. Within the minor, students may focus on aircraft, spacecraft, or disciplines relevant to both. The course requirements for the minor are described in detail below. Courses cannot be double-counted within a major and a minor, or within multiple minors; if necessary, the Aero/Astro adviser can help select substitute courses to fulfill the AA minor core.

The following core courses fulfill the minor requirements:

AA 100. Introduction to Aeronautics and Astronautics	3
ENGR 14. Statics <sup>1</sup>	3
ENGR 15. Dynamics <sup>1</sup>	3
ENGR 30. Thermodynamics <sup>1</sup>	3
ME 70. Introductory Fluids	4
ME 131A. Heat Transfer	4
Two courses from one of the upper-division elective areas below (min. 6 units)	
plus one course from a second area below (min. 3 units):	9-11
Aerospace Systems Synthesis/Design:	
AA 236A,B. Spacecraft Design	8
AA 241A,B. Aircraft Design	6
Dynamics and Controls:	
AA 242A. Classical Dynamics	3
AA 271A. Dynamics and Control of Spacecraft/Aircraft	3
AA 279. Space Mechanics	3
ENGR 105. Feedback Control Design	3
ENGR 205. Introduction to Control Design Techniques	3

Fluids:	
AA 200. Applied Aerodynamics	3
AA 210A. Fundamentals of Compressible Flow	3
AA 214A. Numerical Methods in Fluid Mechanics	3
or AA 283. Aircraft Propulsion	3
Structures:	
AA 240A. Analysis of Structures	3
AA 240B. Analysis of Structure II	3
AA 256. Mechanics of Composites	3
1 ENGR 14, 15, or 30 are waived as minor requirements if already taken as part of the major.	

## CHEMICAL ENGINEERING (CHE) MINOR

The following core courses fulfill the minor requirements:

ENGR 20/CHEMENG 20. Introduction to Chemical Engineering	3
CHEMENG 100. Chemical Process Modeling, Dynamics, and Control	3
CHEMENG 110. Equilibrium Thermodynamics	3
CHEMENG 120A. Fluid Mechanics	4
CHEMENG 120B. Energy and Mass Transport	4
CHEMENG 140. Micro and Nanoscale Fabrication	3
or CHEMENG 160. Polymer Science and Engineering	3
or CHEMENG 181. Biochemistry I	3
CHEMENG 170. Kinetics and Reactor Design	3
CHEMENG 180. Chemical Engineering Plant Design	3
CHEMENG 185A. Chemical Engineering Lab A	4
CHEM 171. Physical Chemistry	3

## CIVIL ENGINEERING (CE) MINOR

The Civil Engineering minor is intended to give students a focused introduction to one or more areas of civil engineering. Departmental expertise and undergraduate course offerings are available in the areas of Construction Engineering and Management, Structural Engineering, and Architectural Design. Students interested in an environmental or energy focus should see the Environmental Engineering minor.

The minimum prerequisite for a Civil Engineering minor focusing on construction engineering and management or structural engineering is MATH 42 (or 21); however, many courses of interest require PHYSICS 41 and/or MATH 51 as prerequisites. The minimum prerequisite for a Civil Engineering minor focusing on architectural design is MATH 41 (or 19) and a course in Statistics. A minor in Civil Engineering is not an ABET-accredited degree program.

Since undergraduates having widely varying backgrounds may be interested in obtaining a civil engineering minor, and the field itself is so broad, no single set of course requirements is appropriate for all students. Instead, interested students are encouraged to propose their own set of courses within the guidelines listed below. Additional information on preparing a minor program is available in Chapter 6 of the *Handbook for Undergraduate Engineering Programs*.

General guidelines are—

1. A Civil Engineering minor must contain at least 24 units of course work not taken for the major, and must consist of at least six classes of at least 3 units each of letter-graded work, except where letter grades are not offered..
2. The list of courses must represent a coherent body of knowledge in a focused area, and should include classes that build upon one another. Example programs are given on the CEE webpage.

Professor Anne Kiremidjian (kiremidjian@stanford.edu) is the CEE undergraduate minor adviser in Structural Engineering and Construction Engineering and Management. John Barton (jhbarton@stanford.edu), Program Director for Architectural Design, is the undergraduate minor adviser in Architectural Design. Students must consult the appropriate adviser when developing their minor program, and obtain approval of the finalized study list from them.

## COMPUTER SCIENCE (CS) MINOR

The following core courses fulfill the minor requirements. Prerequisites include the standard mathematics sequence through MATH 51.

Introductory Programming (AP Credit may be used to fulfill this requirement):	5
CS 106B. Programming Abstractions or CS 106 X. Programming Abstractions (Accelerated)	5
Core:	
CS 103. Mathematical Foundations of Computing <sup>1</sup>	5
CS 107. Computer Organization and Systems <sup>2</sup>	5
CS 109. Introduction to Probability for Computer Scientists <sup>3</sup>	5
Electives (choose two courses from different areas):	
<i>Artificial Intelligence—</i>	
CS 121. Introduction to Artificial Intelligence	3
CS 221. AI: Principles and Techniques	4
<i>Human-Computer Interaction—</i>	
CS 147. Introduction to Human-Computer Interaction Design	4
<i>Software—</i>	
CS 108. Object-Oriented Systems Design	4
CS 110. Principles of Computer Systems	5
<i>Systems—</i>	
CS 140. Operating Systems	4
CS 143. Compilers	4
CS 144. Networking	4
CS 145. Databases	4
CS 148. Graphics	4
<i>Theory—</i>	
CS 154. Automata and Complexity Theory	4
CS 157. Logic and Automated Reasoning	3
CS 161. Design and Analysis of Algorithms	5

*Note:* for students with no programming background and who begin with CS 106A, the minor consists of seven or eight courses.

- 1 Students who have taken either CS 103X or CS 103A/B are considered to have satisfied the CS 103 requirement.
- 2 The name of CS 107 has changed. The previous CS 107 course entitled Programming Paradigms also fulfills this requirement.
- 3 Students who completed STATS 116, MS&E 120, or CME 106 in Winter 2008-09 or earlier may count that course as satisfying the CS 109 requirement. These same courses taken in Spring 2008-09 or later cannot be used to satisfy the CS 109 requirement.

## ELECTRICAL ENGINEERING (EE) MINOR

Courses from any of the following three options, along with four letter-graded EE courses of level 100 or higher (13-21 units), fulfill the minor requirements.

Option I:	
ENGR 40 or 40N or 40P.	5
EE 101A. Circuits I	4
EE 101B. Circuits II	4
Four letter-graded EE courses numbered 100 or higher	
Option II:	
ENGR 40 or 40N or 40P.	5
EE 102A. Signal Processing and Linear Systems I	4
EE 102B. Signal Processing and Linear Systems II	4
Four letter-graded EE courses numbered 100 or higher	
Option III:	
ENGR 40 or 40N or 40P.	5
EE 108A. Digital Systems I	4
EE 108B. Digital Systems II	4
Four letter-graded EE courses numbered 100 or higher	

## ENVIRONMENTAL ENGINEERING (ENV) MINOR

The Environmental Engineering minor is intended to give students a focused introduction to one or more areas of Environmental Engineering. Departmental expertise and undergraduate course offerings are available in the areas of environmental engineering and science, environmental fluid mechanics and hydrology, and atmosphere/energy. The minimum prerequisite for an Environmental Engineering minor is MATH 42

(or 21); however, many courses of interest require PHYSICS 41 and/or MATH 51 as prerequisites. Students should recognize that a minor in Environmental Engineering is not an ABET-accredited degree program.

Since undergraduates having widely varying backgrounds may be interested in obtaining an environmental engineering minor, no single set of course requirements is appropriate for all students. Instead, interested students are encouraged to propose their own set of courses within the guidelines listed below. Additional information on preparing a minor program is available in Chapter 6 of the *Handbook for Undergraduate Engineering Programs*.

*General guidelines are—*

- An Environmental Engineering minor must contain at least 24 units of course work not taken for the major, and must consist of at least six classes of at least 3 units each of letter-graded work, except where letter grades are not offered.
- The list of courses must represent a coherent body of knowledge in a focused area, and should include classes that build upon one another. Example programs are given on the CEE webpage.

Professor Lynn Hildemann (hildemann@stanford.edu) is the CEE undergraduate minor adviser in Environmental Engineering. Students must consult with Professor Hildemann in developing their minor program, and obtain approval of the finalized study list from her.

## MANAGEMENT SCIENCE AND ENGINEERING (MS&E) MINOR

The following courses fulfill the minor requirements:

Background requirement:	
MATH 51. Calculus	5
Minor requirements:	
MS&E 111. Introduction to Optimization	4
MS&E 120. Probabilistic Analysis (prerequisite: MATH 51)	5
MS&E 121. Introduction to Stochastic Modeling	4
MS&E 130 or 134. Information Networks/Systems	3-4
MS&E 142 or 260. Financial Analysis or Production	3-4
MS&E 180. Organizations: Theory and Management	4
Elective (any 100- or 200-level MS&E course)	3-4

## MATERIALS SCIENCE AND ENGINEERING (MATSCI) MINOR

A minor in Materials Science and Engineering allows interested students to explore the role of materials in modern technology and to gain an understanding of the fundamental processes that govern materials behavior.

The following courses fulfill the minor requirements:

*Engineering Fundamentals (choose one of the following)—*

ENGR 50. Introduction to Materials Science, Nanotechnology	4
Emphasis	
ENGR 50E. Introduction to Materials Science, Energy	4
Emphasis	
ENGR 50M. Introduction to Materials Science, Biomaterials	4
Emphasis	
Materials Science Fundamentals and Engineering Depth	24
(choose 6 of the following):	
MATSCI 151. Microstructure and Mechanical Properties	4
MATSCI 152. Electronic Materials Engineering	4
MATSCI 153. Nanostructure and Characterization	4
MATSCI 154. Solid State Thermodynamics	4
MATSCI 155. Nanomaterials Synthesis	4
MATSCI 156. Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution	4
MATSCI 157. Quantum Mechanics of Nanoscale Materials	4
MATSCI 160. Nanomaterials Laboratory	4
MATSCI 161. Nanocharacterization Laboratory	4
MATSCI 162. X-Ray Diffraction Laboratory	4
MATSCI 163. Mechanical Behavior Laboratory	4
MATSCI 164. Electronic and Photonic Materials and Devices	4

Laboratory	
MATSCI 190. Organic and Biological Materials	4
MATSCI 192. Materials Chemistry	4
MATSCI 193. Atomic Arrangements in Solids	4
MATSCI 194. Thermodynamics and Phase Equilibria	4
MATSCI 195. Waves and Diffraction in Solids	4
MATSCI 196. Imperfections in Crystalline Solids	4
MATSCI 197. Rate Processes in Materials	4
MATSCI 198. Mechanical Properties of Materials	4
MATSCI 199. Electronic and Optical Properties of Solids	4

## MECHANICAL ENGINEERING (ME) MINOR

The following courses fulfill the minor requirements:

*General Minor*—This minor aims to expose students to the breadth of ME in terms of topics and analytic and design activities. Prerequisites: MATH 41, 42, and PHYSICS 41.

ENGR 14. Introduction to Solid Mechanics	4
ENGR 15. Dynamics	3
ENGR 30. Thermodynamics	3
ME 70. Introductory Fluids Engineering	4
ME 101. Visual Thinking	4

Plus two of the following:

ME 80. Mechanics of Materials	4
ME 131A. Heat Transfer	4
ME 161. Dynamic Systems	4
ME 203. Manufacturing and Design	4

*Thermosciences Minor* -- Prerequisites: MATH 41, 42, 51 (or CME 100) and PHYSICS 41.

ENGR 14. Introduction to Solid Mechanics	4
ENGR 30. Thermodynamics	3
ME 70. Introductory Fluids Engineering	4
ME 131A. Heat Transfer	4
ME 131B. Fluid Mechanics	4
ME 140. Advanced Thermal Systems	5

*Mechanical Design Minor*—This minor aims to expose students to design activities supported by analysis. Prerequisites: MATH 41, 42, and PHYSICS 41.

ENGR 14. Introduction to Solid Mechanics	4
ENGR 15. Dynamics	3
ME 80. Mechanics of Materials	4
ME 101. Visual Thinking	4
ME 112. Mechanical Systems Design	4
ME 203. Manufacturing and Design	4

Plus one of the following:

ME 113. Mechanical Engineering Design	4
ME 210. Introduction to Mechatronics	4
ME 220. Introduction to Sensors	4

## AERONAUTICS AND ASTRONAUTICS (AA)

Completion of the undergraduate program in Aeronautics and Astronautics leads to the conferral of the Bachelor of Science in Engineering. The subplan "Aeronautics and Astronautics" appears on the transcript and on the diploma.

### MISSION OF THE UNDERGRADUATE PROGRAM IN AERONAUTICS AND ASTRONAUTICS

The mission of the undergraduate program in Aeronautics and Astronautics Engineering is to provide students with the fundamental principles and techniques necessary for success and leadership in the conception, design, implementation, and operation of aerospace and related engineering systems. Courses in the major introduce students to engineering principles. Students learn to apply this fundamental knowledge to conduct laboratory

experiments and aerospace system design problems. Courses in the major include engineering fundamentals, mathematics, and the sciences, as well as in-depth courses in aeronautics and astronautics, dynamics, mechanics of materials, fluids engineering, and heat transfer. The major prepares students for careers in aircraft and spacecraft engineering, space exploration, air and space-based telecommunication industries, teaching, research, military service, and many related technology-intensive fields.

## REQUIREMENTS

Mathematics (24 units):	
MATH 53 or CME 102/ENGR 155A	5
MATH electives <sup>1</sup>	
Science (18 units):	
PHYSICS 41. Mechanics	4
PHYSICS 43. Electricity and Magnetism	4
One additional Physics course	3
Science electives <sup>1</sup>	9
Technology in Society <sup>1</sup> (one course required)	3-5
Engineering Fundamentals <sup>1</sup> : three courses minimum, including:	
ENGR 30. Engineering Thermodynamics	3
ENGR 70A. Programming Methodology	3-5
Engineering Depth (39 units):	
AA 100. Introduction to Aeronautics and Astronautics	3
AA 190. Directed Research in Aeronautics and Astronautics (WIM)	3
ENGR 15. Dynamics	3
CEE 101A. Mechanics of Materials or ME 80. Strength of Materials	4
ME 161. Dynamic Systems or PHYSICS 110. Intermediate Mechanics	4
ME 70. Introductory Fluids Engineering	4
ME 131A. Heat Transfer	4
Depth Area I <sup>2</sup>	6
Depth Area II <sup>2</sup>	6
Engineering Elective(s) <sup>3</sup>	3

These requirements are subject to change. The final requirements are published with sample programs in the *Handbook for Undergraduate Engineering Programs*.

- Courses that satisfy the Math electives, Science electives, the Technology in Society requirement, and the Engineering Fundamentals requirement are listed in Figures 3-1, 3-2, 3-3, and 3-4 in the *Handbook for Undergraduate Engineering Programs* at <http://ughb.stanford.edu>.
- Two of the following areas:  
Fluids (AA 200, 210A, 214A, 283; ME 131B)  
Structures (AA 240A, 240B, 256)  
Dynamics and Controls (AA 242A, 271A, 279; ENGR 105, 205)  
Systems Design (AA 241A, 241B, 236A, 236B)
- Electives are to be approved by the adviser, and might be from the depth area lists or other upper-division Engineering courses.

## ARCHITECTURAL DESIGN (AD)

Completion of the undergraduate program in Architectural Design leads to the conferral of the Bachelor of Science in Engineering. The subplan "Architectural Design" appears on the transcript and on the diploma.

### MISSION OF THE UNDERGRADUATE PROGRAM IN ARCHITECTURAL DESIGN

The mission of the undergraduate program in Architectural Design is to develop students' ability to integrate engineering and architecture in ways that blend innovative architectural design with cutting-edge engineering technologies. Courses in the program combine hands-on architectural design studios with a wide variety of other courses. Students can choose from a broad mix of elective courses concerning energy conservation, sustainability, building systems, and structures, as well as design foundation and fine arts courses. In addition to preparing students for advanced studies in architecture and construction management, the program's math and science requirements prepare students well for graduate work in other fields such as civil and environmental engineering, law, and business.

**REQUIREMENTS**

Mathematics and Science (36 units minimum):	
MATH 19, 20, and 21, or 41 and 42 (required)	10
One course in Statistics (required)	3-5
PHYSICS 21 <i>or</i> 41. Mechanics (required)	3-4
Recommended:	
EARTHSYS 101, 102; GES 1; CEE 64, 70, 101D; CME 100; PHYSICS 23 <i>or</i> 43; or from School of Engineering approved list <sup>1</sup>	
Technology in Society (one course required; see Basic Requirement 4)	3-5
Engineering Fundamentals (three courses minimum; see Basic Requirement 3):	
ENGR 14. Introduction to Solid Mechanics	4
ENGR 60. Engineering Economy	3
Fundamentals Elective	3-5
Engineering Depth:	
CEE 31 <i>or</i> 31Q. Accessing Architecture Through Drawing	4
CEE 100. Managing Sustainable Building Projects (WIM)	4
CEE 101A. Mechanics of Materials	4
CEE 110. Building Information Modeling	4
CEE 130. Architectural Design: 3D Modeling, Methodology, and Process	4
CEE 136. Green Architecture	4
CEE 137B. Advanced Architecture Studio (or one of the 137 series)	5
CEE 156. Building Systems	4
ARTHIST 3. Introduction to the History of Architecture	5
Engineering Depth Electives (with at least 3 units from SoE courses): the number of units of Depth Electives must be such that courses in Engineering Fundamentals and Engineering Depth total at least 60 units. <sup>2</sup>	

These requirements are subject to change. The final requirements are published with sample programs in the *Handbook for Undergraduate Engineering Programs*.

- School of Engineering approved list of math and science courses available in the *Handbook for Undergraduate Engineering Programs* at <http://ughb.stanford.edu>
- Engineering depth electives: At least one of the following courses: CEE 111, 115, 124, 131, 131A, 132 *or* 138A; and others from CEE 32A, 32B, 32Q, 80N, 101B, 101C, 122A,B, 134B, 135A, 139, 154, 172A, 176A, 180, 181, 182, 183; ENGR 50, 103, 131; ME 101, 110A, 115, 120, 222; ARTSTUDIO 60, 70, 140, 145, 148, 151, 271; ARTHIST 141, 142, 143A, 188A, 252A; FILMPROD 114; DRAMA 137; URBANST 110, 113, 163, 171.

**ATMOSPHERE/ENERGY (A/E)**

Completion of the undergraduate program in Atmosphere/Energy leads to the conferral of the Bachelor of Science in Engineering. The subplan "Atmosphere/Energy" appears on the transcript and on the diploma.

**MISSION OF THE UNDERGRADUATE PROGRAM IN ATMOSPHERE/ENERGY**

Atmosphere and energy are strongly linked: fossil-fuel energy use contributes to air pollution, climate change, and weather modification; and changes in the atmosphere feed back to renewable energy, including wind, solar, hydroelectric, and wave energy. The mission of the undergraduate program in Atmosphere/Energy (A&E) is to provide students with the fundamental background necessary to solve large- and local-scale climate, air pollution, and energy problems through renewable and efficient energy systems. To accomplish this goal, students learn in detail the causes and proposed solutions to the problems, and learn to evaluate whether the proposed solutions are truly beneficial. A/E students take courses in renewable energy resources, indoor and outdoor air pollution, energy efficient buildings, climate change, renewable energy and clean-vehicle technologies, weather and storm systems, energy technologies in developing countries, electric grids, and air quality management. The curriculum is flexible: depending upon their area of interest, students may take in-depth courses in energy or atmosphere and focus either on science, technology, or policy. The major is designed to provide students with excellent preparation for careers in industry, government, and research, as well as study in graduate school.

**REQUIREMENTS**

Mathematics (23 units minimum, including at least one course from each group):	
Group A:	
MATH 53. Ordinary Differential Equations with Linear Algebra	5
CME 102. Ordinary Differential Equations for Engineers	5
Group B:	
CME 106. Introduction to Probability and Statistics for Engineers	4
STATS 60. Introduction to Statistical Methods: Pre-Calculus	5
STATS 110. Statistical Methods in Engineering and the Physical Sciences	4-5
EESS 160. Statistical Methods for Earth and Environmental Sciences	3-4
Science (22 units minimum, including all of the following):	
PHYSICS 41. Mechanics	4
PHYSICS 43. Electricity and Magnetism <i>or</i> 45. Light and Heat	4
CHEM 31B. Chemical Principles II <i>or</i> CHEM 31X. Chemical Principles <i>or</i> ENGR 31	4
CEE 70. Environmental Science and Technology	3
Technology in Society:	
STS 110. Ethics and Public Policy (WIM)	3-5
Engineering Fundamentals (three courses minimum, including the following):	
ENGR 25E. Energy: Chemical Transformations for Production, Storage, and Use	3
Plus one of the following courses plus one elective (see Basic Requirement 3):	
ENGR 30. Engineering Thermodynamics	3
ENGR 60. Engineering Economy	3
ENGR 70A. Programming Methodology	3-5
Engineering Depth (42 units minimum):	
Required:	
CEE 64. Air Pollution: From Urban Smog to Global Change	3
CEE 173A. Energy Resources	4-5
At least 34 units from the following with at least four courses from each group:	
Group A: Atmosphere	
AA 100. Introduction to Aeronautics and Astronautics	3
CEE 63. Weather and Storms	3
CEE 101B. Mechanics of Fluids <i>or</i> ME 70. Introductory Fluids Engineering	4
CEE 164. Introduction to Physical Oceanography <i>or</i> EESS 146B. Atmosphere, Ocean, Climate Dynamics	4
CEE 172. Air Quality Management	3
CEE 172A. Indoor Air Quality (given alternate years)	2-3
CEE 172S. Greenhouse Gas Mitigation	3-4
CEE 178. Introduction to Human Exposure Analysis	3
EARTHSYS 111. Biology and Global Change	3
EARTHSYS 133. California Climate Change Law and Policy	3
EARTHSYS 144. Fundamentals of GIS <i>or</i> GEOPHYS 140. Introduction to Remote Sensing	4
EARTHSYS 147. Control Climate Change/21st Century (alt years)	3
EARTHSYS 148. Cooperage Climate Protocol <i>or</i> EESS 57Q. Climate Change from Past to the Future	3
EESS 146A Atm., Ocean, Clim. Dynamics: Atm. Circ. (alt years)	2
ME 131B. Fluid Mechanics: Compressible Flow and Turbomachinery	3
Group B: Energy	
CEE 109. Creating a Green Student Workforce <i>or</i> EARTHSYS 45N. Environmental Issues Confronting the World (alternate years)	4
CEE 115. Goals & Methods for the Sustainable Design of Buildings <i>or</i> CEE 177S. Design for a Sustainable World	3-4
CEE 142A. Negotiating Sustainable Development <i>or</i> CEE 156. Building Systems	1-5
CEE 172P. Distributed Generation and Grid Integration Renewables	3
CEE 176A. Energy Efficient Buildings	3-4
CEE 176B. Electric Power: Renewables and Efficiency	3-4
CEE 176F. Energy Systems Field Trips (alternate years)	4

CEE 177S. Design for a Sustainable World	1-5
CHEMENG 35N. Renewable Energy for a Sustainable World	3
EARTHSYS 101. Energy and the Environment	3
EARTHSYS 102. Renewable Energy Sources and Greener Energy Processes	3
EARTHSYS 132. Energy and Climate Cooperation in the Western Hemisphere	4
EE 25Q. Electric Automobiles and Aircraft	3
EESS 37N. Energy and Environment on the Back of an Envelope	3
ENERGY 104. Technology in the Greenhouse <i>or</i> MATSCI 115C. Energy Technologies for a Sustainable Future	3
MATSCI 156. Solar Cells, Fuel Cells, and Batteries	2
	4

These requirements are subject to change. The final requirements are published with sample programs in the *Handbook for Undergraduate Engineering Programs*.

## BIOENGINEERING (BIOE)

Completion of the undergraduate program in Bioengineering leads to the conferral of the Bachelor of Science in Engineering. The subplan "Bioengineering" appears on the transcript and on the diploma.

### MISSION OF THE UNDERGRADUATE PROGRAM IN BIOENGINEERING

The mission of the Department of Bioengineering is to create a fusion of engineering and the life sciences that promotes scientific discovery and the development of new biomedical technologies and therapies through research and education. The Bioengineering (BioE) major enables students to embrace biology as a new engineering paradigm and apply engineering principles to medical problems and biological systems. Students who major in BioE obtain a solid background in the basic sciences (chemistry, physics, and biology) and mathematics. They take three engineering fundamentals courses including an introductory bioengineering course and computer programming. Starting in the sophomore year, BioE students take nine bioengineering core classes to gain essential knowledge to pursue a career in bioengineering and then have the opportunity to pursue elective courses suited to their own interests. The major prepares students to continue on to graduate or medical school; work in the biotechnology, medical device, medical imaging, or other medical and non-medical industries; or pursue advanced degrees in business or law.

### REQUIREMENTS

Mathematics (28 units minimum required; see Basic Requirement 1) <sup>1</sup>	
MATH 41 & 42 or AP Calculus	10
CME 100. Vector Calculus for Engineers	5
CME 102. Ordinary Differential Equations for Engineers	5
CME 104. Linear Algebra & Partial Differential Equations for Engineers	5
CME 106. Introduction to Probability & Statistics for ENGRs Science (26 units minimum) <sup>2</sup>	3-4
CHEM 31X <i>or</i> A.B. General Chemistry	4-8
CHEM 33. Structure and Reactivity	4
BIO 41,42. Biology Core	10
PHYSICS 41. Mechanics	4
PHYSICS 43. Electricity and Magnetism	4
Technology in Society (one course required; see Basic Requirement 4)	
BIOE 131. Ethics	3
Engineering Topics (Engineering Science and Design):	
Engineering Fundamentals (3 courses required):	
ENGR 70A (same as CS 106A). Programming Methodology	5
ENGR 80. Introduction to Bioengineering	4
Fundamentals Elective; see UGHB Fig. 3-4 for approved course list; may not use ENGR 70B or X	3-5
Bioengineering Core (36 units required):	
BIOE 41. Physical Biology of Macromolecules	4
BIOE 42. Physical Biology of Cells	4
BIOE 44. Fundamentals of Engineering Biology Lab	4
BIOE 51. Anatomy for Bioengineers	4
BIOE 101. Systems Biology	4
BIOE 103. Systems Physiology & Design	4

BIOE 123. Optics and Devices Lab	4
BIOE 141A. Biodesign Project I	4
BIOE 141B. Biodesign Project II	4
Bioengineering Depth Electives (4 courses, minimum 12 units):	
BIOE 212. Introduction to Biomedical Informatics Research Methodology	3
BIOE 214. Representations and Algorithms for Computational Molecular Biology	3-4
BIOE 220. Introduction to Imaging and Image-Based Human Anatomy	3
BIOE 222A. Multimodality Molecular Imaging in Living Subjects I	4
BIOE 222B. Multimodality Molecular Imaging in Living Subjects II	4
BIOE 244. Advanced Frameworks and Approaches for Engineering Integrated Genetic Systems	4
BIOE 261. Principles and Practice of Stem Cell Engineering	3
BIOE 281. Biomechanics of Movement	3
BIOE 311. Biophysics of Developmental Biology and Tissue Engineering	3

These requirements are subject to change. The final requirements are published with sample programs in the *Handbook for Undergraduate Engineering Programs* (UGHB). Students pursuing a premed program will need to take additional courses; see the UGHB, BioE Premed 4-Year Plan.

- 1 It is strongly recommended that the CME series (100, 102, 104) be taken rather than the MATH 50 series (51, 52, 53). CME 106 should be taken rather than STATS 110 or 141.
- 2 Science must include both Chemistry (CHEM 31A and B or X, *or* ENGR 31) and Physics with two quarters of course work in each and two courses of BIO core. CHEM 31A and B are considered one course even though given over two quarters. Premeds should take Chemistry, not ENGR 31.

## BIOMECHANICAL ENGINEERING (BME)

Completion of the undergraduate program in Biomechanical Engineering leads to the conferral of the Bachelor of Science in Engineering. The subplan "Biomechanical Engineering" appears on the transcript and on the diploma.

### MISSION OF THE UNDERGRADUATE PROGRAM IN BIOMECHANICAL ENGINEERING

The mission of the undergraduate program in Biomechanical Engineering is to help students address health science challenges by applying engineering mechanics and design to the fields of biology and medicine. The program is interdisciplinary in nature, integrating engineering course work with biology and clinical medicine. Research and teaching in this discipline focus primarily on neuromuscular, musculoskeletal, cardiovascular, and cell and tissue biomechanics. This major prepares students for graduate studies in bioengineering, medicine or related areas.

### REQUIREMENTS

Mathematics (21 units minimum; see Basic Requirement 1)	
Science (22 units minimum) <sup>1</sup>	
CHEM 31X <i>or</i> A.B. (required)	4-8
BIO 44X. Biology Labs (WIM)	4
Biology or Human Biology A/B core courses	10
Additional units from School of Engineering approved list	
Technology in Society (one course required; see Basic Requirement 4)	3-5
Engineering Topics (Engineering Science and Design):	
Engineering Fundamentals (minimum three courses; see Basic Requirement 3):	
ENGR 14. Introduction to Solid Mechanics	4
ENGR 25B. Biotechnology or	3
ENGR 80. Introduction to Bioengineering	4
Fundamentals Elective	3-5
Engineering Depth:	
ENGR 15. Dynamics	3
ENGR 30. Engineering Thermodynamics	3
ME 70. Introductory Fluids Engineering	4
ME 80. Mechanics of Materials	4
ME 389. Seminar	1
Options to complete the ME depth sequence (3 courses, minimum 9 units):	
ENGR 105. Feedback Control Design	3

ME 101. Visual Thinking	4
ME 112. Mechanical Engineering Design	4
ME 113. Mechanical Engineering Design	4
ME 131A. Heat Transfer	3-4
ME 131B. Fluid Mechanics	4
ME 140. Advanced Thermal Systems	5
ME 161. Dynamic Systems	4
ME 203. Manufacturing and Design	3-4
ME 210. Introduction to Mechatronics	4
ME 220. Introduction to Sensors	3-4
Options to complete the BME depth sequence <sup>2</sup> (3 courses, minimum 9 units):	
BIOE 260. Tissue Engineering	3
BIOE 282. Performance, Development, and Adaptation of Skeletal Muscle	3
ME 280. Skeleton Development and Evolution	3
ME 281. Biomechanics of Movement	3
ME 283. Introduction to Biomechanics	3
ME 284A. Cardiovascular Bioengineering	3
ME 284B. Cardiovascular Bioengineering	3
ME 287. Mechanics of Biological Tissues	3
ME 294. Medical Device Design	3
ME 239. Mechanics of the Cell	3

These requirements are subject to change. The final requirements are published with sample programs in the *Handbook for Undergraduate Engineering Programs*.

- 1 Science must include both Chemistry and Physics with one year of course work (3 courses) in at least one, two courses of HUMBIO core or BIO core, and CHEM 31A and B or X, or ENGR 31. CHEM 31A and B are considered one course even though given over two quarters.
- 2 Check the *Handbook for Undergraduate Engineering Programs* for other options that may be introduced during the academic year.

## BIOMEDICAL COMPUTATION (BMC)

Completion of the undergraduate program in Biomedical Computation leads to the conferral of the Bachelor of Science in Engineering. The subplan "Biomedical Computation" appears on the transcript and on the diploma.

## MISSION OF THE UNDERGRADUATE PROGRAM IN BIOMEDICAL COMPUTATION

The mission of the undergraduate program in Biomedical Computation is to prepare students to work at the cutting edge of the interface between computer science, biology, and medicine. Students in the major gain a foundation in the biological and computational disciplines. They learn techniques of informatics and simulation and their countless applications in understanding and analyzing biology at all levels, from individual molecules in cells to entire organisms and populations. Students in the program select an in-depth focus area and participate in a substantial research project with a faculty member. The Biomedical Computation major prepares students to enter a wide range of cutting-edge fields in academia and industry.

## REQUIREMENTS

Mathematics (21 unit minimum; see Basic Requirement 1)	
MATH 41. Calculus	5
MATH 42. Calculus	5
STATS 116. Theory of Probability <sup>1</sup>	5
CS 103. Mathematical Foundations of Computing	5
Science (17 units minimum; see Basic Requirement 2)	
PHYSICS 41. Mechanics	4
CHEM 31X or A/B or ENGR 31. Chemical Principles	4
CHEM 33. Structure and Reactivity	4
BIO 41. Evolution, Genetics, Biochemistry or HUMBIO 2A. Genetics, Evolution, and Ecology	5
BIO 42. Cell Biology, Dev. Biology, and Neurobiology or HUMBIO 3A. Cell and Developmental Biology	5
BIO 43. Plant Biology, Evolution, and Ecology or HUMBIO 4A. The Human Organism	5
Engineering Fundamentals (two different courses required):	
CS 106B (or CS 106X). Programming Abstractions (or	5

Accelerated)	
For the second required course, see concentrations	
Technology in Society (one course required; see Basic Requirement 4)	3-5
Engineering	
CS 107. Computer Organization and Systems	5
CS 161. Data Structures and Algorithms	4
One of CS 270, 273A, 274, 275, 278, 279	3
Research: 6 units of biomedical computation research in any department <sup>2,3</sup>	6
Engineering Depth Concentration (choose one of the following concentrations): <sup>7</sup>	
Cellular/Molecular Concentration (10 courses):	
Mathematics: one of the following courses:	5
CME 100. Vector Calculus for Engineers	
STATS 141. Biostatistics	
MATH 51. Advanced Calculus	
One additional Engineering Fundamental <sup>4</sup>	3-5
Biology (four courses):	
BIO 129A. Cell Dynamics I	4
BIO 129B. Cell Dynamics II	4
BIO 188. Biochemistry or CHEM 135. Physical Chemistry or CHEM 171. Physical Chemistry	3
BIO 203. Advanced Genetics or BIO 118. Genetic Analysis of Biological Processes	4
Informatics Electives (two courses) <sup>5,6</sup>	6-10
Simulation Electives (two courses) <sup>5,6</sup>	6-10
Simulation, Informatics, or Cell/Mol Elective (one course) <sup>5,6</sup>	3-5
Informatics Concentration:	
Mathematics: One of the following courses:	
STATS 141. Biostatistics	4
STATS 203. Intro to Regression Models and ANOVA	3
STATS 205. Intro to Nonparametric Statistics	3
STATS 215. Statistical Models in Biology	3
STATS 225. Bayesian Analysis	3
One additional Engineering Fundamental <sup>4</sup>	3-5
Informatics Core (three courses)	
Choose one: CS 145. Databases or CS 147. HCI	4
Choose one: CS 121/122, CS 228, CS 229 or CS 223B	3-4
One additional course from the previous two lines	3-4
Informatics Electives (three courses) <sup>5,6</sup>	9-15
Cellular Electives (two courses) <sup>5,6</sup>	6-10
Organs Electives (two courses) <sup>5,6</sup>	6-10
Organs/Organisms Concentration:	
Mathematics (one of the following courses):	
CME 100. Vector Calculus for Engineers	5
STATS 141. Biostatistics	5
MATH 51. Advanced Calculus	5
One additional Engineering Fundamental <sup>4</sup>	3
Biology (two courses)	
BIO 112. Human Physiology	4
BIO 188. Biochemistry I or BIOE/RAD 220. Introduction to Imaging	3
Two additional Organs Electives <sup>5,6</sup>	6-10
Simulation Electives (two courses) <sup>5,6</sup>	6-10
Informatics Electives (two courses) <sup>5,6</sup>	6-10
Simulation, Informatics, or Organs Elective (one course) <sup>5,6</sup>	3-5
Simulation Concentration:	
Mathematics:	
CME 100 or MATH 51. Advanced Calculus I	5
Engineering Fundamentals:	
ENGR 30. Engineering Thermodynamics	3
Simulation Core:	
CME 102 or MATH 53. Advanced Calculus II	5
ENGR 80. Introduction to Biotechnology	3
BIOE 101. Systems Biology	4
BIOE 102. Systems Physiology & Design I	4
BIOE 102. Systems Physiology & Design II	4
Simulation Electives (two courses) <sup>5,6</sup>	6-10
Cellular Elective (one course) <sup>5,6</sup>	3
Organs Elective (one course) <sup>5,6</sup>	3
Simulation, Cellular, or Organs Elective (one course) <sup>5,6</sup>	3-5



These requirements are subject to change; see <http://bmc.stanford.edu> for the most up-to-date program description. The final requirements are published with sample programs in the *Handbook for Undergraduate Engineering Programs*.

- 1 CS 109, MS&E 120, MS&E 220, EE 178, and CME 106 are acceptable substitutes for STATS 116.
- 2 Research projects require pre-approval of BMC Coordinators.
- 3 Research units taken as CS 191W or in conjunction with ENGR199W fulfill the Writing in the Major (WIM) requirement. CS 272, which does not have to be taken in conjunction with research, also fulfills the WIM requirement.
- 4 One 3-5 unit course required; CS 106A may not be used. See Fundamentals list in *Handbook for Undergraduate Engineering Programs*.
- 5 The list of electives is continually updated to include all applicable courses. For the current list of electives, see <http://bmc.stanford.edu>.
- 6 A course may only be counted towards one elective or core requirement; it may not be double-counted.
- 7 A total of 40 Engineering units must be taken. The core classes only provide 27 Engineering units, so the remaining units must be taken from within the electives.

## CHEMICAL ENGINEERING (CHE)

Completion of the undergraduate program in Chemical Engineering leads to the conferral of the Bachelor of Science in Chemical Engineering.

### MISSION OF THE UNDERGRADUATE PROGRAM IN CHEMICAL ENGINEERING

Chemical engineers are responsible for the conception and design of processes for the purpose of production, transformation, and transportation of materials. This activity begins with experimentation in the laboratory and is followed by implementation of the technology in full-scale production. The mission of the undergraduate program in Chemical Engineering is to develop students' understanding of the core scientific, mathematical, and engineering principles that serve as the foundation underlying these technological processes. The program's core mission is reflected in its curriculum which is built on a foundation in the sciences of chemistry, physics, and biology. Course work includes the study of applied mathematics, material and energy balances, thermodynamics, fluid mechanics, energy and mass transfer, separations technologies, chemical reaction kinetics and reactor design, and process design. The program provides students with excellent preparation for careers in the corporate sector and government, or for graduate study.

### REQUIREMENTS

Mathematics:

MATH 41, 42.	10
CME 100. Vector Calculus for Engineers or MATH 51 and 52. Calculus	5
CME 102. Ordinary Differential Equations for Engineers or MATH 53. Ordinary Differential Equations	10
CME 104. Linear Algebra and Partial Differential Equations for Engineers	5
or CME 106. Intro to Probability and Statistics for Engineers	5
	4

Science:

CHEM 31X. Chemical Principles or CHEM 31A,B. Chemical Principles I,II	4
CHEM 33. Structure and Reactivity	8
CHEM 35. Organic Monofunctional Compounds	4
CHEM 36. Chemical Separations	4
PHYSICS 41. Mechanics	3
PHYSICS 43. Electricity and Magnetism	4

Technology in Society (one course required; see Basic Requirement 4) 3-5

Engineering Fundamentals (three courses minimum; see Basic Requirement 3):

ENGR 20/CHEMENG 20. Introduction to Chemical Engineering	3
ENGR 25B/CHEMENG 25B. Biotechnology or ENGR 25E/CHEMENG 25E. Energy:Chemical Transformations for Production, Storage, and Use	3
Fundamentals Elective	3-5

Chemical Engineering Depth (minimum 68 Engineering Science and Design units; see Basic Requirement 5):

CHEMENG 10. The Chemical Engineering Profession	1
CHEMENG 100. Chemical Process Modeling, Dynamics, and Control	3
CHEMENG 110. Equilibrium Thermodynamics	3
CHEMENG 120A. Fluid Mechanics	4
CHEMENG 120B. Energy and Mass Transport	4
CHEMENG 130. Separation Process	3
CHEMENG 150. Biochemical Engineering	3
CHEMENG 170. Kinetics and Reactor Design	3
CHEMENG 180. Chemical Engineering Plant Design	3
CHEMENG 185A. Chemical Engineering Laboratory A (WIM)	4
CHEMENG 185B. Chemical Engineering Laboratory B	4
CHEMENG 181. Biochemistry I	3
CHEM 130. Qualitative Organic Analysis	4
CHEM 131. Organic Polyfunctional Compounds	3
CHEM 171. Physical Chemistry: Chemical Thermodynamics	3
CHEM 173. Physical Chemistry: Quantum Chemistry	3
CHEM 175. Physical Chemistry	3

Two courses required\*:

CHEMENG 140. Micro and Nanoscale Fabrication	3
CHEMENG 160. Polymer Science and Engineering	3
CHEMENG 174. Environmental Microbiology I	3
CHEMENG 183. Biochemistry II	3

\*Any two acceptable except combining 174 and 183

Unit count is higher if program includes one or more of the following: MATH 20 series, MATH 50 series (in lieu of the CME math courses), or CHEM 31A,B (in lieu of CHEM 31X). The above requirements are subject to change. The final requirements are published with representative sequences of courses in the *Handbook for Undergraduate Engineering Programs*. Handbooks are available at <http://ughb.stanford.edu> or from the department or school.

## CIVIL ENGINEERING (CE)

Completion of the undergraduate program in Civil Engineering leads to the conferral of the Bachelor of Science in Civil Engineering.

### MISSION OF THE UNDERGRADUATE PROGRAM IN CIVIL ENGINEERING

The mission of the undergraduate program in Civil Engineering is to provide students with the principles of engineering and the methodology needed for civil engineering practice. This pre-professional program balances the fundamentals common to many specialties in civil engineering and allows for concentration in structures and construction or environmental and water studies. Students in the major learn to apply knowledge of mathematics, science, and civil engineering to conduct experiments, design structures and systems to creatively solve engineering problems, and communicate their ideas effectively. The curriculum includes course work in structural, construction, and environmental engineering. The major prepares students for careers in government and industry, and further graduate study.

### REQUIREMENTS

Mathematics and Science (45 units minimum <sup>1</sup> ; see Basic Requirements 1 and 2):	
Technology in Society <sup>2</sup> (one course; see Basic Requirement 4)	3-5
Engineering Fundamentals (three courses minimum; see Basic Requirement 3)	
ENGR 14. Introduction to Solid Mechanics	4
ENGR 90. Environmental Science and Technology	3
Fundamentals Elective	3-5
Engineering Depth (minimum of 68 Engineering Science and Design units; see Basic Requirement 5):	
ENGR 60. Engineering Economy	3
CEE 100. Managing Sustainable Building Projects (WIM)	4
CEE 101A. Mechanics of Materials	4
CEE 101B. Mechanics of Fluids	4
CEE 101C. Geotechnical Engineering	4
Specialty courses in either	

Environmental and Water Studies <sup>3</sup>	
or Structures and Construction <sup>4</sup>	39-40
Other School of Engineering Electives	0-4

These requirements are subject to change. The final requirements are published with sample programs in the *Handbook for Undergraduate Engineering Programs*.

- 1 Mathematics must include CME 100/102 (or Math 51/53) and a Statistics class. Science must include PHYSICS 41, either CHEM 31A, CHEM 31X or ENGR 31; two additional quarters in either chemistry or physics, and GES 1. For students in the Environmental and Water Studies track, the additional chemistry or physics must include CHEM 33; for students in the Structures and Construction track, it must include PHYSICS 43 or 45.
- 2 Chosen TiS class must specifically include and ethics component, such as STS 101, 110, or 115; COMM 169; CS 181; or MS&E 181.
- 3 Environmental and Water Studies: ENGR 30; CEE 101D, 160, 161A, 166A, 166B, 171, 172, 177, 179A; and either CEE 169 or 179C. Remaining specialty units from: CEE 63, 64, 109, 129, 164, 166D, 172A, 173A, 176A, 176B, 178, 199.
- 4 Structures and Construction: ENGR 50 or 50E or 50M; CEE 102, 156, 180, 181, 182, 183. Remaining specialty units from: ENGR 15, CME 104; CEE 101D, 111, 122A,B, 129, 141A/B, 142A, 151, 155, 159C, 159D, 160, 161A, 171, 176A, 176B, 195A/B, 196, 199, 203, and one of 110, 130, 131A, 134B, or 135A.

## COMPUTER SCIENCE (CS)

Completion of the undergraduate program in Computer Science leads to the conferral of the Bachelor of Science in Computer Science.

### MISSION OF THE UNDERGRADUATE PROGRAM IN COMPUTER SCIENCE

The mission of the undergraduate program in Computer Science is to develop students' breadth of knowledge across the subject areas of computer sciences, including their ability to apply the defining processes of computer science theory, abstraction, design, and implementation to solve problems in the discipline. Students take a set of core courses. After learning the essential programming techniques and the mathematical foundations of computer science, students take courses in areas such as programming techniques, automata and complexity theory, systems programming, computer architecture, analysis of algorithms, artificial intelligence, and applications. The program prepares students for careers in government, law, and the corporate sector, and for graduate study.

### REQUIREMENTS

Mathematics (26 units minimum):	
CS 103. Mathematical Foundations of Computing <sup>1</sup>	5
CS 109. Introduction to Probability for Computer Scientists <sup>2</sup>	5
MATH 41, 42. Calculus <sup>3</sup>	10
Plus two electives <sup>4</sup>	
Science (11 unit minimum):	
PHYSICS 41. Mechanics	4
PHYSICS 43. Electricity and Magnetism	4
Science Elective <sup>5</sup>	3
Technology in Society (one course; see Basic Requirement 4)	3-5
Engineering Fundamentals (13 units; see Basic Requirement 3)	
CS 106B or X. Programming Abstractions (or Accelerated)	5
ENGR 40. Electronics	5
Fundamentals Elective (may not be 70A, B, or X)	3-5
Writing in the Major (one course):	
CS 181W, 191W, 194W, 210B, 294W	
Computer Science Core (15 units):	
CS 107. Computer Organization and Systems <sup>6</sup>	5
CS 110. Principles of Computer Systems <sup>7</sup>	5
CS 161. Data Structures and Algorithms <sup>8</sup>	5
Computer Science Depth <sup>9</sup> (choose one of the following tracks; 25 units minimum):	
<i>Artificial Intelligence Track—</i>	
CS 221. Artificial Intelligence: Principles and Techniques	4
Choose two of: CS 223A, 224M, 224N, 226, 227, 228, 229, 231A	6-8

One additional course from the list above or the following: CS 124, 205A, 222, 224S, 224U, 224W, 225A 225B, 227B, 231B, 262, 276, 277, 279, 321, 326A, 327A, 329 (with adviser consent), 331, 374, 379 (with adviser consent); EE 263, 376A; ENGR 205, 209A; MS&E 251, 339, 351; STATS 315A, 315B	3-4
Track Electives: at least three additional courses from the lists above, the general CS electives list <sup>10</sup> , or the following: CS 275, 278; EE 364A, 364B; ECON 286; MS&E 252, 352, 355; PHIL 152; PSYCH 202, 204A, 204B; STATS 200, 202, 205	9-13
<i>Biocomputation Track—the Mathematics, Science, and Engineering Fundamentals requirements are non-standard for this track. See Handbook for Undergraduate Engineering Programs for details.)</i>	
One of: CS 121, 221, 228, 229, 231A	3-4
One of: CS 262, 270, 273A, 274, 275, 278, 279	3-4
One additional course from the lists above or the following: CS 124, 145, 147, 148, 248	3-4
One course from either the general CS electives list <sup>10</sup> , BIOE 101, or the list of Biomedical Computation (BMC) Informatics electives (see <a href="http://bmc.stanford.edu">http://bmc.stanford.edu</a> and select Informatics from the elective options)	3-4
One course from the BMC Informatics elective list	3-4
One course from either the BMC Informatics, Cellular/Molecular, or Organs/Organisms electives lists	3-5
One course from either the BMC Cellular/Molecular or Organs/Organisms electives lists	3-5
<i>Computer Engineering Track—</i>	
EE 108A and 108B	6-8
Two of: EE 101A, 101B, 102A, 102B	8
Satisfy the requirements of one of the following concentrations:	
1) Digital Systems concentration CS 140 or 143; EE 109, 271	11-12
Two of: CS 140 or 143 (if not counted above), 144, 149, 240E, 244; EE 273, 282	6-8
2) Robotics and Mechatronics concentration CS 205A, 223A; ME 210; ENGR 105	13
One of: AA 278; CS 225A, 225B, 231A, 277; ENGR 205, 206, 207A, 207B	3-4
3) Networking concentration CS 140 and 144	8
Three of: CS 240, 240E, 244, 244B, 244E, 249A, 249B; EE 179, 276	9-11
<i>Graphics Track—</i>	
CS 148, 248	8
One of <sup>11</sup> : CS 205A; CME 104, 108; MATH 52, 113	3-5
Two of: CS 164, 178, 205B, 231A, 268, 348A, 348B, 448	6-8
Track Electives: at least two additional courses from the lists above, the general CS electives list <sup>10</sup> , or the following: ARTSTUDI 60, 70, 179; CS 48N; CME 302, 306, 324; EE 262, 264, 278, 368; ME 101; PSYCH 30, 221; STS 144	6-8
<i>Human-Computer Interaction Track—</i>	
CS 147, 247	8
One of: PSYCH 55, 70, 252; ME 101, 116; or any MS&E 18X	3-4
One of: CS 108, 124, 140, 142, 221, 229, 249A, 448B	3-4
One of: CS 148, 376, 377, 378, 447	3-4
Track Electives: at least two additional courses from the lists above, the general CS electives list <sup>10</sup> , or the following: ARTSTUDI 60; COMM 169; CS 476A	6-9
<i>Information Track—</i>	
CS 124, 145	8
Two courses, from different areas:	6-9
<i>Information-based AI applications:</i> CS 224N, 224S, 229	
<i>Database and Information Systems:</i> CS 140, 142, 245, 246, 341, 345, 346, 347	
<i>Information Systems in Biology:</i> CS 262, 270, 274	
<i>Information Systems on the Web:</i> CS 224W, 276, 364B	
At least three additional courses from the above areas or the general CS electives list <sup>10</sup>	9-14
<i>Systems Track—</i>	
CS 140	4

- One of: CS 143 or EE 108B 3-4
- Two additional courses from the list above or the following: CS 144, 145, 149, 155, 240, 242, 243, 244, 245; EE 271, 282 6-8
- Track Electives: at least three additional courses selected from the list above, the general CS electives list<sup>10</sup>, or the following: CS 240E, 244C, 244E, 315A, 315B, 341, 343, 344, 344E, 345, 346, 347, 349 (with adviser consent), 448; EE 382A, 382C, 384A, 384B, 384C, 384M, 384S, 384X, 384Y 9-12
- Theory Track—*
- CS 154 4
- One of: CS 164, 255, 258, 261, 268, 361A, 361B, 365 3
- Two additional courses from the list above or the following: CS 143, 155, 157 or PHIL 151, 205A, 228, 242, 254, 259, 262, 354, 355, 357, 358, 359 (with consent of undergraduate adviser), 364A, 364B, 369 (with adviser consent), 374; MS&E 310 6-8
- Track Electives: at least three additional courses from the list above, the general CS electives list<sup>10</sup>, or the following: CME 302, 305; PHIL 152 9-12
- Unspecialized Track—*
- CS 154 4
- One of: CS 140, 143 4
- One additional course from the list above or the following: CS 144, 155, 242, 244; EE 108B 3-4
- One of: CS 121 or 221, 223A, 228, 229, 231A 3-4
- One of: CS 145, 147, 148, 248, 262 3-4
- At least two courses from the general CS electives list<sup>10</sup> 6-8
- Individually Designed Track—*
- Students may propose an individually designed track. Proposals should include a minimum of seven courses, at least four of which must be CS courses numbered 100 or above. See *Handbook for Undergraduate Engineering Programs* for further information.
- Capstone Project (3 units minimum) 3
- CS 191, 191W, 194, 194W, 210B, 294, 294W<sup>12</sup>
- These requirements are subject to change. The final requirements are published with sample programs in the *Handbook for Undergraduate Engineering Programs*.
- Students who have taken either CS 103X or CS 103A,B are considered to have satisfied the CS103 requirement. Students who took CS103X are required to complete one additional unit in their track or elective courses (i.e., 26 total units for track and elective courses).
  - Students who completed STATS 116, MS&E 120, or CME 106 in Winter Quarter 2008-09 or earlier may count that course as satisfying the CS 109 requirement. These same courses taken in Spring Quarter 2008-09 or later cannot be used to satisfy the CS 109 requirement.
  - MATH 19, 20, and 21 may be taken instead of MATH 41 and 42 as long as at least 26 MATH units are taken.
  - The math electives list consists of: MATH 51, 103, 104, 108, 109, 110, 113; CS 157, 205A; PHIL 151; CME 100, 102, 104. Completion of MATH 52 and 53 counts as one math elective. Restrictions: MATH 51 and 103, or MATH 103 and 113, or CS 157 and PHIL 151, may not be used in combination to satisfy the math electives requirement. Students who have taken both MATH 51 and 52 may not count CME 100 as an elective. Courses counted as math electives cannot also count as CS electives, and vice versa.
  - The science elective may be any course of 3 or more units from the School of Engineering lists plus PSYCH 30 or 55; AP Chemistry and Physics also may be used to meet this requirement. Either of the PHYSICS sequences 61/63 or 21/23 may be substituted for 41/43 as long as at least 11 science units are taken.
  - The name of CS 107 has changed. The previous CS 107 course entitled Programming Paradigms also fulfills this requirement.
  - Students who completed CS 108 and either CS 140 or CS 143 by Winter Quarter 2008-09 or earlier, may choose to count CS 108 as satisfying the CS 110 requirement. In such a case, CS 108 may not also be counted as an elective and the student is required to complete one additional unit in their track or elective courses (i.e., 26 total units for track and elective courses).
  - Students who took CS 161 for 4 units are required to complete one additional unit in their track or elective courses (i.e., 26 total units for track and elective courses).
  - Students must satisfy the requirements for any one track. Track requirements plus electives should include a minimum of seven courses and total at least 25 units.
  - General CS Electives: CS 108, 121 or 221, 124, 140, 142, 143, 144, 145, 147, 148, 149, 154, 155, 156, 157 or PHIL 151, 164, 205A, 205B, 210A, 222, 223A, 224M, 224N, 224S, 224U, 224W, 225A, 225B, 226, 227, 227B, 228, 228T, 229, 231A, 240, 240H, 241, 242, 243, 244, 244B, 245, 246, 247, 248, 249A, 249B, 254, 255, 258, 261, 262, 263, 270, 271, 272, 273A, 274, 276, 277, 295; CME 108; EE 108B, 282.
  - CS 205A is recommended in this list for the Graphics track. Students taking CME 104 are also required to take its prerequisite, CME 102.

- 12 Independent study projects (CS 191 or 191W) require faculty sponsorship and must be approved by the adviser, faculty sponsor, and the CS senior project adviser (P. Young). A signed approval form, along with a brief description of the proposed project, should be filed the quarter before work on the project is begun. Further details can be found in the *Handbook for Undergraduate Engineering Programs*.

## ELECTRICAL ENGINEERING (EE)

Completion of the undergraduate program in Electrical Engineering leads to the conferral of the Bachelor of Science in Electrical Engineering.

## MISSION OF THE UNDERGRADUATE PROGRAM IN ELECTRICAL ENGINEERING

The mission of the undergraduate program of the Department of Electrical Engineering is to augment the liberal education expected of all Stanford undergraduates, to impart a basic understanding of electrical engineering built on a foundation of physical science, mathematics, computing, and technology, and to provide majors in the department with knowledge of electrical engineering principles along with the required supporting knowledge of mathematics, science, computing, and engineering fundamentals. The program develops students' skills in performing and designing experimental projects and communicating their findings to the scientific community effectively. Students in the major are required to select one subdiscipline for specialization. Choices include bioelectronics and bioimaging, circuits and devices, computer hardware, computer software, controls, fields and waves, communication and signal processing, or solid state and photonic devices. The program prepares students for careers in government agencies, the corporate sector, or for future study in graduate or professional schools.

## REQUIREMENTS

- Mathematics:
- MATH 41, 42 10
- MATH 51 and 52, or CME 100/ ENGR 154 and CME 104/ENGR 155B 10
- MATH 53 or CME 102/ENGR 155A 5
- EE 178, STATS 116, MATH 151, or CME 106/ENGR 155C 3-5
- Science:
- PHYSICS (41, 43) or (61, 63) 8
- Math or Science electives<sup>1</sup>: 7-9
- Technology in Society (one course; see Basic Requirement 4) 3-5
- Technical Writing: ENGR 102E (WIM corequisite for EE 100X or EE 108A) 1
- EE 100. The Electrical Engineering Profession OR 1
- EE 100X. (if used for WIM) 2
- Engineering Fundamentals (three courses minimum; see Basic Requirement 3):
- CS 106B or CS 106X 5
- At least two additional courses, at least one of which is not in EE or CS (CS 106A is not allowed) 6-10
- Engineering Depth (minimum 68 Engineering Topics units; see Basic Requirement 5):
- Circuits: EE 101A,B 8
- Signals Processing and Linear Systems: EE 102A,B 8
- Digital Systems: EE 108A (Laboratory, WIM), 108B 8
- Physics in Electrical Engineering: EE 41 or EE 141 3-5
- Specialty courses<sup>2</sup> 9-12
- One course in Design<sup>3</sup>
- Electrical Engineering electives<sup>4</sup> 9-20
- These requirements are subject to change. The final requirements are published with sample programs in the *Handbook for Undergraduate Engineering Programs*.
- A minimum of 12 science units must be taken. A minimum of 45 math and science units combined must be taken.
  - Three courses from one of the specialty areas shown below (consultation with an adviser in the selection of these courses is especially important):  
Bioelectronics and Bioimaging: EE 122B, 124, 134, 168, 169, 202, 225  
Circuits and Devices: EE 114, 116, 122A, 133, 212, 214B, 216, 271  
Communications and Signal Processing: EE 124, 133, 168, 179, 261, 263 (264 or 265), 276, 278B, 279  
Computer Hardware: EE 109, 271, 273, 282; CS 107

Computer Software: CS 107, 108, 110, 140, 143, 145, 148, 194 (CS 144 *or* EE 284)  
 Controls: ENGR 105, 205, 206, 207A, 207B, 209A, 209B; EE 263  
 Fields and Waves: EE 134, 141, 242, 247, 252, 256  
 Solid State and Photonic Devices: EE 116, 134, 136, 141, 216, 222, 223, 228, 235, 268

3 The design course may be part of the specialty sequence. The following courses satisfy this requirement: EE 109, 133, 134, 168, 256, 262, 265; CS 194, ENGR 206.

4 May include up to two additional Engineering Fundamentals. May include up to 10 units of EE 191. May include any CS 193 course.

## ENGINEERING PHYSICS (EPHYS)

Completion of the undergraduate program in Engineering Physics leads to the conferral of the Bachelor of Science in Engineering. The subplan "Engineering Physics" appears on the transcript and on the diploma.

## MISSION OF THE UNDERGRADUATE PROGRAM IN ENGINEERING PHYSICS

The mission of the undergraduate program in Engineering Physics is to provide students with a strong foundation in physics and mathematics, together with engineering design and problem solving skills. All majors take high-level math and physics courses as well as engineering courses. This background prepares them to tackle complex problems in multidisciplinary areas that are at the forefront of 21st-century technology such as solid state devices, quantum optics and photonics, materials science, nanotechnology, electromechanical systems, energy systems, and any other engineering field that requires a solid background in physics. Because the program emphasizes science, mathematics, and engineering, students are well prepared to pursue graduate work in engineering, physics, or applied physics.

## REQUIREMENTS

Mathematics (18 units):  
 MATH 51 and 52. Multivariable Calculus 10  
*or* CME 100 and 104. Vector Calculus, Linear Algebra, PDE  
 MATH 53 *or* CME 102. Ordinary Differential Equations 5  
 MATH 131P. Partial Differential Equations I 3

Science (15 units minimum):  
 PHYSICS 41 and 42. Mechanics and Lab<sup>1</sup> 5  
 PHYSICS 43 and 67<sup>2</sup>. Electricity and Magnetism and Lab 5  
 PHYSICS 45 and 46. Light and Heat and Lab 5  
 PHYSICS 70. Foundations of Modern Physics 4  
*or*  
 PHYSICS 61 and 62. Mechanics and Special Relativity and Lab<sup>3</sup> 5  
 PHYSICS 63 and 64. Electricity, Magnetism, and Waves and Lab 5  
 PHYSICS 65 and 67. Thermodynamics and Modern Physics and Lab 6

Technology in Society (one course required; see Basic Requirement 4) 3-5

Engineering Fundamentals (three courses minimum; CS 106A *or* X recommended) 9-14

Engineering Physics Depth (core):  
 Advanced Mathematics  
 One advanced math elective such as EE 261, PHYSICS 112, CS 109, *or* CME 106. Also qualified are EE 263, any Math *or* Statistics course numbered 100 *or* above, and any CME course numbered 200 *or* above, except CME 206. 3-4

Intermediate Mechanics:  
 ENGR 15. Dynamics 3  
*or* PHYSICS 110. Intermediate Mechanics 4

Intermediate Electricity and Magnetism:  
 EE 141 and 242. Engineering Electromagnetics and Electromagnetic Waves 7  
*or* PHYSICS 120 and 121. Intermediate Electricity and Magnetism 8

Numerical Methods:  
 APPPHYS 215. Numerical Methods for Physicists and Engineers 3

*or* CME 108. Introduction to Scientific Computing 3-4  
*or* CME 206/ME 300C. Intro to Numerical Methods for Engineering 3  
*or* PHYSICS 113. Computational Physics 4

Electronics Lab:  
 ENGR 40. Introductory Electronics 5  
*or* EE 101B. Circuits II 3  
*or* EE 122A. Analog Circuits Laboratory 3  
*or* PHYSICS 105. Analog Electronics 3  
*or* APPPHYS 207. Laboratory Electronics 3

Writing Lab (WIM):  
 EE 108A and ENGR 102E. Digital Systems I 4-5  
*or* ME 203 and ENGR 102M. Manufacturing and Design 5  
*or* MATSCI 161. Nanocharacterization Laboratory 4  
*or* MATSCI 164. Electronic and Photonic Materials and Devices Laboratory 4  
*or* PHYSICS 107. Experimental Techniques and Data Analysis 4

Quantum Mechanics:  
 EE 222 and 223. Applied Quantum Mechanics I and II 6  
*or* PHYSICS 130 and 131. Quantum Mechanics 8

Thermodynamics and Statistical Mechanics:  
 PHYSICS 170 and 171. Thermodynamics, Kinetic Theory, and Statistical Mechanics 8  
*or* ME 346A. Introduction to Statistical Mechanics 3

Design Course (choose one of the following):  
 CS 108. Object-Oriented Systems Design 3-4  
 EE 133. Analog Communications Design Laboratory 3-4  
 ME 203. Design and Manufacturing 4  
 ME 210 *or* EE 118. Introduction to Mechatronics 4  
 PHYSICS 108. Advanced Project Laboratory 4

Three courses from one specialty area:  
 Solid State Physics:  
 PHYSICS 172/APPPHYS 272. Solid State Physics 3  
 APPPHYS 273. Solid State Physics II 3  
 EE 116. Semiconductor Device Physics 3  
 EE 216. Principles and Models of Semiconductor Devices 3  
 MATSCI 199. Electronic and Optical Properties of Solids 4  
 PHYSICS 172. Solid State Physics 3

Photonics:  
 EE 216. Principles and Models of Semiconductor Devices 3  
 EE 231. Introduction to Lasers 3  
 EE 232. Laser Dynamics 3  
 EE 234. Photonics Laboratory 3  
 EE 243. Semiconductor Optoelectronic Devices 3  
 EE 268. Introduction to Modern Optics 3  
 MATSCI 199. Electronic and Optical Properties of Solids 4

Materials Science: Any MATSCI courses numbered 151 to 199 (except 159Q) *or* PHYSICS 172/APPPHYS 272. 4

Electromechanical System Design:  
 ME 80. Mechanics of Materials 4  
 ME 112. Mechanical Systems Design 4  
 ME 210 *or* EE 118. Introduction to Mechatronics 4

Energy Systems:  
 ME 131A. Heat Transfer 3-4  
 ME 131B. Fluid Mechanics: Compressible Flow and Turbomachinery 4  
 ME 140. Advanced Thermal Systems 5

Renewable Energy:  
 EE 293A. Fundamentals of Energy Processes 3-4  
 EE 293B. Fundamentals of Energy Processes 3  
 MATSCI 156. Solar Cells, Fuel Cells and Batteries 4  
 MATSCI 302. Solar Cells 3  
 MATSCI 316. Nanoscale Science, Engineering, and Technology 3  
 ME 260. Fuel Cell Science Technology 3

These requirements are subject to change. The final requirements are published with sample programs in the Handbook for Undergraduate Engineering Programs.

- 1 PHYSICS 42, Mechanics Lab (1 unit), recommended in 2010-11; required in 2011-12
- 2 PHYSICS 67, Electricity and Magnetism Lab (1 unit), recommended in place of PHYSICS 44
- 3 PHYSICS 62, Mechanics Lab (1 unit), recommended in 2010-11; required in 2011-12

## ENVIRONMENTAL ENGINEERING (ENV)

Completion of the undergraduate program in Environmental Engineering leads to the conferral of the Bachelor of Science in Environmental Engineering.

### MISSION OF THE UNDERGRADUATE PROGRAM IN ENVIRONMENTAL ENGINEERING

The mission of the undergraduate program in Environmental Engineering is to equip students with the problem solving skills and knowledge necessary to assess and develop solutions to environmental problems impacting the biosphere, land, water, and air quality. Courses in the program are multidisciplinary in nature, combining fundamental principles drawn from physics, chemistry, geology, engineering, and biology. Students learn about the analytical methods necessary to evaluate environmental changes and to design strategies to prevent or remediate problems that inevitably result from human activities. The program prepares students for careers in consulting, industry, and government, and for graduate school in engineering.

### REQUIREMENTS

Mathematics and Science (see Basic Requirement 1 and 2)	45 units <sup>1</sup>
Technology in Society <sup>2</sup> (one course; see Basic Requirement 4)	3-5
Engineering Fundamentals (three courses minimum; see Basic Requirement 3):	
ENGR 30. Engineering Thermodynamics	3
ENGR 90. Environmental Science and Technology Fundamentals Elective	3
Engineering Depth (minimum of 68 Engineering Science and Design units; see Basic Requirement 5):	3-5
ENGR 60. Engineering Economy	3
CEE 64. Air Pollution: From Urban Smog to Global Change	3
CEE 100. Managing Sustainable Building Projects (WIM)	4
CEE 101B. Mechanics of Fluids	4
CEE 101D. Computations in CEE	3
CEE 160. Mechanics of Fluids Laboratory	2
CEE 161A. Rivers, Streams, and Canals	3
CEE 166A. Watersheds and Wetlands	3
CEE 166B. Floods and Droughts, Dams, and Aqueducts	3
CEE 171. Environmental Planning Methods	3
CEE 172. Air Quality Management	3
CEE 177. Aquatic Chemistry and Biology	4
CEE 179A. Water Chemistry Laboratory	2
Capstone design experience: CEE 169 or 179B or 179C	5
CEE Breadth Electives <sup>3</sup>	10
Other School of Engineering Electives	0-4

These requirements are subject to change. The final requirements are published with sample programs in the *Handbook for Undergraduate Engineering Programs*.

- Math must include CME 100/102 (or Math 51/53) and a Statistics course. Science must include PHYSICS 41; either ENGR 31, CHEM 31A or CHEM 31X; CHEM 33; GES 1; and one other physics or chemistry class for at least 3 units.
- Chosen TiS class must specifically include an ethics component, such as STS 101, 110 or 115; COMM 169; CS 181; or MS&E 181.
- Breadth electives currently include CEE 63, 101C, 109, 129, 164, 166D, 172A, 173A, 176A, 176B, 178, and 199.

### INDIVIDUALLY DESIGNED MAJORS IN ENGINEERING (IDMENS)

Completion of the undergraduate program in Individually Designed Majors in Engineering (IDMEN) leads to the conferral of the Bachelor of Science in an Individually Designed Major: (approved title). The approved title of the IDMEN also appears on the transcript.

## MISSION OF THE UNDERGRADUATE PROGRAM IN INDIVIDUALLY DESIGNED MAJORS IN ENGINEERING

The mission of the undergraduate program in Individually Designed Majors in Engineering (IDMEN) is to provide students with an understanding of engineering principles and the analytical and problem solving, design, and communication skills necessary to be successful in the field. The B.S. for IDMENs is intended for undergraduates interested in pursuing engineering programs that, by virtue of their focus and intellectual content, cannot be accommodated by existing departmental majors or the pre-approved School of Engineering majors. Core courses in the curriculum include engineering fundamentals, mathematics, technology in society, and the sciences. Students then take additional courses pertinent to their IDMEN major. The program prepares students for careers in government and the corporate sector, and for graduate study.

### B.S. IN INDIVIDUALLY DESIGNED MAJORS IN ENGINEERING

The B.S. degree for IDMENs is intended for undergraduates interested in pursuing engineering programs that, by virtue of their focus and intellectual content, cannot be accommodated by existing departmental majors or the pre-approved School of Engineering majors. IDMEN curricula are designed by students with the assistance of two faculty advisers of their choice and are submitted to the Undergraduate Council's Subcommittee on Individually Designed Majors. The degree conferred is "Bachelor of Science in Individually Designed Major in Engineering: (approved title)."

Students must submit written proposals to the IDMEN subcommittee detailing their course of study. Programs must meet the following requirements: mathematics (21 unit minimum, see Basic Requirement 1 below), science (17 units minimum, see Basic Requirement 2 below), Technology in Society (one approved course, see Basic Requirement 4 below), engineering (40 units minimum), and sufficient relevant additional course work to bring the total number of units to at least 90 and at most 107. Students may take additional courses pertinent to their IDMEN major, but the IDMEN proposal itself may not exceed 107 units. The student's curriculum must include at least three Engineering Fundamentals courses (choosing from ENGR 10, 14, 15, 20, 25B, 25E, 30, 40, 40N, 40P, 50/50E/50M, 60, 62, 70A, 70B, 70X, 80, 90). Students are responsible for completing the prerequisites for all courses included in their majors.

Each proposal should begin with a statement describing the proposed major. In the statement, the student should make clear the motivation for and goal of the major, and indicate how it relates to her or his projected career plans. The statement should specify how the courses to be taken relate to and move the student toward realizing the major's goal. A proposed title for the major should be included. The title approved by the IDMEN Subcommittee is listed on the student's official University transcript and on the diploma in this form: "Individually Designed Major in Subplan", where "Subplan" is the title approved by the IDMEN Subcommittee.

The proposal statement should be followed by a completed Program Sheet listing all the courses comprising the student's IDMEN curriculum, organized by the five categories printed on the sheet (mathematics, science, technology in society, engineering fundamentals, and engineering depth). Normally, the courses selected should comprise a well-coordinated sequence or sequences that provide mastery of important principles and techniques in a well-defined field. In some circumstances, especially if the proposal indicates that the goal of the major is to prepare the student for graduate work outside of engineering, a more general engineering program may be appropriate. A four-year study plan, showing courses to be taken each quarter, should also be included in the student's IDMEN proposal.

The proposal must be signed by two faculty members who certify that they endorse the major as described in the proposal and that they agree to serve as the student's permanent advisers. One of the faculty members, who must be from the School of Engineering, acts as the student's primary adviser. The proposal must be accompanied by a statement from that person giving an appraisal of the academic value and viability of the proposed major.

Students proposing IDMENs must have at least four quarters of undergraduate work remaining at Stanford after the quarter in which their proposals are first submitted. Any changes in a previously approved major must be endorsed by the advisers and re-approved by the IDMEN subcommittee. A request by a student to make changes in her or his approved curriculum must be made sufficiently far in advance so that, should the request be denied, adequate time remains to complete the original, approved curriculum. Proposals are reviewed and acted upon once a quarter. Forms may be obtained from the *Handbook for Undergraduate Engineering Programs* at <http://ughb.stanford.edu>. Completed proposals should be submitted to Darlene Lazar in the Office of Student Affairs, Huang Engineering Center, Suite 135. An IDMEN cannot be a student's secondary major.

## MANAGEMENT SCIENCE AND ENGINEERING (MS&E)

Completion of the undergraduate program in Management Science and Engineering leads to the conferral of the Bachelor of Science in Management Science and Engineering.

### MISSION OF THE UNDERGRADUATE PROGRAM IN MANAGEMENT SCIENCE AND ENGINEERING

The mission of the undergraduate program in Management Science and Engineering is to provide students with the fundamentals of engineering systems analysis so that they are able to plan, design, and implement complex economic and technical management systems. The program builds on the foundational courses for engineering including calculus, engineering fundamentals, and physics or chemistry as well as management science. Students may select courses in computer science, information, organizational theory, mathematical modeling, optimization, probability, statistics and finance or production. To allow for greater in-depth exploration in a particular area, students then choose a concentration area. The major prepares students for a variety of career paths, including facilities and process management, investment banking, management consulting or for graduate school in industrial engineering, operations research, economics, public policy, medicine, law, or business.

### REQUIREMENTS

Mathematics (7 courses and 32 units minimum <sup>1</sup> ; see Basic Requirement 1):	
MATH 41. Calculus	5
MATH 42. Calculus	5
MATH 51. Linear Algebra and Differential Calculus of Several Variables	5
MATH 53. Ordinary Differential Equations with Linear Algebra	5
MS&E 120. Probabilistic Analysis	5
MS&E 121. Introduction to Stochastic Modeling	4
STATS 110 or 200. Statistical Methods/Inference	3-5
Science (3 courses and 11 units minimum <sup>1</sup> ; see Basic Requirement 2):	
One of the following three sequences:	
CHEM 31B or X, and 33	8
PHYSICS 21, 22, 23, and 24	8
PHYSICS 41 and 43	8
Science Elective	3
Technology in Society (one course <sup>2</sup> ; see Basic Requirement 4)	3-5
Engineering Fundamentals (three courses minimum; see Basic Requirement 3):	
CS 106A. Programming Methodology <sup>3</sup>	5
ENGR 25. Biotechnology	3-5

or ENGR 40. Introduction to Electronics	
or ENGR 80. Introduction to Bioengineering Fundamentals Elective <sup>4</sup>	3-5
Engineering Depth (core; all required):	23-26
CS 106B or CS 106X. Programming Abstractions	5
or CS 103. Math Foundations of Computing	5
or CME 108. Intro to Scientific Computing	4
MS&E 108. Senior Project	5
MS&E 111. Introduction to Optimization <sup>4</sup>	4
MS&E 130 or 134. Information <sup>5</sup>	3-4
MS&E 142 or 260. Financial Analysis or Production <sup>6</sup>	3-4
MS&E 180. Organizations: Theory and Management	4
Engineering Depth (concentration: choose one of the following 5 concentrations; 7 courses minimum): <sup>7</sup>	24-30
Financial and Decision Engineering Concentration:	27-31
ECON 50. Economic Analysis I	5
ECON 51. Economic Analysis II	5
MS&E 140. Industrial Accounting	4
MS&E 152. Introduction to Decision Analysis (WIM)	4
MS&E 245G or 247S. Finance	3-5
Two of the following courses:	
ENGR 145. Technology Entrepreneurship <sup>8</sup>	4
MS&E 107. Interactive Management Science	3
MS&E 146. Corporate Financial Management	3
MS&E 223. Simulation	3
MS&E 247G. International Finance	4
MS&E 250A. Engineering Risk Analysis	3
MS&E 260. Production/Operating Systems <sup>6</sup>	4
Operations Research Concentration:	24-27
MATH 113. Linear Algebra and Matrix Theory <sup>8</sup>	3
MATH 115. Functions of a Real Variable <sup>8</sup>	3
MS&E 112. Network and Integer Optimization	3
MS&E 142 or 260. Financial Analysis or Production <sup>6</sup>	3-4
MS&E 152. Introduction to Decision Analysis (WIM)	3-4
MS&E 241. Economic Analysis	3-4
MS&E 251. Stochastic Decision Models	3
STATS 202. Data Analysis <sup>8</sup>	3
Organization, Technology, and Entrepreneurship Concentration	22-30
At least one of the following courses:	
ECON 50. Economic Analysis I	5
PSYCH 70. Introduction to Social Psychology	4
SOC 114. Economic Sociology	5
At least two of the following courses:	
ENGR 145. Technology Entrepreneurship <sup>8</sup>	4
MS&E 175. Innovation, Creativity, and Change	3-4
MS&E 181. Issues in Technology and Work <sup>8</sup>	3
At least four of the following courses (may also include omitted courses from above: ENGR 145, MS&E 175, or MS&E 181):	
Organizations and Technology:	
CS 147. Intro Human Computer Interaction	4
ENGR 130. Science, Technology, and Contemporary Society <sup>8</sup>	4-5
MS&E 134. Organizations and Info Systems <sup>5</sup>	3-4
MS&E 185. Global Work	4
MS&E 189. Social Networks	3-4
Entrepreneurship and Innovation:	
MS&E 140. Industrial Accounting	3-4
MS&E 178. The Spirit of Entrepreneurship	3
MS&E 266. Management of New Product Development	4
Policy and Strategy Concentration:	25-30
ECON 50. Economic Analysis I	5
ECON 51. Economic Analysis II	5
MS&E 190. Policy and Strategy Analysis	3
At least four of the following courses, including at least one course in policy and at least one course in strategy:	
Policy:	
MS&E 193. Technology and National Security <sup>8</sup>	3
MS&E 197. Ethics and Public Policy (WIM) <sup>8</sup>	5
MS&E 243. Energy and Environmental Policy Analysis	3
MS&E 248. Economics of Natural Resources	3-4
MS&E 292. Health Policy Modeling	3
Strategy:	

ENGR 145. Technology Entrepreneurship <sup>8</sup>	4
MS&E 175. Innovation, Creativity, and Change	3-4
MS&E 266. Mgmt. of New Product Development	3-4
Production and Operations Management Concentration:	26-30
ECON 50. Economic Analysis I	5
ECON 51. Economic Analysis II	5
MS&E 140. Industrial Accounting	3-4
MS&E 152. Introduction to Decision Analysis (WIM)	4
and three of the following courses:	
MS&E 142 or 245G. Financial Analysis/Finance	3-4
MS&E 262. Supply Chain Management	3
MS&E 263. Internet-Enabled Supply Chains	3
MS&E 264. Sustainable Product Development and Manufacturing	3
MS&E 265. Supply Chain Logistics	4
MS&E 266. Management of New Product Development	3-4
MS&E 268. Operations Strategy	3

These requirements are subject to change. The final requirements are published with sample programs in the *Handbook for Undergraduate Engineering Programs*.

- 1 Math and Science must total a minimum of 45 units. Electives must come from the School of Engineering approved list, or PHYSICS 21, 22, 23, 24, 25, 26; PSYCH 55, 70. AP credit for Chemistry, Mathematics, and Physics may be used.
- 2 Technology in Society course must be one of the following MS&E approved courses: COMM 120, 169, CS 201, MS&E 181, 193 (WIM), STS 101/ENGR 130, STS 110/MS&E 197 (WIM), STS 115/ENGR 131, STS 160, 163, 170, 279.
- 3 Students may petition to place out of CS 106A.
- 4 Students may not count ENGR 62 for engineering fundamentals as that course counts toward engineering depth (core) and cannot be double counted.
- 5 Students may not count 134 for both core and the Organization, Technology, and Entrepreneurship concentration.
- 6 Students may not count 142 or 260 for both core and concentration. Students doing the Financial and Decision Engineering concentration must take 142, students doing the Operations Research concentration must take both 142 and 260, and students doing the Production and Operations Management concentration must take 260.
- 7 Engineering fundamentals, engineering depth (core), and engineering depth (concentration) must total a minimum of 60 units.
- 8 Courses used to satisfy the Math, Science, Technology in Society, or Engineering Fundamental requirement may not also be used to satisfy an engineering depth requirement.

## MATERIALS SCIENCE AND ENGINEERING (MATSCI)

Completion of the undergraduate program in Materials Science and Engineering leads to the conferral of the Bachelor of Science in Materials Science and Engineering.

### MISSION OF THE UNDERGRADUATE PROGRAM IN MATERIALS SCIENCE AND ENGINEERING

The mission of the undergraduate program in Materials Science and Engineering is to provide students with a strong foundation in materials science and engineering with emphasis on the fundamental scientific and engineering principles which underlie the knowledge and implementation of material structure, processing, properties, and performance of all classes of materials used in engineering systems. Courses in the program develop students' knowledge of modern materials science and engineering, teach them to apply this knowledge analytically to create effective and novel solutions to practical problems, and develop their communication skills and ability to work collaboratively. The program prepares students for careers in industry and for further study in graduate school.

### REQUIREMENTS

Mathematics (20 units minimum; see Basic Requirement 1):	
MATH 51 and 52, or CME 100/ENGR 154 and CME 104/ENGR 155B	10
MATH 53 or CME 102/ENGR 155A	5
Science (20 units minimum; see Basic Requirement 2):	
Must include a full year of physics or chemistry, with one quarter of study in the other subject.	
Technology in Society (one course; see Basic Requirement 4)	3-5
Engineering Fundamentals (three courses minimum; see Basic Requirement 3)	

ENGR 50. Intro to Materials Science, Nanotechnology <sup>1</sup>	4
or ENGR 50E. Intro to Materials Science, Energy <sup>1</sup>	4
or ENGR 50M. Intro to Materials Science, Biomaterials <sup>1</sup>	4
At least two additional courses	6-9
Materials Science and Engineering Depth:	
Materials Science Fundamentals <sup>2</sup>	24
MATSCI 153. Nanostructure and Characterization	4
MATSCI 154. Solid State Thermodynamics	4
MATSCI 155. Nanomaterials Synthesis	4
MATSCI 157. Quantum Mechanics of Nanoscale Materials	4
And two additional courses	8
Engineering Depth: Choose four of the following lab courses:	16
MATSCI 160. Nanomaterials Laboratory	4
MATSCI 161. Nanocharacterization Laboratory (WIM)	4
MATSCI 162. X-Ray Diffraction Laboratory	4
MATSCI 163. Mechanical Behavior Laboratory	4
MATSCI 164. Electronic & Photonic Materials & Devices Lab (WIM)	4
Focus Area Options <sup>3</sup>	10

These requirements are subject to change. The final requirements are published with sample programs in the *Handbook for Undergraduate Engineering Programs*.

- 1 If both ENGR 50, 50E, and/or ENGR 50M are taken, one may be used for the Materials Science Fundamentals requirement.
- 2 Materials Science Fundamentals; 24 units (6 courses): MATSCI 153, 154, 155 and 157 are required, and choose 2 courses from ENGR 50, 50E, or 50M MATSCI 151,152, 156, 190, 192, 193, 194, 195, 196, 197, 198, 199. The MATSCI 150 series is designed specifically for undergraduates, while the 190 series represents more advanced courses.
- 3 Focus Area Options; 10 units from one of the following areas:  
 Bioengineering: BIOE 220, 281, 284A, 284B, 333, 381; MATSCI 190, 380, 381, 382  
 Chemical Engineering: CHEM 171; CHEMENG 130, 140, 150, 160  
 Chemistry: CHEM 151, 153, 171, 173, 175, 181, 183, 185  
 Electronics and Photonics: EE 101A, 101B, 102A, 102B, 116, 134, 136, 141, MATSCI 343  
 Energy Technology: EE 293A, 293B; MATSCI 302, 303; ME 260  
 Materials Characterization Techniques: MATSCI 320, 321, 323, 325, 326.  
 Mechanical Behavior and Design: AA 240A, 240B, 256; MATSCI 198, 358; ME 80 or CEE 101A, ME 203, 294  
 Nanoscience: BIOE 333, EE 136, ENGR 240, MATSCI 316, 320, 346, 347, 380  
 Physics: PHYSICS 70, 110, 120, 121,130, 131, 134 170, 171, 172.  
 Self-Defined Option: petition for a self-defined cohesive program, minimum of 10 units.

## MECHANICAL ENGINEERING (ME)

Completion of the undergraduate program in Mechanical Engineering leads to the conferral of the Bachelor of Science in Mechanical Engineering

### MISSION OF THE UNDERGRADUATE PROGRAM IN MECHANICAL ENGINEERING

The mission of the undergraduate program in Mechanical Engineering is to provide students with a balance of intellectual and practical experiences that enable them to address a variety of societal needs. The curriculum encompasses elements from a wide array of disciplines built around the themes of biomedicine, computational engineering, design, energy, and multiscale engineering. Course work may include mechatronics, computational simulation, solid and fluid dynamics, microelectromechanical systems, biomechanical engineering, energy science and technology, propulsion, sensing and control, and nano- and micro- mechanics, and design. The program prepares students for entry-level work as mechanical engineers and for graduate studies in either an engineering discipline or another field where a broad engineering background is useful.

### REQUIREMENTS

Mathematics (24 units minimum <sup>1</sup> ; see Basic Requirement 1) must include: CME 102/ENGR 155A. Ordinary Differential Equations for Engineers	
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or MATH 53. Ordinary Differential Equations with Linear Algebra	5
and	
CME 106/ENGR 155C. Introduction to Probability and Statistics for Engineers	
or STATS 110. Statistical Methods in Engineering	
or STATS 116. Theory of Probability	3-5
Science (20 units minimum <sup>1</sup> ; see Basic Requirement 2):	
CHEM 31X or ENGR 31 (recommended)	
Technology in Society (one course from approved ME list; <sup>2</sup> see Basic Requirement 4)	3-5
Engineering Fundamentals: (three courses minimum; see Basic Requirement 3)	
ENGR 40. Introductory Electronics (required)	5
ENGR 70A (same as CS 106A). Programming Methodology (required)	3-5
Fundamentals Elective <sup>3</sup>	3-5
Engineering Depth (minimum of 68 Engineering Science and Design ABET units; see Basic Requirement 5):	
ENGR 14. Introduction to Solid Mechanics	4
ENGR 15. Dynamics	3
ENGR 30. Engineering Thermodynamics	3
ENGR 102M. Technical Writing*	1
ME 70. Introductory Fluids Engineering	4
ME 80. Mechanics of Materials	4
ME 101. Visual Thinking	4
ME 103D. Engineering Drawing*	1
ME 112. Mechanical Engineering Design	4
ME 113. Mechanical Engineering Design	4
ME 131A. Heat Transfer	4
ME 131B. Fluid Mechanics	4
ME 140. Advanced Thermal Systems	5
ME 161. Dynamic Systems	4
ME 203. Manufacturing and Design*	4

\*All three courses (ENGR 102M, ME 103D, ME 203) must be taken concurrently in order to fulfill the Writing in the Major (WIM) requirement.

Options to complete the ME depth sequence: see the list of options in the ME major section of the *Handbook for Undergraduate Engineering Programs*.

These requirements are subject to change. The final requirements are published with sample programs in the *Handbook for Undergraduate Engineering Programs*.

- 1 Math and science must total 45 units. Math: 24 units required and must include a course in differential equations (CME 102/ENGR 155A or MATH 53; one of these required) and Statistics (CME 106/ENGR 155C or STATS 110 or 116 is required—STATS 60/160 do not fulfill statistics requirement). Science: 20 units minimum and requires courses in Physics and Chemistry, with at least a full year (3 courses) in one or the other. CHEM 31A/B are considered one course because they cover the same material as CHEM 31X but at a slower pace. CHEM 31X or ENGR 31 are recommended.
- 2 ME majors must choose their TIS course from the following list: ME 190 (recommended; offered every other year), STS 101, 110, or 115; POLISCI 114S, or CS 281.
- 3 ME Fundamental elective may not be a course counted for other requirements. Students may opt to use ENGR 14, 15, or 30 from the required depth courses as the third fundamental class. However, total units for Engineering Topics (Fundamentals + Depth) must be a minimum of 68 units; additional options courses may be required to meet unit requirements.

## PRODUCT DESIGN (PD)

Completion of the undergraduate program in Product Design leads to the conferral of the Bachelor of Science in Engineering. The subplan "Product Design" appears on the transcript and on the diploma.

## MISSION OF THE UNDERGRADUATE PROGRAM IN PRODUCT DESIGN

The mission of the undergraduate program in Product Design is to graduate designers who can synthesize technology and aesthetics in the service of human need. The program teaches a design process that encourages creativity, craftsmanship, and personal expression, and emphasizes brainstorming and need finding. Students studying product design follow the basic mechanical engineering curriculum and are expected to meet the University requirements for a Bachelor of Science degree. The program emphasis is placed on conceptual thinking, creativity, risk taking, and aesthetics. Students are taught to use design processes

to resolve constraints arising from technical, human, aesthetic, and business concerns. The course work provides students with the skills necessary to carry projects from initial concept to completion of working prototypes. The program prepares students for careers in industry and for graduate study.

## REQUIREMENTS

Mathematics (20 units minimum)	
Recommended: one course in Statistics	
Science (22 units minimum): 15 units must be from School of Engineering approved list <sup>1</sup>	
One year of PHYSICS 40 series (required)	
Behavioral Science <sup>1</sup> (8 units minimum):	
PSYCH 1. Introduction to Psychology (required)	5
PSYCH elective from courses numbered 20-95	3-5
Mathematics and Science (maximum combined total of 45 units)	
Technology in Society (one course):	
ME 120. History of Philosophy of Design (required)	3-4
Engineering Fundamentals (three courses minimum):	13-15
ENGR 40 (required), 70A (required), plus one course from ENGR 10, 15, 20, 25, 30, 50, 50M, 60, 62	
Product Design Engineering Depth (48 units minimum):	
ARTSTUDI 60. Design I: Fundamental Visual Language	3
ARTSTUDI 160. Design II: The Bridge	3
One additional Art Studio course (ARTSTUDI 70 recommended)	3
ENGR 14. Introduction to Solid Mechanics	4
ENGR 102M*. Technical/Professional Writing for ME Majors <sup>3</sup>	1
ME 80. Mechanics of Materials	4
ME 101. Visual Thinking	4
ME 103D*. Engineering Drawing	1
ME 110A. Design Sketching	1
ME 112. Mechanical Systems	4
ME 115A. Human Values in Design <sup>2</sup>	3
ME 115B. Introduction to Design Methods <sup>2</sup>	3
ME 115C. Design and Business Factors <sup>2</sup>	3
ME 116. Advanced Product Design: Formgiving	4
ME 203*. Manufacturing and Design <sup>3</sup>	4
ME 216A. Advanced Product Design: Needfinding	4
ME 216B. Advanced Product Design: Implementation	4

\*These three courses (ENGR 102M, ME 103D, ME 203) must be taken concurrently in order to fulfill the Writing in the Major (WIM) requirement.

These requirements are subject to change. The final requirements are published with sample programs in the *Handbook for Undergraduate Engineering Programs*.

- 1 School of Engineering approved science list available at <http://ughb.stanford.edu>.
- 2 One quarter abroad may substitute for one of the ME 115-series classes.
- 3 Must be taken concurrently to fulfill the Writing in the Major requirement.

## GRADUATE PROGRAMS IN THE SCHOOL OF ENGINEERING

### ADMISSION

Application for admission with graduate standing in the school should be made to the graduate admissions committee in the appropriate department or program. While most graduate students have undergraduate preparation in an engineering curriculum, it is feasible to enter from other programs, including chemistry, geology, mathematics, or physics.

For further information and application instructions, see the department sections in this bulletin or <http://gradadmissions.stanford.edu>. Stanford undergraduates may also apply as coterminal students; details can be found under "Degree Program Options" in the "Undergraduate Programs in the School of Engineering" section of this bulletin.

### FELLOWSHIPS AND ASSISTANTSHIPS

Departments and divisions of the School of Engineering award graduate fellowships, research assistantships, and teaching assistantships each year.



## CURRICULA IN THE SCHOOL OF ENGINEERING

For further details about the following programs, see the department sections in this bulletin.

Related aspects of particular areas of graduate study are commonly covered in the offerings of several departments and divisions. Graduate students are encouraged, with the approval of their department advisers, to choose courses in departments other than their own to achieve a broader appreciation of their field of study. For example, most departments in the school offer courses concerned with nanoscience, and a student interested in an aspect of nanotechnology can often gain appreciable benefit from the related courses given by departments other than her or his own.

Departments and programs of the school offer graduate curricula as follows:

### AERONAUTICS AND ASTRONAUTICS

- Aeroelasticity
- Aircraft Design, Performance, and Control
- Applied Aerodynamics
- Computational Aero-Acoustics
- Computational Fluid Dynamics
- Control of Robots, including Space and Deep-Underwater Robots
- Conventional and Composite Structures/Materials
- Direct and Large Eddy Simulation of Turbulence
- High-Lift Aerodynamics
- Hybrid Propulsion
- Hypersonic and Supersonic Flow
- Multidisciplinary Design Optimization
- Navigation Systems (especially GPNetworked and Hybrid Control)
- Optimal Control, Estimation, System Identification
- Spacecraft Design and Satellite Engineering
- Turbulent Flow and Combustion

### BIOENGINEERING

- Biomedical Computation
- Biomedical Devices
- Biomedical Imaging
- Cell and Molecular Engineering
- Regenerative Medicine

### CHEMICAL ENGINEERING

- Applied Statistical Mechanics
- Biocatalysis
- Biochemical Engineering
- Bioengineering
- Biophysics
- Computational Materials Science
- Colloid Science
- Dynamics of Complex Fluids
- Energy Conversion
- Functional Genomics
- Hydrodynamic Stability
- Kinetics and Catalysis
- Microrheology
- Molecular Assemblies
- Nanoscience and Technology
- Newtonian and Non-Newtonian Fluid Mechanics
- Polymer Physics
- Protein Biotechnology
- Renewable Fuels
- Semiconductor Processing
- Soft Materials Science
- Solar Utilization

- Surface and Interface Science
- Transport Mechanics

### CIVIL AND ENVIRONMENTAL ENGINEERING

- Atmosphere/Energy
- Construction Engineering and Management
- Design/Construction Integration
- Environmental Engineering and Science
- Environmental Fluid Mechanics and Hydrology
- Environmental and Water Studies
- Geomechanics
- Structural Engineering
- Sustainable Design and Construction

### COMPUTATIONAL AND MATHEMATICAL ENGINEERING

- Applied and Computational Mathematics
- Computational Fluid Dynamics
- Computational Geometry and Topology
- Discrete Mathematics and Algorithms
- Numerical Analysis
- Optimization
- Partial Differential Equations
- Stochastic Processes

### COMPUTER SCIENCE

See <http://forum.stanford.edu/research/areas.php> for a comprehensive list.

- Algorithmic Game Theory
- Analysis of Algorithms
- Artificial Intelligence
- Autonomous Agents
- Biomedical Computation
- Compilers
- Complexity Theory
- Computational Biology
- Computational Geometry
- Computational Logic
- Computational Photography
- Computational Physics
- Computer Architecture
- Computer Graphics
- Computer Security
- Computer Science Education
- Computer Vision
- Cryptography
- Database Systems
- Data Mining
- Digital Libraries
- Distributed and Parallel Computation
- Distributed Systems
- Electronic Commerce
- Formal Verification
- Haptic Display of Virtual Environments
- Human-Computer Interaction
- Image Processing
- Information and Communication Technologies for Development
- Information Management and Mining
- Machine Learning
- Mathematical Theory of Computation
- Mobile Computing
- Multi-Agent Systems
- Natural Language and Speech Processing
- Networking and Internet Architecture

- Operating Systems
- Parallel Computing
- Probabilistic Models and Methods
- Programming Systems/Languages
- Robotics
- Robust System Design
- Scientific Computing and Numerical Analysis
- Sensor Networks
- Social and Information Networks
- Social Computing
- Ubiquitous and Pervasive Computing
- Visualization
- Web Application Infrastructure

### **ELECTRICAL ENGINEERING**

- Computer Hardware
- Computer Software Systems
- Control and Systems Engineering
- Communication Systems
- Dynamic Systems and Optimization
- Electronic Circuits
- Electronic Devices, Sensors, and Technology
- Fields, Waves, and Radioscience
- Image Systems
- Lasers, Optoelectronics, and Quantum Electronics
- Network Systems
- Signal Processing
- Solid State Materials and Devices
- VLSI Design

### **ENGINEERING**

- Interdepartmental Programs
- Interdisciplinary Programs

### **MANAGEMENT SCIENCE AND ENGINEERING**

- Decision and Risk Analysis
- Dynamic Systems
- Economics
- Entrepreneurship
- Finance
- Information
- Marketing
- Optimization
- Organization Behavior
- Organizational Science
- Policy
- Production
- Stochastic Systems
- Strategy

### **MATERIALS SCIENCE AND ENGINEERING**

- Biomaterials
- Ceramics and Composites
- Computational Materials Science
- Electrical and Optical Behavior of Solids
- Electron Microscopy
- Fracture and Fatigue
- Imperfections in Crystals
- Kinetics
- Magnetic Behavior of Solids
- Magnetic Storage Materials
- Nanomaterials
- Photovoltaics
- Organic Materials
- Phase Transformations

- Physical Metallurgy
- Solid State Chemistry
- Structural Analysis
- Thermodynamics
- Thin Films
- X-Ray Diffraction

### **MECHANICAL ENGINEERING**

- Biomechanics
- Combustion Science
- Computational Mechanics
- Controls
- Design of Mechanical Systems
- Dynamics
- Environmental Science
- Experimental Stress and Analysis
- Fatigue and Fracture Mechanics
- Finite Element Analysis
- Fluid Mechanics
- Heat Transfer
- High Temperature Gas Dynamics
- Kinematics
- Manufacturing
- Mechatronics
- Product Design
- Robotics
- Sensors
- Solids
- Thermodynamics
- Turbulence
- Turbulence

### **MASTER OF SCIENCE IN THE SCHOOL OF ENGINEERING**

The M.S. degree is conferred on graduate students in engineering according to the University regulations stated in the "Graduate Degrees" section of this bulletin, and is described in the various department listings. A minimum of 45 units is usually required in M.S. programs in the School of Engineering. The presentation of a thesis is not a school requirement. Further information is found in departmental listings.

### **MASTER OF SCIENCE IN ENGINEERING**

The M.S. in Engineering is available to students who wish to follow an interdisciplinary program of study that does not conform to a normal graduate program in a department. There are three school requirements for the M.S. degree in Engineering:

1. The student's program must be a coherent one with a well-defined objective and must be approved by a department within the school which has experience with graduate-level teaching and advising in the program area.
2. The student's program must include at least 21 units of courses within the School of Engineering with catalog numbers of 200 or above in which the student receives letter grades.
3. The program must include a total of at least 45 units.

Each student's program is administered by the particular department in which it is lodged and must meet the standard of quality of that department. Transfer into this program is possible from any graduate program by application through the appropriate department; the department will then recommend approval to the Office of Student Affairs in the School of Engineering. The application should be submitted before completing 18 units of the proposed program; it should include a statement describing the objectives of the program, the coherence of the proposed coursework, and why this course of study cannot conform to existing graduate programs. Normally, it will include the approval of at least one faculty member willing to serve as advisor. (A co-advising team may be appropriate for interdisciplinary programs.)

The actual transfer will be accomplished through the Graduate Authorization Petition process.

## ENGINEER IN THE SCHOOL OF ENGINEERING

The degree of Engineer is intended for students who want additional graduate training beyond that offered in an M.S. program. The program of study must satisfy the student's department and must include at least 90 units beyond the B.S. degree. The presentation of a thesis is required. The University regulations for the Engineer degree are stated in the "Graduate Degrees" section of this bulletin, and further information is available in the individual departmental sections of this bulletin.

## DOCTOR OF PHILOSOPHY IN THE SCHOOL OF ENGINEERING

Programs leading to the Ph.D. degree are offered in each of the departments of the school. University regulations for the Ph.D. are given in the "Graduate Degrees" section of this bulletin. Further information is found in departmental listings.

## HONORS COOPERATIVE PROGRAM

Industrial firms, government laboratories, and other organizations may participate in the Honors Cooperative Program (HCP), a program that permits qualified engineers, scientists, and technology professionals admitted to Stanford graduate degree programs to register for Stanford courses and obtain the degree on a part-time basis. In many areas of concentration, the master's degree can be obtained entirely online.

Through this program, many graduate courses offered by the School of Engineering on campus are made available through the Stanford Center for Professional Development (SCPD). SCPD delivers more than 250 courses a year on television and online. For HCP employees who are not part of a graduate degree program at Stanford, courses and certificates are also available through a non-degree option (NDO) and a non-credit professional education program. Non-credit short courses may be customized to meet a company's needs. For a full description of educational services provided by SCPD, see <http://scpd.stanford.edu>; call (650) 725-3000; fax (650) 725-2868; or email [scpd-registration@stanford.edu](mailto:scpd-registration@stanford.edu).

## OVERSEAS STUDIES COURSES IN ENGINEERING

For course descriptions and additional offerings, see the listings in the *Stanford Bulletin's* ExploreCourses web site (<http://explorecourses.stanford.edu>) or the Bing Overseas Studies web site (<http://bossp.stanford.edu>). Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

### AUTUMN QUARTER

#### BERLIN

OSPBER 40B. Introductory Electronics. 5 units, Roger Howe, GER:DB:EngrAppSci

OSPBER 50B. Introductory Science of Materials. 4 units, Staff, GER:DB:EngrAppSci

#### FLORENCE

OSPFLOR 50F. Introductory Science of Materials. 4 units, Staff, GER:DB:EngrAppSci

#### PARIS

OSPPARIS 40P. Introductory Electronics. 5 units, Roger Howe, GER:DB:EngrAppSci

OSPPARIS 50P. Introductory Science of Materials. 4 units, Staff, GER:DB:EngrAppSci

### WINTER QUARTER

#### BERLIN

OSPBER 40B. Introductory Electronics. 5 units, Roger Howe, GER:DB:EngrAppSci

OSPBER 50B. Introductory Science of Materials. 4 units, Staff, GER:DB:EngrAppSci

#### FLORENCE

OSPFLOR 50F. Introductory Science of Materials. 4 units, Staff, GER:DB:EngrAppSci

#### PARIS

OSPPARIS 50P. Introductory Science of Materials. 4 units, Staff, GER:DB:EngrAppSci

### SPRING QUARTER

#### BERLIN

OSPBER 40B. Introductory Electronics. 5 units, Simon Wong, GER:DB:EngrAppSci

OSPBER 50B. Introductory Science of Materials. 4 units, Staff, GER:DB:EngrAppSci

#### FLORENCE

OSPFLOR 50F. Introductory Science of Materials. 4 units, Staff, GER:DB:EngrAppSci

#### KYOTO

OSPKYOTO 40K. Introductory Electronics. 5 units, Simon Wong, GER:DB:EngrAppSci

#### PARIS

OSPPARIS 40P. Introductory Electronics. 5 units, Simon Wong, GER:DB:EngrAppSci

OSPPARIS 50P. Introductory Science of Materials. 4 units, Staff, GER:DB:EngrAppSci

# AERONAUTICS AND ASTRONAUTICS

*Emeriti: (Professors)* Peter Bradshaw, Arthur E. Bryson, Robert H. Cannon, Richard Christensen,\* Daniel B. DeBra,\* Bradford W. Parkinson,\* J. David Powell,\* Charles R. Steele, Stephen W. Tsai,\* Walter G. Vincenti

*Chair:* Charbel Farhat

*Professors:* Brian J. Cantwell, Fu-Kuo Chang, Per Enge, Charbel Farhat, Antony Jameson, Ilan Kroo, Sanjiva Lele, Robert W. MacCormack, Stephen Rock, George S. Springer, Claire Tomlin

*Associate Professors:* Juan Alonso, Sanjay Lall

*Assistant Professor:* Sigrid Close

*Courtesy Professors:* C. W. Francis Everitt, J. Christian Gerdes, Ronald K. Hanson, Lambertus Hesselink

*Consulting Professors:* G. Scott Hubbard, Arif Karabeyoglu, Stanley Weiss, Gregory Ziliac

*Consulting Assistant Professor:* Steven Murray

\* Recalled to active duty.

*Phone:* (650) 723-3317

*Web Site:* <http://aa.stanford.edu>

Courses offered by the Department of Aeronautics and Astronautics are listed under the subject code AA on the *Stanford Bulletin's* ExploreCourses web site.

The Department of Aeronautics and Astronautics prepares students for professional positions in industry, government, and academia by offering a comprehensive program of graduate teaching and research. In this broad program, students have the opportunity to learn and integrate multiple engineering disciplines. The program emphasizes structural, aerodynamic, guidance and control, and propulsion problems of aircraft and spacecraft. Courses in the teaching program lead to the degrees of Master of Science, Engineer, and Doctor of Philosophy. Undergraduates and doctoral students in other departments may also elect a minor in Aeronautics and Astronautics.

Requirements for all degrees include courses on basic topics in Aeronautics and Astronautics, as well as in mathematics, and related fields in engineering and the sciences.

The current research and teaching activities cover a number of advanced fields, with emphasis on:

- Aeroelasticity and Flow Simulation
- Aircraft Design, Performance, and Control
- Applied Aerodynamics
- Computational Aero-Acoustics
- Computational Fluid Dynamics
- Computational Mechanics and Dynamical Systems
- Control of Robots, including Space and Deep-Underwater Robots
- Conventional and Composite Materials and Structures
- Direct and Large-Eddy Simulation of Turbulence
- High-Lift Aerodynamics
- Hybrid Propulsion
- Hypersonic and Supersonic Flow
- Multidisciplinary Design Optimization
- Navigation Systems (especially GPS)
- Optimal Control, Estimation, System Identification
- Spacecraft Design and Satellite Engineering
- Turbulent Flow and Combustion

## MISSION OF THE UNDERGRADUATE PROGRAM IN AERONAUTICS AND ASTRONAUTICS

The mission of the undergraduate program in Aeronautics and Astronautics Engineering is to provide students with the fundamental principles and techniques necessary for success and leadership in the conception, design, implementation, and operation of aerospace and related engineering systems. Courses in the major introduce students to engineering principles. Students learn to apply this fundamental knowledge to conduct laboratory experiments and aerospace system design problems. Courses in the major include engineering fundamentals, mathematics, and the sciences, as well as in-depth courses in aeronautics and astronautics, dynamics, mechanics of materials, fluids engineering, and heat transfer. The major prepares students for careers in aircraft and spacecraft engineering, space exploration, air and space-based telecommunication industries, teaching, research, military service, and many related technology-intensive fields.

## GRADUATE PROGRAMS IN AERONAUTICS AND ASTRONAUTICS

*Admission*—To be eligible to apply for admission to the department, a student must have a bachelor's degree in engineering, physical science, mathematics, or an acceptable equivalent. Students who have not yet received a master's degree in a closely allied discipline will be admitted to the master's program; eligibility for the Ph.D. program is considered after the master's year (see "Doctor of Philosophy" below). Applications for admission with financial aid (fellowships or assistantships) or without financial aid must be received and completed by December 7 for the next Autumn Quarter.

Information about admission to the Honors Cooperative Program is included in the "School of Engineering" section of this bulletin. The department may consider HCP applications for Winter or Spring quarters as well as for Autumn Quarter; prospective applicants should contact the department's student services office.

Further information and application forms for all graduate degree programs may be obtained from Graduate Admissions, the Registrar's Office, <http://gradadmissions.stanford.edu>.

*Waivers and Transfer Credits*—Students may receive departmental waivers of required courses for the M.S. degree in Aeronautics and Astronautics by virtue of substantially equivalent and satisfactorily performed course work at other institutions. A waiver petition (signed by the course instructor and adviser) should be submitted to the student services office indicating (1) the Stanford University course number and title, and (2) the institution, number(s), and title(s) of the course(s) wherein substantially equivalent material was treated. If a waiver is granted, the student must take an additional technical elective, chosen in consultation with their adviser, from graduate courses in Aeronautics and Astronautics. The total 45-unit requirement for the master's degree is not reduced by course waivers.

A similar procedure should be followed for transfer credits. The number of transfer credits allowed for each degree (Engineer and Ph.D.) is delineated in the "Graduate Degrees" section of this bulletin; transfer credit is not accepted for the M.S. degree. Transfer credit is allowed only for courses taken as a graduate student, after receiving a bachelor's degree, in which equivalence to Stanford courses is established and for which a grade of 'B' or better has been awarded. Transfer credits, if approved, reduce the total number of Stanford units required for a degree.

*Fellowships and Assistantships*—Fellowships and course or research assistantships are available to qualified graduate students. Fellowships sponsored by Gift Funds, Stanford University, and Industrial Affiliates of Stanford University in Aeronautics and Astronautics provide grants to several first-year students for the nine-month academic year to cover tuition and living expenses. Stanford Graduate Fellowships, sponsored by the University,

provide grants for three full years of study and research; each year, the department is invited to nominate several outstanding doctoral or predoctoral students for these prestigious awards. Students who have excelled in their master's-level course work at Stanford are eligible for course assistantships in the department; those who have demonstrated research capability are eligible for research assistantships from individual faculty members. Students may also hold assistantships in other departments if the work is related to their academic progress; the criteria for selecting course or research assistants are determined by each hiring department. A standard, 20 hours/week course or research assistantship provides a semi-monthly salary and an 8-10 unit tuition grant per quarter. Research assistants may be given the opportunity of additional summer employment. They may use their work as the basis for a dissertation or Engineer's thesis.

## AERONAUTICS AND ASTRONAUTICS FACILITIES

The work of the department is centered in the William F. Durand Building for Space Engineering and Science. This 120,000 square foot building houses advanced research and teaching facilities and concentrates in one complex the Department of Aeronautics and Astronautics as well as some of the activities of the Mechanical Engineering Department.

The Durand Building also houses faculty and staff offices and several conference rooms. Attached to the building is a modern classroom building equipped for televising lectures; it contains a lecture auditorium.

Through the department's close relations with nearby NASA-Ames Research Center, students and faculty have access to one of the best and most extensive collections of experimental aeronautical research facilities in the world, as well as the latest generation of supercomputers.

## GENERAL INFORMATION

Further information about the facilities and programs of the department is available at <http://aa.stanford.edu>, or from the department's student services office.

The department has a student branch of the American Institute of Aeronautics and Astronautics, which sponsors programs and speakers covering aerospace topics and social events. It also conducts visits to nearby research, government, and industrial facilities, and sponsors a Young Astronauts Program in the local schools.

## BACHELOR OF SCIENCE IN ENGINEERING (AERONAUTICS AND ASTRONAUTICS)

Although primarily a graduate-level department, the program offers an undergraduate major in Aeronautics and Astronautics (AA) leading to the B.S. degree in Engineering and an undergraduate minor in Aeronautics and Astronautics. For further information, see the *Handbook for Undergraduate Engineering Programs* at <http://ughb.stanford.edu>.

Undergraduates interested in aerospace are encouraged to combine either a minor or a coterminal M.S. in Aeronautics and Astronautics with a major in a related discipline (such as Mechanical or Electrical Engineering). Students considering these options are encouraged to contact the department's student services office.

## COTERMINAL DEGREES PROGRAM IN AERONAUTICS AND ASTRONAUTICS

This special program allows Stanford undergraduates an opportunity to work simultaneously toward a B.S. in another field and an M.S. in Aeronautics and Astronautics. General requirements for this program and admissions procedures are described in the "School of Engineering" section of this bulletin.

Admission is granted or denied through the departmental faculty Admissions and Awards Committee. A coterminal student must meet the course and scholarship requirements detailed for the M.S. below.

For University coterminal degree program rules and University application forms, see <http://registrar.stanford.edu/shared/publications.htm#Coterm>.

## MASTER OF SCIENCE IN AERONAUTICS AND ASTRONAUTICS

The University's basic requirements for the master's degree are outlined in the "Graduate Degrees" section of this bulletin. Students with an aeronautical engineering background should be able to qualify for the master's degree in three quarters of work at Stanford. Students with a bachelor's degree in Physical Science, Mathematics, or other areas of Engineering may find it necessary to take certain prerequisite courses, which would lengthen the time required to obtain the master's degree. The following are departmental requirements.

*Grade Point Averages*—A minimum grade point average (GPA) of 2.75 is required to fulfill the department's M.S. degree requirements; a minimum GPA of 3.4 is required for eligibility to attempt the Ph.D. qualifying examination. It is incumbent upon both M.S. and potential Ph.D. candidates to request letter grades in all courses except those that do not offer a letter grade option and those that fall into the categories of colloquia and seminars (for example, AA 297 and ENGR 298). Insufficient grade points on which to base the GPA may delay expected degree conferral or result in refusal of permission to take the qualifying examinations. Candidates with GPAs of 3.0 through 3.4 may request the permission of the candidacy committee to attempt the qualifying examinations.

The master's program (45 units) in Aeronautics and Astronautics (AA) is designed to provide a solid grounding in the basic disciplines. All candidates for this degree are expected to meet the basic course requirements in experimentation in aeronautics and astronautics, fluid mechanics, guidance and control, propulsion, and structural mechanics (category A below), in addition to work in applied mathematics (category B) and technical electives (category C).

- A. *Basic Courses*—Candidates choose eight courses as follows:
- One course in each basic area of Aeronautics and Astronautics:
    - Experimentation: 241X, 236A, 257, 284B, or 290; or ENGR 206 or 207A
    - Fluids: one of 200 or 210A
    - Guidance and Control: ENGR 105 or ENGR 205
    - Propulsion: 283
    - Structures: 240A
  - Three courses, one each from three of the areas below:
    - Fluids: 200 (if 210A was taken or waived in item 1); or 210A (if 200 was taken or waived in item 1)
    - Structures: 240B or 256
    - Controls/Dynamics: 242A, 271A, or 279
    - Aero/Astro elective: AA course numbered 200 and above, excluding seminars and independent research.

Candidates who believe they have satisfied a basic course requirement in previous study may request a waiver of one or more courses (see "Waivers and Transfer Credits" in the "Graduate Programs in Aeronautics and Astronautics" section of this bulletin).

B. *Mathematics Courses*—During graduate study, each candidate is expected to develop a competence in the applied mathematics pertinent to his or her major field. This requirement can be met by matriculating in a minimum of 6 units in either (1) applied mathematics (for example, complex variables, linear algebra, partial differential equations, probability), or (2) technical electives that strongly emphasize applied mathematics. A list of courses approved for the mathematics requirement is available in the departmental student services office. (Calculus, ordinary differential equations, and vector analysis are fundamental

mathematics prerequisites, and do not satisfy the master's mathematics requirement.) Students planning to continue to the Ph.D. should note that 25 percent of the major-field Ph.D. qualifying examination is devoted to pertinent mathematics.

C. *Technical Electives*—Candidates, in consultation with their advisers, select at least four courses (totaling at least 12 units) in their major field from among the graduate-level courses offered by the departments of the School of Engineering and related science departments. This requirement increases by one course, taken in either the major or peripheral fields, for each basic course that is waived. Normally, one course (3 units) in this category may be directed research. Courses taken in satisfaction of the other master's requirements (categories A, B, and D) may not also be counted as technical electives.

D. *Other Electives*—It is recommended that all candidates enroll in at least one humanities or social science course. Language classes qualify in this category, but practicing courses in, for example, art, music, and physical education do not qualify.

When planning their programs, candidates should check course descriptions carefully to ensure that all prerequisites have been satisfied. A course that is taken to satisfy a prerequisite for courses in category A (basic courses) or B (mathematics) cannot be counted as a technical elective, but can count toward the M.S. degree in category D (other electives).

## MASTER OF SCIENCE IN ENGINEERING (AA)

Students whose career objectives require a more interdepartmental or narrowly focused program than is possible in the M.S. program in Aeronautics and Astronautics (AA) may pursue a program for an M.S. degree in Engineering (45 units). This program is described in the "Graduate Programs in the School of Engineering" section of this bulletin.

Sponsorship by the Department of Aeronautics and Astronautics in this more general program requires that the student file a proposal before completing 18 units of the proposed graduate program. The proposal must be accompanied by a statement explaining the objectives of the program and how the program is coherent, contains depth, and fulfills a well-defined career objective. The proposed program must include at least 12 units of graduate-level work in the department and meet rigorous standards of technical breadth and depth comparable to the regular AA Master of Science program. The grade and unit requirements are the same as for the M.S. degree in Aeronautics and Astronautics.

## ENGINEER IN AERONAUTICS AND ASTRONAUTICS

The degree of Engineer represents an additional year (or more) of study beyond the M.S. degree and includes a research thesis. The program is designed for students who wish to do professional engineering work upon graduation and who want to engage in more specialized study than is afforded by the master's degree alone. It is expected that fulltime students will be able to complete the degree within two years of study after the master's degree.

The University's basic requirements for the degree of Engineer are outlined in the "Graduate Degrees" section of this bulletin. The following are department requirements.

The candidate's prior study program should have fulfilled the department's requirements for the master's degree or a substantial equivalent. Beyond the master's degree, a total of 45 units of work is required, including a thesis and a minimum of 30 units of courses chosen as follows:

1. 24 units of approved technical electives, of which 9 are in mathematics or applied mathematics. (A list of courses approved for the mathematics requirement is available in the departmental student services office.) The remaining 15 units are chosen in consultation with the adviser, and represent a coherent field of study related to the thesis topic. Suggested fields include: (a) acoustics, (b) aerospace structures, (c)

aerospace systems synthesis and design, (d) analytical and experimental methods in solid and fluid mechanics, (e) computational fluid dynamics, and (f) guidance and control.

2. 6 units of free electives.
3. The remaining 15 units may be thesis, research, technical courses, or free electives.

Candidates for the degree of Engineer are expected to have a minimum grade point average (GPA) of 3.0 for work in courses beyond those required for the master's degree. All courses except seminars and directed research should be taken for a letter grade.

## DOCTOR OF PHILOSOPHY IN AERONAUTICS AND ASTRONAUTICS

The University's basic requirements for the Ph.D. degree are outlined in the "Graduate Degrees" section of this bulletin. Department requirements are stated below.

Qualifications for candidacy for the doctoral degree are contingent on:

1. Having fulfilled department requirements for the master's degree or its substantial equivalent.
2. Maintaining a high scholastic record for graduate course work.
3. Completing 3 units of a directed research problem (AA 290 or an approved alternative).
4. In the first year of doctoral study, passing an oral Ph.D. qualifying examination given by the department during Autumn and Spring quarters.

Detailed information about the deadlines, nature, and scope of the Ph.D. qualifying examination can be obtained from the department. Research on the doctoral dissertation may not be formally started before passing this examination.

Beyond the master's degree, a total of 90 additional units of work is required, including a minimum of 36 units of approved formal course work (excluding research, directed study, and seminars). The courses should consist primarily of graduate courses in engineering and related sciences, and should form a strong and coherent doctoral program. At least 12 units must be from graduate-level courses in mathematics or applied mathematics (a list of approved courses is available from the department student services office). University requirements for continuous registration apply to doctoral students for the duration of the degree.

*Dissertation Reading Committee*—Each Ph.D. candidate is required to establish a reading committee for the doctoral dissertation within six months after passing the department's Ph.D. Qualifying exams. Thereafter, the student should consult frequently with all members of the committee about the direction and progress of the dissertation research.

A dissertation reading committee consists of the principal dissertation adviser and at least two other readers. Reading committees in Aeronautics and Astronautics often include faculty from another department. It is expected that at least two members of the AA faculty be on each reading committee. If the principal research adviser is not within the AA department, then the student's AA academic adviser should be one of those members. The initial committee, and any subsequent changes, must be officially approved by the department Chair.

*University Oral and Dissertation*—The Ph.D. candidate is required to take the University oral examination after the dissertation is substantially completed (with the dissertation draft in writing), but before final approval. The examination consists of a public presentation of dissertation research, followed by substantive private questioning on the dissertation and related fields by the University oral committee (four selected faculty members, plus a chair from another department). Once the oral has been passed, the student finalizes the dissertation for reading committee review and final approval. Forms for the University oral scheduling and a one-page dissertation abstract should be submitted to the department student services office at least three weeks prior to the date of the oral for departmental review and approval.

## PH.D. MINOR IN AERONAUTICS AND ASTRONAUTICS

A student who wishes to obtain a Ph.D. minor in Aeronautics and Astronautics should consult the department office for designation of a minor adviser. A minor in Aeronautics and Astronautics may be obtained by completing 20 units of graduate-level courses in the Department of Aeronautics and Astronautics, following a program (and performance) approved by the department's candidacy chair.

The student's Ph.D. reading committee and University oral committee must each include at least one faculty member from Aeronautics and Astronautics.

## BIOENGINEERING

*Chair:* Russ B. Altman

*Co-Chair:* Stephen R. Quake

*Professors:* Russ B. Altman, Annelise E. Barron, Dennis R. Carter, Scott L. Delp, Norbert J. Pelc, Stephen R. Quake, Matthew Scott, James R. Swartz, Paul Yock

*Associate Professors:* Kwabena Boahen, Karl Deisseroth

*Assistant Professors:* Zev David Bryant, David B. Camarillo, Jennifer R. Cochran, Markus Willard Covert, Andrew Endy, Kerwyn C. Huang, Michael Lin, Manu Prakash, Ingmar Riedel-Kruse, Christina D. Smolke, Fan Yang

*Courtesy Professors:* Daniel S. Fisher, Sanjiv Sam Gambhir, Thomas Krummel, Michael T. Longaker, Stefanos Zenios

*Courtesy Associate Professors:* Jeffrey A. Feinstein, Garry E. Gold, Kim Butts Pauly

*Affiliated Faculty:* Serafim Batzoglou, Atul J. Butte, Rebecca Fahrig, Stuart B. Goodman, Sarah Heilshorn, Ellen Kuhl, Marc E. Levenston, Craig Levin, Sylvia K. Plevritis, Mark J. Schnitzer, Krishna V. Shenoy, Daniel Mark Spielman

*Student Services:* Clark Center, Room S-165

*Mail Code:* 94305-5444

*Student Services Phone:* Graduate students: (650) 736-2254; Undergraduates: (650) 724-5314

*Web Site:* <http://bioengineering.stanford.edu>

Courses offered by the Department of Bioengineering are listed under the subject code BIOE on the *Stanford Bulletin's* ExploreCourses web site.

Bioengineering is jointly supported by the School of Engineering and the School of Medicine. The facilities and personnel of the Department of Bioengineering are housed in the James H. Clark Center, the William F. Durand Building for Space Engineering and Science, the William M. Keck Science Building, the Jerry Yang and Akiko Yamazaki Environment and Energy Building, and the Richard M. Lucas Center for Magnetic Resonance Spectroscopy and Imaging.

The departmental headquarters is in the James H. Clark Center for Biomedical Engineering and Sciences, along with approximately 600 faculty, staff, and students from more than 40 University departments. The Clark Center is also home to Stanford's Bio-X program, a collaboration of the Schools of Engineering, Medicine, Humanities and Sciences, and Earth Sciences.

Courses in the teaching program lead to the degrees of Master of Science and Doctor of Philosophy. The department collaborates in research and teaching programs with faculty members in Chemical Engineering, Mechanical Engineering, Electrical Engineering, and departments in the School of Medicine. Quantitative biology is the core science base of the department. The research and educational thrusts are in biomedical computation, biomedical imaging, biomedical devices, regenerative medicine, and cell/molecular engineering. The clinical dimension of the department includes cardiovascular

medicine, neuroscience, orthopedics, cancer care, neurology, and environment.

## MISSION OF THE UNDERGRADUATE PROGRAM IN BIOENGINEERING

The mission of the Department of Bioengineering is to create a fusion of engineering and the life sciences that promotes scientific discovery and the development of new biomedical technologies and therapies through research and education. The Bioengineering (BioE) major enables students to embrace biology as a new engineering paradigm and apply engineering principles to medical problems and biological systems. Students who major in BioE obtain a solid background in the basic sciences (chemistry, physics, and biology) and mathematics. They take three engineering fundamentals courses including an introductory bioengineering course and computer programming. Starting in the sophomore year, BioE students take six core classes to gain essential knowledge to pursue a career in bioengineering and then have the opportunity to pursue elective courses suited to their own interests. The major prepares students to continue on to graduate or medical school; work in the biotechnology, medical device, medical imaging, or other medical and non-medical industries; or pursue advanced degrees in business or law.

The department offers an undergraduate major in Bioengineering (BIOE) leading to the B.S. degree in Engineering. An undergraduate major in Biomechanical Engineering and an undergraduate major in Biomedical Computation, both of which lead to the B.S. degree in Engineering, are available through the School of Engineering. For further information, see the *Handbook for Undergraduate Engineering Programs* at <http://ughb.stanford.edu>.

## GRADUATE PROGRAMS IN BIOENGINEERING

The University's requirements for the M.S. and Ph.D. degrees are outlined in the "Graduate Degrees" section of this bulletin.

*Admission*—Students are expected to enter with a series of core competencies in mathematics, biology, chemistry, physics, computing, and engineering. Students entering the program are assessed by the examination of their undergraduate transcripts and research experiences. Specifically, the department requires that students have completed mathematics through multivariable calculus and differential equations, completed a series of undergraduate biology courses (equivalent to the BIO 41,42 series) and completed physics, chemistry, and computer sciences courses required of all undergraduate majors in engineering.

Qualified applicants are encouraged to apply for predoctoral national competitive fellowships, especially those from the National Science Foundation. Applicants to the Ph.D. program should consult with their financial aid officers for information and applications.

The deadline for receiving applications is December 6, 2011.

Further information and application forms for all graduate degree programs may be obtained from Graduate Admissions, the Registrar's Office, <http://gradadmissions.stanford.edu>.

## BACHELOR OF SCIENCE IN ENGINEERING (BIOENGINEERING)

The department offers an undergraduate major in Bioengineering (BioE) leading to the B.S. degree in Engineering. For additional information, see the *Handbook for Undergraduate Engineering Programs* at <http://ughb.stanford.edu>.

## COTERMINAL B.S./M.S. PROGRAM IN BIOENGINEERING

This option is available to outstanding Stanford undergraduates who wish to work simultaneously toward a B.S. in another field and an M.S. in Bioengineering. The degrees may be granted

simultaneously or at the conclusion of different quarters, though the bachelor's degree cannot be awarded after the master's degree has been granted. The University minimum requirements for the coterminal bachelor's/master's program are 180 units for the bachelor's degree plus 45 unduplicated units for the master's degree. Students may apply for the coterminal B.S. and M.S. program after 120 undergraduate units have been completed, and they must be accepted into our program one quarter before receiving the B.S. degree. Students should apply directly to the Bioengineering Student Service Office by December 6, 2011. Students interested in the coterminal degree must take the Graduate Record Examination (GRE); applications may be obtained at <http://www.gre.org>. Prospective applicants should see the application form, instructions, and supporting documents at <http://bioengineering.stanford.edu/education/coterminal.html>. University regulations and forms concerning coterminal degree programs are available at <http://registrar.stanford.edu/shared/publications.htm#Coterm>.

The application must provide evidence of potential for strong academic performance as a graduate student. The application is evaluated and acted upon by the graduate admissions committee of the department. Students are expected to enter with a series of core competencies in mathematics, biology, chemistry, physics, computing, and engineering. Typically, a GPA of at least 3.5 in engineering, science, and math is expected.

## MASTER OF SCIENCE IN BIOENGINEERING

The Master of Science in Bioengineering requires 45 units of course work. The curriculum consists of core bioengineering courses, technical electives, seminars and unrestricted electives. Core courses focus on quantitative biology and biological systems analysis. Approved technical electives are chosen by the student in consultation with his/her graduate adviser, and can be selected from graduate course offerings in mathematics, statistics, engineering, physical sciences, life sciences, and medicine. Seminars highlight emerging research in bioengineering and provide training in research ethics. Unrestricted electives can be freely chosen by the student in association with his/her adviser.

The department's requirements for the M.S. in Bioengineering are:

1. *Core Bioengineering courses* (9 units)—the following courses are required:  
BIOE 300A. Molecular and Cellular Bioengineering  
BIOE 300B. Physiology and Tissue Engineering  
BIOE 301A. Molecular and Cellular Bioengineering Lab  
BIOE 301B. Clinical Needs and Technology  
These courses, together with the approved technical electives, should form a cohesive course of study that provides depth and breadth.
2. *Approved Technical Electives* (27 units)—these units must be selected from graduate courses in mathematics, statistics, engineering, physical science, life science, and medicine. They should be chosen in concert with the bioengineering courses to provide a cohesive degree program in a bioengineering focus area. Students are required to take at least one course in some area of device or instrumentation. Up to 9 units of directed study and research may be used as approved electives.
3. *Seminars* (3 units)—the seminar units should be fulfilled through BIOE 390, Introduction to Bioengineering Research, BIOE 393, Bioengineering Departmental Research Colloquium, or BIOE 459, Frontiers in Interdisciplinary Biosciences. Other relevant seminar units may also be used with the approval of the faculty adviser. One of the seminar units must be MED 255, The Responsible Conduct of Research.
4. *Unrestricted Electives* (6 units).

Students are assigned an initial faculty adviser to assist them in designing a plan of study that creates a cohesive degree program with a concentration in a particular bioengineering focus area.

These focus areas include, but are not limited to: Biomedical Computation, Regenerative Medicine/Tissue Engineering, Molecular and Cell Bioengineering, Biomedical Imaging, and Biomedical Devices.

To ensure that an appropriate program is pursued by all M.S. candidates, students who first matriculate at Stanford at the graduate level must:

1. submit an adviser-approved Program Proposal for a Master's Degree form to the student services office during the first month of the first quarter of enrollment
2. obtain approval from the M.S. adviser and the Chair of Graduate Studies for any subsequent program change or changes.

It is expected that the requirements for the M.S. in Bioengineering can be completed within approximately one year. There is no thesis requirement for the M.S.

Due to the interdisciplinary nature of Bioengineering; a number of courses are offered directly through the Bioengineering Department, but many are available through other departments. See respective ExploreCourses for course descriptions.

## COGNATE COURSES

BIOC 218. Computational Molecular Biology (same as BIOMEDIN 231)  
BIOMEDIN 210. Modeling Biomedical Systems: Ontology, Terminology, Problem Solving (same as CS 270)  
BIOMEDIN 217. Translational Bioinformatics (same as CS 275)  
CHEMENG 450. Advances in Biotechnology  
EE 369A,B. Medical Imaging Systems I,II  
EE 369C. Medical Image Reconstruction  
ME 280. Skeletal Development and Evolution  
ME 287. Soft Tissue Mechanics  
ME 381. Orthopaedic Bioengineering  
ME 382A,B. Medical Device Design  
RAD 226. In Vivo Magnetic Resonance Spectroscopy and Imaging

## DOCTOR OF PHILOSOPHY IN BIOENGINEERING

A student studying for the Ph.D. degree must complete a master's degree (45 units) comparable to that of the Stanford M.S. degree in Bioengineering. Up to 45 units of master's degree residency units may be counted towards the degree. The Ph.D. degree is awarded after the completion of a minimum of 135 units of graduate work as well as satisfactory completion of any additional University requirements. Students admitted to the Ph.D. program with an M.S. degree must complete at least 90 units of work at Stanford. The maximum number of transfer units is 45.

On the basis of the research interests expressed in their application, students are assigned an initial faculty adviser who assists them in choosing courses and identifying research opportunities. The department does not require formal lab rotations, but students are encouraged to explore research activities in two or three labs during their first academic year.

Prior to being formally admitted to candidacy for the Ph.D. degree, the student must demonstrate knowledge of bioengineering fundamentals and a potential for research by passing a qualifying oral examination.

Typically, the exam is taken shortly after the student earns a master's degree. The student is expected to have a nominal graduate Stanford GPA of 3.25 to be eligible for the exam. Once the student's faculty sponsor has agreed that the exam is to take place, the student must submit an application folder containing items including a curriculum vitae, research project abstract, and preliminary dissertation proposal to the student services office. Information about the exam may be obtained from the student services office.

In addition to the course requirements of the M.S. degree, doctoral candidates must complete a minimum of 15 additional units of approved formal course work (excluding research, directed study, and seminars).



*Dissertation Reading Committee*—Each Ph.D. candidate is required to establish a reading committee for the doctoral dissertation within six months after passing the department's Ph.D. qualifying exams. Thereafter, the student should consult frequently with all members of the committee about the direction and progress of the dissertation research.

A dissertation reading committee consists of the principal dissertation adviser and at least two other readers. Reading committees in Bioengineering may include faculty from another department. It is expected that at least one member of the Bioengineering faculty be on each reading committee. The initial committee, and any subsequent changes, must be officially approved by the department Chair.

*University Oral and Dissertation*—The Ph.D. candidate is required to take the University oral examination after the dissertation is substantially completed (with the dissertation draft in writing), but before final approval. The examination consists of a public presentation of dissertation research, followed by substantive private questioning on the dissertation and related fields by the University oral committee (four selected faculty members, plus a chair from another department). Once the oral has been passed, the student finalizes the dissertation for reading committee review and final approval. Forms for the University oral scheduling and a one-page dissertation abstract should be submitted to the department student services office at least three weeks prior to the date of the oral for departmental review and approval.

## PH.D. MINOR IN BIOENGINEERING

Doctoral students pursuing a Ph.D. degree in a major other than Bioengineering may apply for the Ph.D. minor in Bioengineering. A minor is not a requirement for any degree, but is available when agreed upon by the student and the major and minor department.

Application forms, including the University's general requirements, can be found at <http://registrar.stanford.edu/shared/forms.htm>.

A student desiring a Ph.D. minor in Bioengineering must have a minor program advisor who is a regular Bioengineering faculty member. This advisor must be a member of the student's reading committee for the doctoral dissertation, and the entire reading committee must meet at least one year prior to the date of the student's dissertation defense.

The Ph.D. minor program must include at least 20 units of course work in Stanford Bioengineering or Bioengineering cognate courses at or above the 200 level. Of these 20 units, no more than 10 can be in cognate courses. All courses listed to fulfill the 20-unit requirement must be taken for a letter grade and the GPA must be at least 3.25. Courses used for a minor may not be used to also meet the requirements for a master's degree.

## M.D./PH.D. DUAL DEGREE PROGRAM

Students interested in a career oriented towards bioengineering and medicine can pursue the combined M.D./Ph.D. degree program. Stanford has two ways to do an M.D./Ph.D. U.S. citizens and permanent residents can apply to the Medical Scientist Training Program and can be accepted with funding from both M.D. and Ph.D. programs for stipend and tuition. They can then select a bioengineering laboratory for their Ph.D. Students not admitted to the Medical Scientist Training Program must apply to be admitted separately to the M.D. program and the Ph.D. program of their choice.

The Ph.D. is administered by the Department of Bioengineering. To be formally admitted as a Ph.D. degree candidate in this combined degree program, the student must apply through normal departmental channels and must have earned or have plans to earn an M.S. in bioengineering or other engineering discipline at Stanford or another university. The M.S. requires 45 units of course work which consists of core bioengineering courses, technical electives, seminars, and 6 unrestricted units.

Students must also pass the Department of Bioengineering Ph.D. qualifying examination.

For students fulfilling the full M.D. requirements who earned their master's level engineering degree at Stanford, the Department of Bioengineering waives the normal departmental requirement of 15 units applied towards the Ph.D. degree beyond the master's degree level through formal course work. Consistent with the University Ph.D. requirements, the department accepts 15 units comprised of courses, research, or seminars approved by the student's academic adviser and the department chair. Students not completing their M.S. engineering degree at Stanford are required to take 15 units of formal course work in engineering-related areas as determined by their academic adviser.

## JOINT DEGREE PROGRAMS IN BIOENGINEERING AND THE SCHOOL OF LAW

The School of Law and the Department of Bioengineering offer joint programs leading to either a J.D. degree combined with an M.S. degree in Bioengineering or to a J.D. degree combined with a Ph.D. in Bioengineering.

The J.D./M.S. and J.D./Ph.D. degree programs are designed for students who wish to prepare themselves intensively for careers in areas relating to both law and bioengineering. Students interested in either joint degree program must apply and gain entrance separately to the School of Law and the Department of Bioengineering and, as an additional step, must secure permission from both academic units to pursue degrees in those units as part of a joint degree program. Interest in either joint degree program should be noted on the student's admission applications and may be considered by the admission committee of each program. Alternatively, an enrolled student in either the Law School or the Bioengineering Department may apply for admission to the other program and for joint degree status in both academic units after commencing study in either program.

Joint degree students may elect to begin their course of study in either the School of Law or the Department of Bioengineering. Faculty advisers from each academic unit will participate in the planning and supervising of the student's joint program. Students must be enrolled full time in the Law School for the first year of law school, and, at some point during the joint program, may be required to devote one or more quarters largely or exclusively to studies in the Bioengineering program regardless of whether enrollment at that time is in the Law School or in the Department of Bioengineering. At all other times, enrollment may be in the graduate school or the Law School, and students may choose courses from either program regardless of where enrolled. Students must satisfy the requirements for both the J.D. and the M.S. or Ph.D. degrees as specified in the *Stanford Bulletin* or elsewhere.

The Law School shall approve courses from the Bioengineering Department that may count toward the J.D. degree, and the Bioengineering Department shall approve courses from the Law School that may count toward the M.S. or Ph.D. degree in Bioengineering. In either case, approval may consist of a list applicable to all joint degree students or may be tailored to each individual student's program. The lists may differ depending on whether the student is pursuing an M.S. or a Ph.D. in Bioengineering.

In the case of a J.D./M.S. program, no more than 45 units of approved courses may be counted toward both degrees. In the case of a J.D./Ph.D. program, no more than 54 units of approved courses may be counted toward both degrees. In either case, no more than 36 units of courses that originate outside the Law School may count toward the law degree. To the extent that courses under this joint degree program originate outside of the Law School but count toward the law degree, the law school credits permitted under Section 17(1) of the Law School Regulations shall be reduced on a unit-per-unit basis, but not below zero. The maximum number of law school credits that may be counted toward the M.S. or Ph.D. in Bioengineering is the

greater of: (i) 15 units; or (ii) the maximum number of units from courses outside of the department that M.S. or Ph.D. candidates in Bioengineering are permitted to count toward the applicable degree under general departmental guidelines or in the case of a particular student's individual program. Tuition and financial aid arrangements will normally be through the school in which the student is then enrolled.

## CHEMICAL ENGINEERING

*Emeriti: (Professors)* Andreas Acrivos, Michel Boudart, George M. Homsy, Robert J. Madix, Channing R. Robertson

*Chair:* Eric S. G. Shaqfeh

*Professors:* Stacey F. Bent, Curtis W. Frank, Gerald G. Fuller, Chaitan Khosla, Jens K. Nørskov, Eric S. G. Shaqfeh, Alfred M. Spormann, James R. Swartz

*Associate Professor:* Zhenan Bao

*Assistant Professors:* Alexander R. Dunn, Thomas F. Jaramillo, Elizabeth S. Sattely, Andrew J. Spakowitz, Clifford L. Wang

*Courtesy Professors:* Annelise E. Barron, Gordon E. Brown, Christopher E. D. Chidsey, Daniel Herschlag, Jeffrey R. Koseff, Franklin M. Orr, Jr., Robert M. Waymouth

*Lecturers:* Lisa Y. Hwang, Shari B. Libicki, Sara Loesch-Frank, John E. Moalli, Anthony Pavone, Howard B. Rosen

*Consulting Professors:* Douglas C. Cameron, Jae Chun Hyun

*Visiting Professor:* Subhash Risbud

*Administrative Office:* Stauffer III, Room 113

*Student Services Office:* Keck Science Building, Room 189

*Mail Code:* 94305-5025

*Student Services Phone:* (650) 723-1302

*Web Site:* <http://cheme.stanford.edu>

Courses offered by the Department of Chemical Engineering are listed under the subject code CHEMENG on the *Stanford Bulletin's* ExploreCourses web site.

Research investigations are currently being carried out in the following fields: applied statistical mechanics, biocatalysis, bioengineering, biophysics, colloid science, computational materials science, electronic materials, hydrodynamic stability, kinetics and catalysis, Newtonian and non-Newtonian fluid mechanics, polymer science, renewable energy, rheo-optics of polymeric systems, and surface and interface science. Additional information may be found at <http://cheme.stanford.edu>.

The Department of Chemical Engineering offers opportunities for both undergraduates and graduate students to pursue course work in interdisciplinary biosciences, which include the chemical, biological, physical, mathematical, and engineering sciences. Courses include CHEMENG 25B, 150, 181/281, 183/283, 185B, 355, 450, 454, and 456. In addition, students seeking a broad introduction to current topics in the interdisciplinary biosciences and engineering should consider CHEMENG 459, *Frontiers in Interdisciplinary Biosciences*, which covers emerging technologies and other subject matter at the intersection of engineering and biology, ranging from molecular to complex systems; see <http://biox.stanford.edu>. Students are encouraged to review course offerings in all departments of the School of Engineering.

Further information about the department may be found at <http://cheme.stanford.edu>. Undergraduates considering majoring in Chemical Engineering are encouraged to talk with faculty and meet with staff in the departmental student services office. Students interested in pursuing advanced work in chemical engineering, including coterminal degrees, should contact the department as well. Admission to the Master of Science program for an active undergraduate Stanford student is by approval of an Application for Admission to Coterminal Master's Program. Admission to an advanced degree program for an active Stanford graduate student is by approval of a Graduate Authorization Petition. All other students should go to <http://studentaffairs.stanford.edu/gradadmissions> for general and

departmental information about the requirements and processes for applying for admission to a graduate degree program.

## MISSION OF THE UNDERGRADUATE PROGRAM IN CHEMICAL ENGINEERING

Chemical engineers are responsible for the conception and design of processes for the purpose of production, transformation, and transportation of materials. This activity begins with experimentation in the laboratory and is followed by implementation of the technology in full-scale production. The mission of the undergraduate program in Chemical Engineering is to develop students' understanding of the core scientific, mathematical, and engineering principles that serve as the foundation underlying these technological processes. The program's core mission is reflected in its curriculum which is built on a foundation in the sciences of chemistry, physics, and biology. Course work includes the study of applied mathematics, material and energy balances, thermodynamics, fluid mechanics, energy and mass transfer, separations technologies, chemical reaction kinetics and reactor design, and process design. The program provides students with excellent preparation for careers in the corporate sector and government or for advanced study.

## LEARNING OUTCOMES

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to be able to demonstrate:

1. proficiency in and ability to apply knowledge of engineering and mathematics through differential equations, probability and statistics, and science including physics, chemistry, and biology.
2. ability to design and to conduct experiments, as well as to analyze and to interpret data.
3. ability to design a system, component, or process to meet desired needs.
4. ability to function on multidisciplinary teams.
5. ability to identify, formulate, and solve engineering problems.
6. professional and ethical responsibility.
7. ability to communicate effectively.
8. the broad education necessary to understand the impact of engineering solutions in a global and societal context.
9. recognition of the need for and an ability to engage in life-long learning.
10. knowledge of contemporary issues.
11. ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
12. the background for admission to engineering or other professional graduate programs.

## GRADUATE PROGRAMS IN CHEMICAL ENGINEERING

The University's requirements, including residency requirements, for the M.S., Engineer, and Ph.D. degrees are summarized in the "Graduate Degrees" section of this bulletin.

Current research and teaching activities cover a number of advanced topics in chemical engineering, including applied statistical mechanics, biocatalysis, biochemical engineering, bioengineering, biophysics, computational materials science, colloid science, dynamics of complex fluids, energy conversion, functional genomics, hydrodynamic stability, kinetics and catalysis, microrheology, molecular assemblies, nanoscience and technology, Newtonian and non-Newtonian fluid mechanics, polymer physics, protein biotechnology, renewable fuels, semiconductor processing, soft materials science, solar utilization, surface and interface science, and transport mechanics.

*Fellowships and Assistantships*—Qualified predoctoral applicants are encouraged to apply for nationally competitive fellowships, for example, those from the National Science

Foundation. Applicants to the Ph.D. program should consult with their financial aid officers for application information and advice. In the absence of other awards, incoming Ph.D. students normally are awarded departmental fellowships. Matriculated Ph.D. students are primarily supported by fellowship awards and assistantship appointments. All students are encouraged to apply for external, competitive fellowships and may obtain information about various awarding agencies from faculty advisers and student services. Assistantships are paid positions for graduate students that, in addition to a salary, provide the benefit of a tuition allocation. Individual faculty members appoint students to research assistantships; the department chair appoints doctoral students to teaching assistantships. Contact departmental student services for additional information.

## COGNATE COURSES FOR ADVANCED DEGREES IN CHEMICAL ENGINEERING

In addition to core CHEMENG graduate courses in the 300 series and elective CHEMENG graduate courses in the 200 and 400 series, students pursuing advanced degrees in chemical engineering include elective courses offered by other departments. The following list is a partial list of the more frequently chosen courses and is subdivided into five focus areas.

### *Broadly Applicable—*

- APPPHYS 207. Laboratory Electronics (3 units)
- CHEM 221. Advanced Organic Chemistry (3 units)
- CHEM 271. Advanced Physical Chemistry (Quantum Mechanics) (3 units)
- CHEM 273. Advanced Physical Chemistry (Angular Momentum, etc.) (3 units)
- EE 261. The Fourier Transform and its Applications (3 units)
- EE 268. Introduction to Modern Optics (3 units)
- MS&E 234. Organizations and Information Systems (4 units)
- STATS 200. Statistical Inference (3 units)

### *Biochemistry and Bioengineering focus, e.g., with CHEMENG 281, 283, 454, 456—*

- BIO 203. Advanced Genetics (human)
- BIO 217. Neuronal Biophysics (4 units)
- BIOC 133. Genetics of Prokaryotes (3 units; needs approval of chair)
- BIOE 331. Protein Engineering (3 units)
- BIOPHYS/SBIO 228. Computational Structural Biology (3 units)
- BIOPHYS/SBIO 241. Biologic Macromolecules (3-5 units)
- CBIO 241. Molecular, Cellular, and Genetics Basis of Cancer (3 units)
- CEE 274. Environmental Microbiology I & II (3 units each)
- MCP 256. How Cells Work: Energetics, Compartments, and Coupling in Cell Biology (4 units)
- MPHA 210. Signal Transduction Pathways and Networks (4 units)
- MPHA 240. Drug Discovery (4 units)
- MPHA 260. Quantitative Chemical Biology (4 units)
- SBIO 228. Computational Structural Biology (3 units)
- SBIO 241. Biological Macromolecules (3-5 units)

### *Fluid Mechanics, Applied Mathematics, and Numerical Analysis focus, e.g., with CHEMENG 462—*

- AA 218. Introduction to Symmetry Analysis (3 units)
- CME 200. Linear Algebra with Application to Engineering Computations (3 units)
- CME 204. Partial Differential Equations in Engineering (3 units)
- CME 206. Introduction to Numerical Methods for Engineering (3 units)
- CME 212. Introduction to Large-Scale Computing in Engineering (3 units)
- CME 332. Computational Methods for Scientific Reasoning and Discovery (3 units)
- CME 340. Computational Methods in Data Mining (3 units)
- ME 338A. Continuum Mechanics (3 units)
- ME 351A. Fluid Mechanics (3 units)
- ME 457. Fluid Flow in Microdevices (3 units)

- ME 469A. Computational Methods in Fluid Mechanics (3 units)

### *Materials Science focus, e.g., with CHEMENG 260, 442, 460, 461, 464, 466—*

- MATSCI 210. Organic and Biological Materials (3 units)
- MATSCI 251. Microstructure and Mechanical Properties (3 units)
- MATSCI 316. Nanoscale Science, Engineering, and Technology (3 units)
- MATSCI 343. Organic Semiconductors for Electronics and Photonics (3 units)
- MATSCI 380. Molecular Biomaterials (3 units)

### *Microelectronics focus, e.g., with CHEMENG 240—*

- AA 218. Introduction to Symmetry Analysis (3 units)
- CME 200. Linear Algebra with Application to Engineering Computation (3 units)
- CME 204. Partial Differential Equations in Engineering (3 units)
- CME 206. Introduction to Numerical Methods for Engineering (3 units)
- CME 212. Introduction to Large-Scale Computing in Engineering (3 units)
- CME 332. Computational Methods for Scientific Reasoning and Discovery (3 units)
- CME 340. Computational Methods in Data Mining
- ME 338A. Continuum Mechanics (3 units)
- ME 351. Fluid Mechanics (3 units)
- ME 457. Fluid Flow in Microdevices (3 units)
- ME 469A. Computational Methods in Fluid Mechanics (3 units)

## BACHELOR OF SCIENCE IN CHEMICAL ENGINEERING

The University's basic requirements for the bachelor's degree and coterminal bachelor's and master's degrees are discussed in the "Undergraduate Degrees" section of this bulletin.

The Chemical Engineering B.S. program requires basic courses in biology, chemistry, engineering, mathematics, and physics. The depth sequence of courses required for the major in chemical engineering provides training in applied chemical kinetics, biochemical engineering, electronic materials, engineering thermodynamics, plant design, polymers, process analysis and control, separation processes, and transport phenomena. Undergraduates who wish to major in the department should consult the curriculum outlined in the "Undergraduate Program in Chemical Engineering" section of this bulletin. Courses taken to fulfill the requirements for the major (courses in mathematics; science; technology and society; engineering fundamentals; and engineering depth) must be taken for a letter grade if this option is offered.

Representative sequences of courses leading to a B.S. in Chemical Engineering, in both flow chart and 4-year, quarter-by-quarter formats, can be found in the *Handbook for Undergraduate Engineering Programs*, available at <http://ughb.stanford.edu>. These are explanatory examples, with each sequence starting at a different level and demonstrating how a student, based on his or her pre-college preparation, can complete the major in four years. These typical course schedules are available as well from departmental student services and chemical engineering faculty advisers for undergraduates. It is recommended that students discuss their prospective programs with chemical engineering faculty advisers, especially if transferring from another major such as Biology, Chemistry, Physics, or other Engineering major. With advance planning, students can usually arrange to attend one of the overseas campuses.

Students interested in a minor in Chemical Engineering should consult the requirements for a "Minor in Chemical Engineering" section of this bulletin.

## HONORS PROGRAM

The Department of Chemical Engineering offers a program leading to the degree of Bachelor of Science in Chemical Engineering with Honors. Qualified undergraduate majors conduct

independent study and research at an advanced level with faculty mentors, graduate students, and fellow undergraduates. This three quarter sequential program requires concurrent participation each quarter in the CHEMENG 191H seminar; completion of a faculty-approved thesis; and participation in the Chemical Engineering Honors Poster Session held annually during the Mason Lecture Series Spring Quarter. The last requirement may also be fulfilled through an alternative, public, oral presentation with the approval of the department chair. Work should begin at least four quarters prior to graduation.

Admission to the honors program is by application and submission of a research proposal and is subject to approvals by faculty advisers, sponsors, and the chair of the department. Declared Chemical Engineering majors with a cumulative grade point average (GPA) of 3.5 or higher are encouraged to apply. Students should submit their applications no later than the first week of March Winter Quarter of their junior year; applications must be submitted no later than the end of the first week of Autumn Quarter of the senior year. An application includes a research proposal, approved by both the student's research thesis adviser and a faculty reader. The faculty adviser or, alternatively, a faculty sponsor, must be a faculty member in the Department of Chemical Engineering. Students should start their research no later than Spring Quarter their junior year and are encouraged to consider incorporating research opportunities such as those sponsored by Undergraduate Academic Life into their honors research proposal; see [http://ual.stanford.edu/OO/research\\_opps/Grants](http://ual.stanford.edu/OO/research_opps/Grants) [http://ual.stanford.edu/OO/research\\_opps/Grants](http://ual.stanford.edu/OO/research_opps/Grants)). See departmental student services staff in Stauffer III, room 113, for more information about the application process, a proposal template, and other assistance.

In order to receive departmental honors, students admitted to the honors program must:

1. Maintain an overall grade point average (GPA) of at least 3.5 as calculated on the unofficial transcript.
2. Complete at least three quarters of research with a minimum of 9 units of CHEMENG 190H for a letter grade. All quarters must focus on the same topic. The same faculty adviser and faculty reader should be maintained throughout if feasible.
3. Enroll in CHEMENG 191H, Undergraduate Honors Seminar, concurrently with each quarter of CHEMENG 190H.
4. Participate with a poster and oral presentation of thesis work at the Chemical Engineering Honors Poster Session held during Spring Quarter or, at the Undergraduate Program Committee's discretion, at a comparable public event. Submit at the same time to student services one copy of the poster in electronic format.
5. Submit final drafts of a thesis simultaneously to the adviser and the reader and, if appropriate, to the Chemical Engineering faculty sponsor, no later than April 9th, or the first school day of the second week of the quarter in which the degree is to be conferred.
6. Complete all work and thesis revisions and obtain indicated faculty approvals on the Certificate of Final Reading of Thesis forms by the end of the last full week of April, or the first month of the graduation quarter.
7. Submit to departmental student services five (5) final copies of the honors thesis, as approved by the appropriate faculty. Include in each thesis an original, completed, faculty signature sheet immediately following the title page. The 2011-12 deadline is May 1, 2012, or the Tuesday at the beginning of the first week of the second month of the graduation quarter.
8. Submit to student services one copy of the honors thesis in electronic format at the same time as the final copies of the thesis or no later than May 1, 2012.
9. Submit one copy of the thesis, upon departmental approval, to the School of Engineering.

## COTERMINAL BACHELOR'S AND MASTER'S DEGREES IN CHEMICAL ENGINEERING

University requirements for the coterminal M.A./M.S. are described in the "Coterminal Bachelor's and Master's Degrees" section of this bulletin. For University coterminal degree program rules and University application forms, see <http://studentaffairs.stanford.edu/registrar/publications#Coterm>.

Undergraduates with strong academic records may apply to study for a master's degree while at the same time completing their bachelor's degree(s). Interested students should discuss their educational goals with their faculty advisers before applying and should talk with departmental graduate student services about the departmental application requirements. Students who complete their applications by the seventh week of a quarter may be admitted to the M.S. the following quarter.

## MASTER OF SCIENCE IN CHEMICAL ENGINEERING

A range of M.S. programs comprising appropriate course work is available to accommodate students wishing to obtain further academic preparation before pursuing a professional chemical engineering career. This degree is lecture course based; there are no research or thesis requirements. It is a terminal M.S. degree. It is not a prerequisite for nor does it lead into the department's Ph.D. program. For conferral of an M.S. degree in chemical engineering the following departmental requirements must be met.

*Unit and Course Requirements*—Students terminating their graduate work with the M.S. degree in Chemical Engineering must develop a graduate-level, thematic M.S. program consisting of a minimum of 45 completed units of academic work that includes (1) four Chemical Engineering lecture courses selected from the 300 series; (2) 3 units of 699 Colloquia; (3) an additional 30 units, selected from graduate-level science or engineering lecture courses in any department and, by petition to the Chair of the Department of Chemical Engineering, from upper-division undergraduate lecture courses in science and engineering. Alternatively, up to 6 units of research may be used in lieu of up to 6 units of the additional 30 lecture units to partially satisfy the 45 unit minimum requirement. Another option is an up-to-six-unit combination of research units and 1, 2, or 3 units of 459 or other similar 1- or 2-unit graduate seminar courses, with faculty developed curricula, used in lieu of up to 6 units of the required additional 30 lecture units. Credit toward the M.S. degree is not given for Chemical Engineering special topics courses numbered in the 500 series nor for similar courses in other departments.

To ensure that an appropriate Chemical Engineering graduate program is pursued by each M.S. candidate, students who first matriculate at Stanford at the graduate level must, during the first quarter, no later than the eighth week, (a) complete a Program Proposal for a Master's Degree form, that is approved by the M.S. adviser; (b) submit this petition to departmental student services, for review by the department chair; and (c) obtain approval for any subsequent program change or changes from the M.S. adviser and the department chair. Stanford undergraduates admitted to the coterminal master's program must (a) submit an adviser-approved Program Proposal for a Master's Degree (a graduate degree progress form) either during their second quarter of graduate standing or upon the completion of 9 units of graduate work (whichever occurs first), and (b) document with student services their M.S. adviser's review and approval of their graduate program when they have accrued 30 units toward the M.S. degree in Chemical Engineering. Each M.S. candidate must obtain approvals for the final M.S. program no later than the eighth week of the quarter preceding the quarter of degree conferral, in order to permit amendment of the final quarter's study list if the faculty deem this necessary. Students with questions should contact departmental student services.

*Minimum Grade Requirement*—Any course used to satisfy the

45-unit minimum for the M.S. degree must be taken for a letter grade, if offered. An overall grade point average (GPA) of 3.0 must be maintained for these courses.

*Research Experience*—Students in the M.S. program wishing to obtain research experience should work with the M.S. faculty adviser on the choice of research adviser as early as feasible and in advance of the anticipated quarter(s) of research. Once arrangements are mutually agreed upon, including the number of units, students enroll in the appropriate section of CHEMENG 600. A written report describing the results of the research under taken must be submitted to and approved by the research adviser. CHEMENG 600 may not be taken in lieu of any of the required four 300-level lecture courses.

## ENGINEER IN CHEMICAL ENGINEERING

The degree of Engineer is awarded after completion of a minimum of 90 units of graduate work beyond the B.S. degree and satisfactory completion of all University requirements plus the following departmental requirements. This degree is not a prerequisite for the Ph.D. program.

*Unit and Course Requirements*—A minimum of 90 total units (including research) within which 45 units of lecture course work are required, including (1) CHEMENG 300, 310, 320, 340, 345, 355 and (2) 3 units of CHEMENG 699. The remaining lecture courses, to total at least 45 completed units, may be chosen from graduate level science and engineering courses according to the guidelines given in the Master of Science section and with the consent of the graduate curriculum committee chair and the department chair. In fulfilling the required 45-unit requirement for lecture course units, an aggregate of 6 units maximum of the required 45-unit minimum of course work may include such courses as CHEMENG 459 and 699, but not 500 level seminar courses or research units. Students seeking the Engineer degree may petition to add a M.S. program and apply for the M.S. degree once the requirements for that degree have been fulfilled (see General Requirements in the "Graduate Degrees" section of this bulletin and Chemical Engineering's "Master of Science" section).

*Minimum Grade Requirement*—Any course intended to satisfy the degree requirements must be taken for a letter grade, if offered. An overall grade point average (GPA) of 3.0 must be maintained for these courses.

*Reading Committee Requirement*—All candidates are required to have an initial meeting with their reading committees, consisting of two members of the Chemical Engineering faculty, by the end of their seventh quarter. Following this initial meeting, additional committee meetings must occur no less than once a year until all the requirements for the degree are satisfied. Students are encouraged to hold meetings on a more frequent basis to help focus and guide the thesis project. It is each student's responsibility to schedule these meetings and to assist in the keeping of accurate degree progress records by informing student services when meetings have taken place.

*Thesis Requirement*—The thesis must represent a substantial piece of research equivalent to nine months of full-time effort and must be approved by the student's reading committee.

*Qualification for the Ph.D. Program by Students Ready to Receive the Degree of Engineer*—After completing the requirements for the Engineer degree, a student may request to be examined on the research work completed for that degree, for the purpose of qualifying for admission to Ph.D. candidacy. If the request is granted, the student's thesis must be approved by the reading committee and available in its final form for inspection by the entire faculty at least two weeks prior to the scheduled date of said examination.

## DOCTOR OF PHILOSOPHY IN CHEMICAL ENGINEERING

The Ph.D. degree is awarded after the completion of a minimum of 135 units of graduate work as well as satisfactory completion of any additional University requirements and the following departmental requirements. Completion of a M.S. degree is not a prerequisite for beginning, pursuing, or completing doctoral work.

*Unit and Course Requirements*—A minimum of 135 completed units, including a minimum of 45 units of lecture course work, is required for the Ph.D. degree. The following courses are required: CHEMENG 300, 310, 320, 340, 345, and 355, plus two courses in the CHEMENG 440, 450, or 460 series. These are to be taken at Stanford, and any petition to substitute another graduate-level course for any of these core courses must be approved by the department chair. The remaining lecture courses may be chosen from graduate-level science and engineering lecture courses in any department and, by petition to the department chair, from upper-division undergraduate lecture courses in the sciences and engineering. Three units of CHEMENG 699 must be completed and may be included in the required 45 units of lecture courses. Additionally, 1, 2, or 3 units of seminar courses with faculty developed curricula, such as CHEMENG 459, may be substituted for up to 3 units of the unspecified lecture courses, but not for any of the specified CHEMENG courses above. All proposals for Ph.D. course work must be approved by the student's adviser and the department chair or his designee. Students admitted to Ph.D. candidacy should enroll each quarter in the 500 series, 600, and 699 as appropriate and as study list unit limits permit. Students with questions or issues should see departmental student services. Predoctoral students may petition for a M.S. degree program to be added to their university record. When the petition is approved, students may apply in Axxess for M.S. degree conferral once the requirements for that degree have been fulfilled (see the "Master of Science in Chemical Engineering" section in this bulletin). The M.S. degree must be awarded within the University's candidacy period for completion of a master's degree.

*Minimum Grade Requirement*—Any course intended to satisfy the Ph.D. degree requirements must be taken for a letter grade, if offered. An overall grade point average (GPA) of 3.0 must be maintained for these courses.

*Qualifying Examination*—To be advanced to candidacy for the Ph.D. degree, the student must pass both parts of the qualifying examination. The first part is held at the beginning of Spring Quarter, or the third quarter of study, and the first-year student is asked to make an oral presentation to the faculty of a critical review of a published paper. This preliminary examination, in addition to performance in courses and during research rotations, is the basis for determining whether or not a first-year student is to be allowed by faculty to choose a research adviser and to begin doctoral research work immediately. Failure in the first part of the qualifying examination normally leads to termination of a student's study towards the Ph.D. degree; however, the student may continue to work toward an M.S. degree (see the "Master of Science in Chemical Engineering" section of this bulletin). It also precludes any financial aid beyond that already awarded. Students who pass the preliminary examination take the second part of the qualifying examination at the beginning of their second year, or the fifth quarter. This second examination before the faculty is an oral presentation of their thinking about their research proposal and current progress and an examination of the specifics as well as their understanding of the fundamental chemical, physical, and biological concepts that govern the molecular behavior of the system being studied. Students who pass both parts of the qualifying examination must promptly submit to graduate student services an Application for Candidacy for Doctoral Degree form which has been approved by their research adviser(s), and at the same time establish their doctoral dissertation reading committees.

*Reading Committee Requirement*—All Ph.D. candidates are required to assemble reading committees and to have an initial

meeting with the full committee by the end of their seventh quarter. Reading committee meetings are not examinations; they are intended to be discussion sessions to help focus and guide the dissertation project. Following the initial committee meeting, additional meetings must take place no less than once per year until all the requirements for the Ph.D. degree are satisfied. The department encourages students to take advantage of the benefits of more frequent meetings with their full reading committee. It is the student's responsibility to schedule committee meetings and to assist in the maintenance of degree progress records by reporting the meeting dates to the student services manager.

**Teaching Requirement**—Teaching experience is considered an essential component of doctoral training because it assists in the further development and refinement of candidates' skills in conveying what they know, think, and conclude, based on articulated assumptions and knowledge. All Ph.D. candidates, regardless of the source of their financial support, are required to assist in the teaching of a minimum of two chemical engineering courses.

**Dissertation and Oral Defense Requirements**—A dissertation based on a successful investigation of a fundamental problem in chemical engineering is required. Within approximately five calendar years after enrolling in the Ph.D. program, a student is expected to have fulfilled all the requirements for this degree, including the completion of a dissertation approved by his or her research adviser(s). Upon adviser approval, copies of the final draft of a dissertation must be distributed to each reading committee member. No sooner than three weeks after this distribution, a student may schedule an oral examination. This examination is a dissertation defense, based on the candidate's dissertation research, and is in the form of a public seminar followed by a private examination by the faculty members on the student's oral examination committee. Satisfactory performance in the oral examination and acceptance of an approved dissertation by Graduate Degree Progress, Office of the University Registrar, leads to Ph.D. degree conferral.

## PH.D. MINOR IN CHEMICAL ENGINEERING

The University's general requirements for the Ph.D. minor are specified in the "Graduate Degrees" section of this bulletin. An application for a Ph.D. minor must be approved by both the major and minor departments.

A student desiring a Ph.D. minor in Chemical Engineering must work with a minor program adviser who has a faculty appointment in Chemical Engineering. At a minimum, this adviser must be a member of the student's reading committee for the doctoral dissertation, and the entire reading committee must meet at least once and at least one year prior to the scheduling of the student's oral examination. The department strongly prefers that regular meetings of the full reading committee start in the second year of graduate study or when the student is admitted to Ph.D. candidacy. In addition, the Chemical Engineering faculty member who is the minor adviser must be a member of the student's University oral examination committee.

The Ph.D. minor program must include at least 20 units of graduate-level lecture courses (numbered at the 200 level or above), but may not include any 1-2 unit lecture courses in the 20-unit minimum. The list of courses must form a coherent program and must be approved by the minor program adviser and the chair of this department. All courses for the minor must be taken for a letter grade, and a GPA of at least 3.0 must be earned for these courses.

## CIVIL AND ENVIRONMENTAL ENGINEERING

**Emeriti: (Professors)** James Douglas, Joseph B. Franzini, Helmut Krawinkler\*, Gilbert M. Masters\*, Perry L. McCarty\*, Henry W. Parker, George A. Parks, Martin Reinhard\*, Haresh C. Shah, Robert L. Street\*, Clyde B. Tatum\*, Paul M. Teicholz

**Chair:** Stephen G. Monismith

**Associate Chair:** Sarah Billington

**Professors:** Ronaldo I. Borja, Craig S. Criddle, Gregory G. Deierlein, Martin A. Fischer, Lynn M. Hildemann, Mark Z. Jacobson (on leave Autumn), Anne S. Kiremidjian (on leave Spring), Peter K. Kitanidis, Jeffrey R. Koseff, Kincho H. Law, James O. Leckie (on leave Winter), Raymond E. Levitt (on leave Autumn), Richard G. Luthy, Stephen G. Monismith, Leonard Ortolano, Alfred M. Spormann

**Associate Professors:** Alexandria B. Boehm, Sarah L. Billington, David L. Freyberg, Oliver B. Fringer, Eduardo Miranda

**Assistant Professors:** Jack W. Baker (on leave Autumn), Jennifer Davis, Michael D. Lepech, Ram Rajagopal

**Courtesy Professors:** Peter M. Pinsky, David D. Pollard

**Courtesy Associate Professor:** Margot G. Gerritsen

**Courtesy Assistant Professor:** Karen L. Casciotti

**Lecturers:** Cassiana Aaronson Wright, Montgomery Anderson, Deborah Ballati, John H. Barton II, Thomas Beischer, Cathrine D. Blake, Stanley F. Christensen, Charles Debbas, Nicholas de Sienes, Derek Fong, Renate Fruchter, Robert R. Groves, Andrew G. Hudacek, Glenn Katz, Karl Knapp, Nelson A. Koen Cohen, Erik Kolderup, Royal J. Kopperud, Drew Krafcik, John C. Kunz, Amy Larimer, Ashby Monk, Kimberly Null, Ryan J. Orr, Alexander P. Robertson, Peter Rumsey, Raphael Sperry, Mark Sarkisian, Patti J. Walters, Christopher S. Wasney

**Consulting Professors:** Vladimir Bazjanac, James E. Cloern, Angelos N. Findikakis, Gary E. Griggs, Robert F. Hickey, Thomas L. Holzer, Michael C. Kavanaugh, Mark R. Kroll, Francis L. Ludwig, Martin W. McCann, Jr., Paul K. Meyer, Piotr D. Moncarz, Wayne R. Ott, Ingo Pinnau, Harry F. Ridgway, Benedict R. Schwegler, Jr., Avram S. Tucker, Antonio L. Vives, Michael W. Walton

**Consulting Associate Professors:** William J. Behrman, Robert D. Bornstein, Edward S. Gross, Charles S. Han, Jonathan G. Koomey, Gloria T. Lau, Lisa V. Lucas, Colin Ong, Joel N. Swisher, Jie Wang, Jane Woodward

**Consulting Assistant Professors:** Cristina L. Archer, Murray D. Einarson, Calvin K. Kam, Neil E. Klepeis, Michael L. MacWilliams, Pooya Sarabandi

**Shimizu Visiting Professor:** Tissa H. Illangasekare

**UPS Visiting Associate Professor:** Peter J. Vikesland

\* Recalled to active duty.

**Department Offices:** Yang and Yamazaki Building (Y2E2), Rooms 314/316

**Zip-Mail Code:** 94305-4020

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**Web Site:** <http://cee.stanford.edu>

Courses offered by the Department of Civil and Environmental Engineering are listed under the subject code CEE on the *Stanford Bulletin's* ExploreCourses web site.

The Department of Civil and Environmental Engineering (CEE) at Stanford conducts basic and applied research that advances the civil and environmental engineering professions, educates future academic and industry leaders, and prepares students for careers in professional practice. Civil and environmental engineers work to sustain the natural environment while creating and maintaining the built environment. Civil and environmental engineers are essential to providing the necessities of human life, including water, air, shelter, the infrastructure, energy, and food in increasingly more efficient and renewable

ways.

The department focus is on the theme of engineering for sustainability, including three core areas: the Built Environment, Environmental and Water studies, and Atmosphere and Energy. The built environment includes creating processes, techniques, materials, and monitoring technologies for planning, design, construction and operation of environmentally sensitive, economically efficient, performance-based buildings and infrastructure, and managing associated risks from natural and man-made hazards. The water environment includes creating plans, policies, science-based assessment models and engineered systems to manage water in ways that protect human health, promote human welfare, and provide freshwater and coastal ecosystem services. Atmosphere and Energy includes studying fundamental energy and atmospheric engineering and science, assessing energy-use effects on atmospheric processes and air quality, and analyzing and designing energy-efficient generation and use systems with minimal environmental impact.

The department also hosts the School of Engineering undergraduate major in Architectural Design and the undergraduate major in Atmosphere/Energy; both of these programs lead to a B.S. in Engineering.

## MISSION OF THE UNDERGRADUATE PROGRAM IN CIVIL ENGINEERING

The mission of the undergraduate program in Civil Engineering is to provide students with the principles of engineering and the methodology needed for civil engineering practice. This pre-professional program balances the fundamentals common to many specialties in civil engineering and allows for concentration in structures and construction or environmental and water studies. Students in the major learn to apply knowledge of mathematics, science, and civil engineering to conduct experiments, design structures and systems to creatively solve engineering problems, and communicate their ideas effectively. The curriculum includes course work in structural, construction, and environmental engineering. The major prepares students for careers in government and industry, and further graduate study.

## MISSION OF THE UNDERGRADUATE PROGRAM IN ENVIRONMENTAL ENGINEERING

The mission of the undergraduate program in Environmental Engineering is to equip students with the problem solving skills and knowledge necessary to assess and develop solutions to environmental problems impacting the biosphere, land, water, and air quality. The Environmental Engineering major offers a more focused program in Environmental and Water Studies than the Environmental and Water Studies concentration in the Civil Engineering degree program. Courses in the program are multidisciplinary in nature, combining fundamental principles drawn from physics, chemistry, geology, engineering, and biology. Students learn about the analytical methods necessary to evaluate environmental changes and to design strategies to remediate problems that inevitably may have resulted from human activities. The program prepares students for careers in consulting, industry, and government, and for graduate school in engineering.

## LEARNING OUTCOMES

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. understanding of engineering principles as well as the analytical, problem solving, design, and communication skills necessary to succeed and continue learning in diverse careers.
2. preparation for successful engineering practice with a longer term perspective that takes into account new tools such as

advanced information technology and biotechnology, and increasingly complex professional and societal expectations.

3. sufficient breadth and depth for graduate study in engineering or other professional fields.
4. the awareness, background, and skills necessary to become responsible citizens and leaders in service to society.

## GRADUATE PROGRAMS IN CIVIL AND ENVIRONMENTAL ENGINEERING

The Department of Civil and Environmental Engineering (CEE), in collaboration with other departments, offers graduate degrees structured in three degree programs.

- The Atmosphere and Energy Program offers degrees with the designation of Atmosphere/Energy.
- The Built Environment Program offers degrees with five designations:
  - Construction Engineering and Management
  - Design/Construction Integration
  - Structural Engineering
  - Geomechanics
  - Sustainable Design and Construction.
- The Environmental and Water Studies Program offers degrees with two designations:
  - Environmental Engineering and Science
  - Environmental Fluid Mechanics and Hydrology

For detailed information on these programs and degree designations, see the "Programs of Graduate Study in Civil and Environmental Engineering" section of this bulletin.

## ADMISSIONS AND FINANCIAL AID

Applications require online submission of the application form and statement of purpose, followed by three letters of recommendation, results of the General Section of the Graduate Record Examination, and transcripts of all courses taken at colleges and universities. See <http://gradadmissions.stanford.edu>. Policies for each of the department's programs are available by referring to <http://cee.stanford.edu>. Successful applicants are advised as to the degree and program for which they are admitted. If students wish to transfer from one CEE program to another after being accepted, an application for the intradepartmental change must be filed within the department; they will then be advised whether the change is possible. If, after enrollment at Stanford, students wish to continue toward a degree beyond the one for which they were originally admitted, a written application must be made to the Department of Civil and Environmental Engineering.

The department maintains a continuing program of financial aid for graduate students. Applications for financial aid and assistantships should be filed by December 6, 2011; it is important that Graduate Record Examination scores be available at that time. Applicants not requesting financial assistance have until February 7, 2012 for the online submission. Teaching assistantships carry a salary for as much as half-time work to assist with course offerings during the academic year. Up to half-time research assistantships also are available. Engineer and Ph.D. candidates may be able to use research results as a basis for the thesis or dissertation. Fellowship and scholarship awards or loans may supplement assistantships and other basic support. Continued support is generally provided for further study toward the Engineer or Ph.D. degree based on the student's performance, the availability of research funds, and requisite staffing of current research projects.

## FACILITIES

Research work and instruction under the three programs are carried out in these facilities: Building Energy Laboratory; Environmental Engineering and Science Laboratory; Environmental Fluid Mechanics Laboratory (EFML); Geotechnical Engineering Laboratory; Structural Engineering Laboratory; and water quality control research and teaching laboratories. The John

A. Blume Earthquake Engineering Center conducts research on earthquake engineering including advanced sensing and control, innovative materials, and risk hazard assessment. Research and advanced global teamwork education is conducted in the Project Based Learning (PBL) Laboratory. In collaboration with the Department of Computer Science, the Center for Integrated Facility Engineering (CIFE) employs advanced CAD, artificial intelligence, communications concepts, and information management to integrate participants in the facility development process and to support design and construction automation. The Collaboratory for Research on Global Projects (CRGP) is a multi-school, multi-university research program aimed at improving the performance of global engineering and construction projects, with a special focus on sustainable infrastructure in developing countries.

## BACHELOR OF SCIENCE IN CIVIL AND ENVIRONMENTAL ENGINEERING

The B.S. in Civil Engineering and the B.S. in Environmental Engineering are ABET accredited programs, which place high priority on integrating research with engineering education. Four major objectives structure both degree programs:

1. To provide an understanding of engineering principles and the analytical, problem solving, design, and communication skills to continue succeeding and learning in diverse careers.
2. To prepare for successful engineering practice with a longer term perspective that takes into account new tools such as advanced information technology and biotechnology, and increasingly complex professional and societal expectations.
3. To prepare for possible graduate study in engineering or other professional fields.
4. To develop the awareness, background, and skills necessary to become responsible citizens and leaders in service to society.

Students who major in Civil Engineering or in Environmental Engineering must complete the appropriate requirements for the B.S. degree listed. Each student has elective units, which may be used in any way the student desires, including additional studies in Civil and Environmental Engineering or any other school or department in the University. Because the undergraduate engineering curriculum provides breadth of study, students who intend to enter professional practice in civil or environmental engineering should plan to obtain their professional education at the graduate level.

A number of undergraduate programs at Stanford may be of interest to students seeking to specialize in environmental studies. In addition to the two majors offered in the department, students should examine related programs such as Earth Systems, Geological and Environmental Sciences, Urban Studies, and Human Biology.

## HONORS PROGRAM

This program leads to a B.S. with honors for undergraduates majoring in Civil Engineering or in Environmental Engineering. It is designed to encourage qualified students to undertake a more intensive study of civil and environmental engineering than is required for the normal majors through a substantial, independent research project.

The program involves an in-depth research study in an area proposed to and agreed to by a Department of Civil and Environmental Engineering faculty adviser and completion of a thesis of high quality. A written proposal for the research to be undertaken must be submitted and approved by the faculty adviser in the fourth quarter prior to graduation. At the time of application, the student must have an overall grade point average (GPA) of at least 3.3 for course work at Stanford; this GPA must be maintained to graduation. The thesis is supervised by a CEE faculty adviser and must involve input from the School of Engineering writing program by means of ENGR 202S or its equivalent. The written thesis must be approved by the thesis adviser. Students are encouraged to present their results in a seminar for faculty and

students. Up to 10 units of CEE 199H, Undergraduate Honors Research in Civil and Environmental Engineering, may be taken to support the research and writing (not to duplicate ENGR 202S). These units are beyond the normal Civil Engineering or Environmental Engineering major program requirements.

## MINOR IN CIVIL ENGINEERING OR ENVIRONMENTAL ENGINEERING

The department offers a minor in Civil Engineering and a minor in Environmental Engineering. Departmental expertise and undergraduate course offerings are available in the areas of architectural design, construction engineering, construction management, structural/geotechnical engineering, environmental engineering and science, environmental fluid mechanics and hydrology, and atmosphere/energy. The courses required for the minors typically have prerequisites. Minors are not ABET-accredited programs.

## PROGRAMS OF GRADUATE STUDY IN CIVIL AND ENVIRONMENTAL ENGINEERING

### ATMOSPHERE AND ENERGY PROGRAM

The Atmosphere and Energy program in Civil and Environmental Engineering combines atmospheric science with energy science and engineering. The main goals of the program are to educate students and the public, through courses, research, and public outreach, about the causes of climate, air pollution, and weather problems and methods of addressing these problems through renewable and efficient energy systems. In addition, students learn about feedbacks between the atmosphere and renewable energy systems and the effects of the current energy infrastructure on the atmosphere.

Major focus areas of energy research include examining the resource availability of renewable energies, such as wind, solar, and wave, and studying optimal methods of combining renewable energies together to match energy supply with instantaneous demand. This type of work is generally done through a combination of data analysis, three-dimensional atmospheric computer modeling of wind, solar, wave, and hydroelectric power resources, and transmission load flow computer modeling. Other energy research, performed through three-dimensional computer modeling, focuses on the effects, for example, of hydrogen fuel cell vehicles on air pollution and the ozone layer and the effects of ethanol and diesel vehicles on air quality and climate. Studies also examine the feedback of wind turbines to the atmosphere and the effects of climate change on wind and solar energy resources.

Atmospheric research in the program generally involves laboratory work, field measurements, or three-dimensional computer modeling of the combined atmosphere, ocean, and land surface. An example of laboratory work includes measuring the properties of organic particulate matter that forms in the atmosphere. Examples of fieldwork include measuring exposures to secondhand smoke, allergens, and emissions from building materials.

Computer modeling is performed at a variety of spatial scales, from the globe down to the size of a building or smaller. Some examples of modeling studies include examining the effects of air pollution particles on clouds, rainfall, water supply, ultraviolet radiation, the stratospheric ozone layer, and climate, simulating the dispersion of toxic contaminants in an urban street canyon, studying the effects of aircraft exhaust and biomass burning on climate, studying the effects of carbon dioxide domes over cities on air pollution mortality, and studying the leading causes of global warming and their impacts.

### ENVIRONMENTAL AND WATER STUDIES PROGRAMS

Environmental and water studies include subprograms in environmental engineering and science and environmental fluid



mechanics and hydrology, which includes environmental planning. Course offerings permit study in a single area or interrelated study between areas. Programs are flexible to foster interaction among students and encourage the development of individual programs. The Stanford laboratories for water quality control and environmental fluid mechanics are well equipped for advanced research and instruction.

Courses from other programs and departments complement our programs' course offerings. Examples include Computer Science (numerical methods), Geological and Environmental Sciences (geostatistics, hydrogeology), Mechanical Engineering (applied math, experimental methods, fluid mechanics, heat transfer), Energy Resources Engineering (reservoir engineering, well-test analysis), and Statistics (probability and statistics).

The major areas of specialization in the two subprograms, environmental engineering and science, and environmental fluid mechanics and hydrology, are described following. Admission to these subprograms are handled separately; prospective students should indicate their preference on their application.

### **ENVIRONMENTAL ENGINEERING AND SCIENCE**

The Environmental Engineering and Science (EES) subprogram emphasizes the chemical and biological processes involved in water quality engineering, pollution treatment, remediation, and environmental protection.

Course offerings include: the biological, chemical, and engineering aspects of water supply; the movement and fate of pollutants in surface and ground waters, soil, and the atmosphere; hazardous substance control; molecular environmental biotechnology; and water and air pollution. Companion courses in the Environmental Fluid Mechanics and Hydrology Program (EFMH) include environmental planning and impact assessment, and environmental fluid mechanics, hydrology, and transport modeling.

### **ENVIRONMENTAL FLUID MECHANICS AND HYDROLOGY**

The Environmental Fluid Mechanics and Hydrology (EFMH) subprogram focuses on understanding the physical processes controlling the movement of mass, energy, and momentum in the water environment and the atmosphere. The subprogram also considers environmental and institutional issues involved in planning water resources development projects.

Environmental fluid mechanics courses address: experimental methods; fluid transport and mixing processes; the fluid mechanics of stratified flows; natural flows in coastal waters, estuaries, lakes, and open channels; and turbulence and its modeling. Hydrology courses consider flow and transport in porous media, stochastic methods in both surface and subsurface hydrology, and watershed hydrology and modeling. Atmosphere courses deal with climate, weather, storms and air pollution and their modeling. Planning courses emphasize environmental policy implementation and sustainable water resources development.

The research of this group is focused in the Environmental Fluid Mechanics Laboratory, which includes the P. A. McCuen Environmental Computer Center.

### **SUSTAINABLE BUILT ENVIRONMENT PROGRAMS**

The Sustainable Built Environment programs include subprograms in construction engineering and management, design-construction integration, structural engineering and geomechanics, and sustainable design and construction. These programs focus on educating practitioners and researchers to plan, design, build, and operate more sustainable buildings and infrastructure.

The Construction Engineering and Management (CEM) subprogram prepares students for careers with progressive construction firms worldwide, interested in building more sustainable buildings and infrastructure using advanced modeling and visualization methods and tools known as virtual design and construction.

The Structural Engineering and Geomechanics (SEG) subprogram educates designers and researchers who want to progress beyond traditional life safety code-based design, to develop and disseminate performance-based structural and geotechnical engineering methods and tools that maximize the lifecycle economic value of facilities.

The Design-Construction Integration (DCI) subprogram combines courses from CEM and SEG to educate and prepare students for design construction firms that provide integrated design-build project delivery, construction management, and pre-construction services.

The Sustainable Design and Construction (SDC) subprogram provides courses in sustainable, multi-stakeholder design methods and tools that incorporate lifecycle cost analysis, green architectural design, lighting, and energy analysis, to educate students interested in promoting more sustainable development of buildings and infrastructure.

Admission to these programs are handled separately; prospective students should indicate their preference on their application.

### **CONSTRUCTION ENGINEERING AND MANAGEMENT**

The Construction Engineering and Management (CEM) subprogram prepares technically qualified students for responsible engineering and management roles in all phases of the development of major constructed facilities. It emphasizes management techniques useful in organizing, planning, and controlling the activities of diverse specialists working within the unique project environment of the construction industry, and it covers construction engineering aspects of heavy, industrial and building construction.

The CEM subprogram offers courses in: building systems, construction administration, construction law, project finance, accounting, real estate development, structural design, HVAC design and construction, equipment and methods, estimating, international construction, labor relations, managing human resources, planning and control techniques, productivity improvement, and project and company organizations. Additional related course work is available from other programs within the department, from other engineering departments, and from other schools in the University such as Earth Sciences and the Graduate School of Business.

The CEM program allows students substantial flexibility to tailor their program of study for careers with general contractors, specialty contractors, real estate, or infrastructure developers or facility owners and operators.

### **DESIGN-CONSTRUCTION INTERGRATION**

The Design-Construction Integration (DCI) subprogram prepares students for multidisciplinary collaborative teamwork in an integrated design and construction process. The subprogram extends a student's design or construction background with core courses in each of these areas and develops the background needed to understand the concerns and expertise of the many project stakeholders. It includes a comprehensive project-based learning experience.

The subprogram in Design-Construction Integration is open to applicants with backgrounds in engineering and science. Applicants should also have a background in the planning, design, or construction of facilities by virtue of work experience and/or their undergraduate education. Knowledge in subjects from the traditional areas of civil engineering is necessary for students to receive the degree and to satisfy prerequisite requirements for some of the required graduate courses.

Students with an undergraduate degree in Civil Engineering, and who expect to pursue careers with design or construction firms that emphasize design-build, EPC, or turnkey projects should consider DCI.

### **STRUCTURAL ENGINEERING AND GEOMECHANICS**

The Structural Engineering and Geomechanics (SEG) subprogram encompasses teaching and research in structural

design and analysis, structural materials, earthquake engineering and structural dynamics, advanced sensing and structural health monitoring, risk and reliability analysis, computational science and engineering, and geotechnical engineering including geomechanics. The SEG subprogram prepares students for industrial or academic careers.

Students can balance engineering fundamentals with modern computational and experimental methods to customize programs to launch careers as consultants on large and small projects, designers, and engineering analysts.

Structural design and analysis focuses on the conceptual design of structural systems and on computational methods for predicting the static and dynamic, linear and nonlinear responses of structures.

Structural materials research and teaching focuses on the design and analysis of high-performance as well as low-environmental impact materials.

Earthquake engineering and structural dynamics addresses earthquake phenomena, ground shaking, and the behavior, analysis, and design of structures under seismic and other dynamic forces.

Reliability and risk analysis focuses on advanced methods for structural safety evaluation and design, including methods for loss estimation from damage and failures of structures and lifeline systems.

Computational science and engineering emphasizes the application of modern computing methods to structural engineering and geomechanics and encompasses numerical, structural, and geotechnical analysis, including finite element analysis and boundary element methods.

In the area of geomechanics, students focus on the application of the principles of applied mechanics to problems involving geologic materials including theoretical soil and rock mechanics, computational methods, and analysis and design of foundations and earth structures.

### **SUSTAINABLE DESIGN CONSTRUCTION**

The Sustainable Design and Construction (SDC) subprogram prepares students for careers in planning, designing, building, and operating sustainable buildings and infrastructure to maximize their lifecycle economic value, their net contribution to environmental functions and services, and their social equity.

The subprogram offers courses in: project finance; sustainable multidisciplinary, multi-stakeholder planning and design processes; green architecture; performance-based structural design; building energy systems; and sustainable construction processes and materials. Classes on strategy, economics and organization design for new businesses, and corporate or governmental initiatives focusing on enhancing the sustainability of buildings and infrastructure round out the subprogram.

This subprogram is intended for students with undergraduate degrees in architecture, engineering, science, construction management, economics or business who wish to pursue careers that enhance the sustainability of the built environment.

Potential employers include architectural or engineering design firms, sustainability consultants, construction firms focusing on green buildings, green-tech start-ups, and green-tech venture funds.

### **COTERMINAL B.S./M.S. PROGRAM IN CIVIL AND ENVIRONMENTAL ENGINEERING**

Stanford undergraduates who wish to continue their studies for the Master of Science degree in the coterminal program at Stanford must have earned a minimum of 120 units towards graduation. This includes allowable Advanced Placement (AP) and transfer credit. Applicants must submit their application no later than the quarter prior to the expected completion of their undergraduate degree and are expected to meet the Department of Civil and Environmental Engineering application deadlines for all applicants

for graduate study (January 15, 2011 to be considered for financial aid, and also if no financial aid is requested). Applications are considered once a year near the beginning of Winter Quarter. An application must display evidence of potential for strong academic performance as a graduate student.

It is recommended that students who contemplate advanced study at Stanford discuss their plans with their advisers in the junior year.

University requirements for the coterminal M.S. are described in the "Coterminal Bachelor's and Master's Degrees" section of this bulletin. For University coterminal degree program rules and University application forms, see <http://studentaffairs.stanford.edu/registrar/publications#Coterm>.

### **MASTER OF SCIENCE IN CIVIL AND ENVIRONMENTAL ENGINEERING**

The following programs are available leading to the M.S. degree in Civil and Environmental Engineering:

- Atmosphere/Energy
- Construction Engineering and Management
- Design/Construction Integration
- Environmental Engineering and Science
- Environmental Fluid Mechanics and Hydrology
- Geomechanics
- Structural Engineering
- Sustainable Design Construction

Students admitted to graduate study with a B.S. in Civil Engineering, or equivalent, from an accredited curriculum can satisfy the requirements for the M.S. degree in Civil and Environmental Engineering by completing a minimum of 45 units beyond the B.S. All 45 units must be taken at Stanford. A minimum 2.75 grade point average (GPA) is required for candidates to be recommended for the M.S. degree. No thesis is required.

The program of study must be approved by the faculty of the department and should include at least 45 units of courses in engineering, mathematics, science, and related fields unless it can be shown that other work is pertinent to the student's objectives. Additional program area requirements are available on the department web site and from the department's student services office (Y2E2 room 316).

Candidates for the M.S. in Civil and Environmental Engineering who do not have a B.S. in Civil Engineering may, in addition to the above, be required to complete those undergraduate courses deemed important to their graduate programs. In such cases, more than three quarters is often required to obtain the degree.

### **ENGINEER IN CIVIL AND ENVIRONMENTAL ENGINEERING**

A student with an M.S. in Civil Engineering may satisfy the requirements of the degree of Engineer in Civil and Environmental Engineering by completing 45 unduplicated course work and research units for a total of 90 units. Engineer candidates must submit an acceptable thesis (12 to 15 units) and maintain a minimum GPA of 3.0. The program of study must be approved by a faculty member in the department.

This degree is recommended for those desiring additional graduate education, especially those planning a career in professional practice. The thesis normally should be started in the first quarter of graduate study after the M.S. degree. Programs are offered in the fields of specialization mentioned for the M.S. degree. The Engineer thesis topic, for students who will continue study toward a CEE Ph.D., must be significantly different from their doctoral research.

## DOCTOR OF PHILOSOPHY IN CIVIL AND ENVIRONMENTAL ENGINEERING

The Ph.D. is offered under the general regulations of the University as set forth in the "Graduate Degrees" section of this bulletin. This degree is recommended for those who expect to engage in a professional career in research, teaching, or technical work of an advanced nature. The Ph.D. program requires a total of 135 units of graduate study, at least 90 units of which must be at Stanford. Up to 45 units of graduate study can be represented by the M.S. program described above. Students must maintain a minimum GPA of 3.0 in post-M.S. course work. All candidates for the Ph.D. degree are required to complete CEE 200 in conjunction with a one-quarter teaching assistantship/course assistantship to gain training and instructional experience. Further information on Ph.D. requirements and regulations is found in the department handbook.

The program of study is arranged by the prospective candidate at the beginning of the second year with the advice of a faculty committee whose members are nearest in the field of interest to that of the student. The chair of the committee serves as the student's interim adviser until such time as a member of the faculty has agreed to direct the dissertation research. Insofar as possible, the program of study is adapted to the interests and needs of the student within the framework of the requirements of the department and the University.

By the end of the second year of graduate study (or by the end of the first year for students who enroll at Stanford with an M.S.), the student is expected to pass the department's General Qualifying Examination (GQE) to be admitted to candidacy for the doctoral degree. The purpose of the GQE is to ensure that the student is adequately prepared to undertake doctoral research and has a well planned research topic. The exam may take the form of (1) a written and/or oral general examination of the candidate's major field, (2) a presentation and defense of the candidate's doctoral research dissertation proposal, or (3) a combination research proposal and general examination. The GQE is administered by an advisory committee consisting of at least three Stanford faculty members, including a chair who is a faculty member in Civil and Environmental Engineering. All members are normally on the Stanford Academic Council. A petition for appointment of one advisory committee member who is not on the Academic Council may be made if the proposed person contributes an area of expertise that is not readily available from the faculty. Such petitions are subject to approval by the department chair. When the primary research adviser is not a member of the CEE Academic Council faculty, the committee must consist of four examiners, with two members from the CEE department.

## PH.D. MINOR IN CIVIL AND ENVIRONMENTAL ENGINEERING

A Ph.D. minor is a program outside a major department. Requirements for a minor are established by the minor department. Acceptance of the minor as part of the total Ph.D. program is determined by the major department. Application for the Ph.D. minor must be approved by both the major and the minor department, and the minor department must be represented at the University oral examination.

A student desiring a Ph.D. minor in Civil and Environmental Engineering (CEE) must have a minor program adviser who is a regular CEE faculty member in the program of the designated subfield. This adviser must be a member of the student's University oral examination committee and the reading committee for the doctoral dissertation.

The program must include at least 20 units of graduate-level course work (courses numbered 200 or above, excluding special studies and thesis) in CEE completed at Stanford University. The list of courses must form a coherent program and must be approved by the minor program adviser and the CEE chair. A minimum GPA of 3.0 must be achieved in these courses.

## OVERSEAS STUDIES COURSES IN CIVIL AND ENVIRONMENTAL ENGINEERING

For course descriptions and additional offerings, see the listings in the *Stanford Bulletin's* ExploreCourses web site (<http://explorecourses.stanford.edu>) or the Bing Overseas Studies web site (<http://bossp.stanford.edu>). Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

### AUTUMN QUARTER

#### AUSTRALIA

- OSPAUSTL 10. Coral Reef Ecosystems. 3 units, Kevin Arrigo, Selina Ward, GER:DB:EngrAppSci
- OSPAUSTL 20. Coastal Resource Management. 3 units, Ron Johnstone, GER:DB:EngrAppSci
- OSPAUSTL 30. Coastal Forest Ecosystems. 3 units, Claire Baker, Catherine Lovelock, GER:DB:EngrAppSci

## INSTITUTE FOR COMPUTATIONAL AND MATHEMATICAL ENGINEERING

*Emeritus: (Professor)* Joe Keller (Mathematics, Mechanical Engineering)

*Director:* Margot Gerritsen (Energy Resources Engineering)

*Professors:* Biondo Biondi (Geophysics), Stephen Boyd (Electrical Engineering), Emanuel Candes (Mathematics, Statistics), Gunnar Carlsson (Mathematics), Persi Diaconis (Mathematics, Statistics), David Donoho (Statistics), Charbel Farhat (Aeronautics and Astronautics, Mechanical Engineering), Peter Glynn (Management Science and Engineering), Leonidas Guibas (Computer Science), Pat Hanrahan (Computer Science, Electrical Engineering), Jerry Harris (Geophysics), Peter Kitanidis (Civil and Environmental Engineering), Tze Leung Lai (Statistics), Sanjiva Lele (Mechanical Engineering, Aeronautics and Astronautics), Parviz Moin (Mechanical Engineering), Brad Osgood (Electrical Engineering), George Papanicolaou (Mathematics), Peter Pinsky (Mechanical Engineering), Lenya Ryzhik (Mathematics), Eric Shaqfeh (Chemical Engineering, Mechanical Engineering), Andras Vasy (Mathematics), Lawrence Wein (Graduate School of Business), Wing Wong (Statistics), Yinyu Ye (Management Science and Engineering)

*Associate Professors:* Juan Alonso (Aeronautics and Astronautics), Eric Darve (Mechanical Engineering), Ronald Fedkiw (Computer Science), Oliver Fringer (Civil and Environmental Engineering), Margot Gerritsen (Energy Resources Engineering), Ashish Goel (Management Science and Engineering), Ramesh Johari (Management Science and Engineering), Amin Saberi (Management Science and Engineering), Hamdi Tchelepi (Energy Resources Engineering), Benjamin Van Roy (Management Science and Engineering, Electrical Engineering)

*Assistant Professors:* Eric Dunham (Geophysics), Gianluca Iaccarino (Mechanical Engineering), Adrian Lew (Mechanical Engineering), Andrew Spakowitz (Chemical Engineering)

*Professors (Research):* Antony Jameson (Aeronautics and Astronautics), Walter Murray (Management Science and Engineering), Arogyaswami Paulraj (Electrical Engineering), Michael A. Saunders (Management Science and Engineering)

*Senior Lecturer:* Vadim Khayms

*Web Site:* <http://icme.stanford.edu>

*Mail Code:* 94305-4042

*Phone:* (650) 736-9038

Courses offered by the Institute for Computational and Mathematical Engineering are listed under the subject code CME on the *Stanford Bulletin's* ExploreCourses web site.

The central research mission of the Institute for Computational and Mathematical Engineering (ICME) is to develop sophisticated algorithmic and mathematical tools that impact many applied disciplines. ICME leverages Stanford's strengths in engineering applications and the physical, biological, mathematical and information sciences to guide the development of modern methods for research and education in computational mathematics.

ICME's teaching mission is to provide courses for graduate students and undergraduates from all departments in the mathematical sciences focusing on theoretical work and its role in the solution of real problems, integrating numerical computation to facilitate application of mathematical techniques and theories. The institute identifies research areas that benefit from a multidisciplinary approach in which computational mathematics plays a key role such as discrete mathematics, including computational probability and combinatorial optimization, optimization, stochastics, and numerical solution of partial differential equations. Research applications include the physical sciences, business, medicine, and information science.

A strength of ICME is its multidisciplinary intellectual environment, with interaction among students and faculty with diverse backgrounds and expertise. ICME offers service courses for undergraduates and graduate students to fulfill departmental requirements, core courses for M.S. and Ph.D. students in Scientific Computing and Computational Mathematics, and specialized electives in various application areas.

## GRADUATE PROGRAMS IN COMPUTATIONAL AND MATHEMATICAL ENGINEERING

University regulations governing the M.S. and Ph.D. degrees are described in the "Graduate Degrees" section of this bulletin.

## MASTER OF SCIENCE IN COMPUTATIONAL AND MATHEMATICAL ENGINEERING

The M.S. degree in Computational and Mathematical Engineering is intended as a terminal professional degree and does not lead to the Ph.D. program. Students interested in the doctoral program should apply directly to the Ph.D. program. Master's students who have maintained a minimum grade point average (GPA) of 3.5 are eligible to take the Ph.D. qualifying exam; those who pass this examination and secure a research adviser may continue into the Ph.D. program upon acceptance by the institute.

The master's program consists of 45 units of course work taken at Stanford. No thesis is required; however, students may become involved in research projects during the master's program, particularly to explore an interest in continuing to the doctoral program. Although there is no specific background requirement, significant exposure to mathematics and engineering course work is necessary for successful completion of the program.

Applications to the M.S. program and all required supporting documents must be received by January 10, 2012. See <http://icme.stanford.edu/admissions> for up-to-date information including departmental deadlines. See <http://gradadmissions.stanford.edu> for information and application materials.

The University requirements for the coterminal M.S. are described in the "Coterminal Bachelor's and Master's Degrees" section of this bulletin. For University coterminal degree program rules and University application forms, also see <http://studentaffairs.stanford.edu/registrar/publications#Coterm>.

## REQUIREMENTS

A candidate is required to complete a program of 45 units of courses numbered 200 or above. Courses below 200 level will

require special approval from the program office. At least 36 of these must be graded units, passed with a grade point average (GPA) of 3.0 (B) or better. Master's students interested in continuing to the doctoral program must maintain a 3.5 or better grade point average in the program.

*Requirement 1*—The following courses may be needed as prerequisites for other courses in the program: MATH 41, 42, 51, 52, 53, 103, 113; CME 100, 102, 104, 108, 200, 204, 211, 212, 302; CS 106A, 106X, , 205, 229; ENGR 62; STATS 116 or 202.

*Requirement 2*—Students must demonstrate foundational knowledge in the field by completing the courses in two of the three core parts:

1. *Part I*
  - CME 303. Partial Differential Equations of Applied Mathematics
  - CME 306. Numerical Solution of Partial Differential Equations
2. *Part II*
  - CME 302. Numerical Linear Algebra
  - CME 304. Numerical Optimization
3. *Part III*
  - CME 305. Discrete Mathematics and Algorithms
  - CME 308. Stochastic Methods in Engineering

Courses in this area must be taken for letter grades. Deviations from the core curriculum must be justified in writing and approved by the student's ICME adviser and the chair of the ICME curriculum committee. Courses that are waived may not be counted towards the master's degree.

*Requirement 3*—12 units of general electives to demonstrate breadth of knowledge in technical area. The elective course list represents automatically accepted electives within the program. However, electives are not limited to the list below, and the list is expanded on a continuing basis. The elective part of the ICME program is meant to be broad and inclusive of relevant courses of comparable rigor to ICME courses. Courses outside this list can be accepted as electives subject to approval by the student's ICME adviser.

1. *Aeronautics and Astronautics:*
  - AA 214B. Numerical Computation of Compressible Flow
  - AA 214C. Numerical Computation of Viscous Flow
  - AA 218. Introduction to Symmetry Analysis
2. *Computational and Mathematical Engineering:*
  - CME 208. Mathematical Programming and Combinatorial Optimization
  - CME 212. Introduction to Large Scale Computing in Engineering
  - CME 213. Parallel Comp- MPI and CUDA
  - CME 215 A,B. Advanced Computational Fluid Dynamics
  - CME263. Introduction to Linear Dynamical Systems
  - CME 324. Advanced Methods in Matrix Computation
  - CME 342. Parallel Methods in Numerical Analysis
  - CME 364A. Convex Optimization I
3. *Computer Science:*
  - CS 164. Computing with Physical Objects: Algorithms for Shape and Motion
  - CS 205. Mathematical Methods for Robotics, Vision, and Graphics
  - CS 221. Artificial Intelligence: Principles and Techniques
  - CS 228. Probabilistic Models in Artificial Intelligence
  - CS 229. Machine Learning
  - CS 255. Introduction to Cryptography
  - CS 261. Optimization and Algorithmic Paradigms
  - CS 268. Geometric Algorithms
  - CS 315A. Parallel Computer Architecture and Programming
  - CS 340. Level Set Methods
  - CS 348A. Computer Graphics: Geometric Modeling
  - CS 364A. Algorithmic Game Theory
4. *Electrical Engineering:*

- EE 222. Applied Quantum Mechanics I
  - EE 223. Applied Quantum Mechanics II
  - EE 256. Numerical Electromagnetics
  - EE 262. Two-Dimensional Imaging
  - EE 278. Introduction to Statistical Signal Processing
  - EE 292E. Analysis and Control of Markov Chains
  - EE 363. Linear Dynamic Systems
  - EE 376A. Information Theory
5. *Management Science and Engineering:*
- MS&E 220. Probabilistic Analysis
  - MS&E 221. Stochastic Modeling
  - MS&E 223. Simulation
  - MS&E 238. Network Structures and Analysis
  - MS&E 251. Stochastic Decision Models
  - MS&E 310. Linear Programming
  - MS&E 313. Vector Space Optimization
  - MS&E 316. Pricing Algorithms and the Internet
  - MS&E 321. Stochastic Systems
  - MS&E 322. Stochastic Calculus and Control
  - MS&E 323. Stochastic Simulation
6. *Mathematics:*
- MATH 136. Stochastic Processes
  - MATH 171. Fundamental Concepts of Real Analysis
  - MATH 221. Mathematical Methods of Imaging
  - MATH 227. Partial Differential Equations and Diffusion Processes
  - MATH 236. Introduction to Stochastic Differential Equations
  - MATH 237. Stochastic Equations and Random Media
  - MATH 238. Mathematical Finance
7. *Mechanical Engineering:*
- ME 335A,B,C. Finite Element Analysis
  - ME 346B. Introduction to Molecular Simulations
  - ME 408. Spectral Methods in Computational Physics
  - ME 412. Engineering Functional Analysis and Finite Elements
  - ME 469A,B. Computational Methods in Fluid Mechanics
  - ME 484. Computational Methods in Cardiovascular Bioengineering
8. *Statistics:*
- STATS 208. Introduction to the Bootstrap
  - STATS 217. Introduction to Stochastic Processes
  - STATS 219. Stochastic Processes
  - STATS 227. Statistical Computing
  - STATS 237. Time Series Modeling and Forecasting
  - STATS 250. Mathematical Finance
  - STATS 305. Introduction to Statistical Modeling
  - STATS 310A,B,C. Theory of Probability
  - STATS 324. Classical Multivariate and Random Matrix Theory
  - STATS 345. Computational Molecular Biology
  - STATS 362. Monte Carlo Sampling
  - STATS 366. Computational Biology
9. *Other:*
- CEE 281. Finite Element Structural Analysis
  - CEE 362G. Stochastic Inverse Modeling and Data Assimilation Methods
  - ENGR 209A. Analysis and Control of Nonlinear Systems

*Requirement 4*—9 units of focused graduate application electives, approved by the ICME graduate adviser, in the areas of engineering, mathematics, physical, biological, information, and other quantitative sciences. These courses should be foundational depth courses relevant to the student's professional development and research interests.

*Requirement 5*—3–6 units of programming course work demonstrating programming efficiency.

*Requirement 6*—3 units of an ICME graduate seminar or other approved seminar. Additional seminar units may not be counted towards the 45-unit requirement.

## DOCTOR OF PHILOSOPHY IN COMPUTATIONAL AND MATHEMATICAL ENGINEERING

Applications to the Ph.D. program and all required supporting documents must be received by December 6, 2011. See <http://icme.stanford.edu/admissions> for full information. Prospective graduate students should see <http://gradadmissions.stanford.edu> for information and application materials. Applicants should take the Graduate Record Examination by October of the academic year in which the application is submitted.

Admission to the Ph.D. program does not imply that the student is a candidate for the Ph.D. degree. Advancement to candidacy requires superior academic achievement and passing the qualifying examination.

### *Requirements*—

1. Complete a minimum of 135 units of residency at Stanford, including:
  - a. 45 units from the master's program
  - b. 27 units of focused electives in an area planned with the student's Ph.D. adviser; 12 of these units should come from ICME specialized electives with significant computational content such as the CME 320-380 series. The focused and specialized elective component of the ICME program is meant to be broad and inclusive of relevant courses of comparable rigor to ICME courses. The elective course list following represents automatically accepted electives within the program. However, electives are not limited to the list below, and the list is expanded on a continuing basis; courses outside the list can be accepted as electives subject to approval by the student's ICME adviser.
  - c. 60 units of thesis research
  - d. 3 units of free electives
2. Maintain a grade point average (GPA) of 3.5.
3. Pass the qualifying examination administered by ICME.
4. Complete an approved program of original research.
5. Complete a written dissertation based on research.
6. Pass the oral examination that is a defense of the dissertation research.

### *Specialized Elective List*—See requirement 1b above.

- CEE 362G. Stochastic Inverse Modeling and Data Assimilation Methods
- CME 364A,B. Convex Optimization I,II
- CS 348A. Computer Graphics: Geometric Modeling
- EE 363. Linear Dynamical Systems
- EE 368. Digital Image Processing
- MATH 205A. Real Analysis
- MATH 215A. Complex Analysis, Geometry and Topology
- MATH 217A. Differential Geometry
- MATH 221. Mathematical Methods of Imaging
- MATH 227. Partial Differential Equations and Diffusion Processes
- MATH 236. Introduction to Stochastic Differential Equations
- MATH 237. Stochastic Equations and Random Media
- MATH 238. Mathematical Finance
- ME 335A,B,C. Finite Element Analysis
- ME 346B. Introduction to Molecular Simulations
- ME 351A,B. Fluid Mechanics
- ME 361. Turbulence
- ME 408. Spectral Methods in Computational Physics
- ME 412. Engineering Functional Analysis and Finite Elements
- ME 469A,B. Computational Methods in Fluid Mechanics
- MS&E 319. Approximation Algorithms
- MS&E 336. Topics in Game Theory with Engineering Applications
- STATS 305. Introduction to Statistical Modeling
- STATS 306A,B. Methods for Applied Statistics
- STATS 318. Modern Markov Chains
- STATS 366. Computational Biology

Note: All courses listed under "Requirement 3" under the "Master of Science in Computational and Mathematical Engineering" section can be used for fulfilling the general elective requirement.

### FINANCIAL ASSISTANCE

The department awards a limited number of fellowships, course assistantships, and research assistantships to incoming graduate students. Applying for such assistance is part of submitting the application for admission to the program. Students are appointed for half-time assistantships which provide a tuition scholarship at the 8, 9, 10 unit rate during the academic year and a monthly stipend. Half-time appointments generally require 20 hours of work per week. Most course assistantships and research assistantships are awarded to students in the doctoral program in ICME. If the number of Ph.D. students is not sufficient to staff all course and research assistantship positions available, these positions may be open to master's students. However, master's students are not guaranteed financial assistance.

### PH.D. MINOR IN COMPUTATIONAL AND MATHEMATICAL ENGINEERING

For a minor in Computational and Mathematical Engineering (CME), a doctoral candidate must complete 20 units of approved graduate level courses. These should include three ICME core courses and three ICME graduate electives at the 300 level or above. All courses must be taken for a letter grade and passed with a grade of 'B' or better. Minor programs should be developed in close discussion between the student and the student's primary Ph.D. adviser. Courses taken in fulfillment of the minor cannot be used for the student's Ph.D. degree.

## COMPUTER SCIENCE

*Emeriti: (Professors)* Tom Binford, Edward Feigenbaum, Richard Fikes, Jean-Claude Latombe\*, Donald E. Knuth,\* John McCarthy, Edward J. McCluskey, Zohar Manna, William F. Miller, Nils J. Nilsson, Vaughan Pratt,\* Jeffrey D. Ullman, Gio Wiederhold\*

*Chair:* Jennifer Widom

*Associate Chair for Education:* Mehran Sahami

*Professors:* Alex Aiken, Dan Boneh, David Cheriton, William J. Dally, David Dill, Hector Garcia-Molina, Leonidas J. Guibas, Patrick Hanrahan, John Hennessy, Mark A. Horowitz, Oussama Khatib, Daphne Koller, Monica Lam, Marc Levoy, Teresa Meng, Nick McKeown, John Mitchell, Kunle Olukotun, Balaji Prabhakar, Yoav Shoham, Sebastian Thrun, Luca Trevisan, Jennifer Widom, Terry Winograd

*Associate Professors:* Serafim Batzoglou, Dawson Engler, Ronald P. Fedkiw, Michael Genesereth, Scott Klemmer, Christoforos Kozyrakis, Christopher Manning, David Mazieres, Nick McKeown, Subhasish Mitra, Andrew Ng, Serge A. Plotkin, Mendel Rosenblum, Tim Roughgarden

*Assistant Professors:* Gill Bejerano, Jeffrey Heer, Sachin Katti, Vladlen Koltun, Jure Leskovec, Philip Levis, Fei-Fei Li, Ryan Williams

*Professors (Research):* John Ousterhout, John K. Salisbury

*Professor (Teaching):* Eric S. Roberts

*Associate Professor (Teaching):* Stephen Cooper, Mehran Sahami

*Courtesy Professors:* Russ Altman, Martin Fischer, Bernd Girod, Michael Levitt, Clifford J. Nass, Roy Pea, Fouad A. Tobagi

*Courtesy Associate Professors:* Atul Butte, Ashish Goel, Dan Jurafsky, Vijay Pande, Benjamin Van Roy

*Courtesy Assistant Professors:* Paulo Blikstein, Noah Goodman, Ramesh Johari, Ge Wang

*Lecturers:* Gerald Cain, Nicholas J. Parlante, Keith Schwarz, Patrick Young, Julie Zelenski

*Consulting Professors:* Gary Bradski, Stuart Card, Tom Dean, Kathleen Fisher, Kurt Konolige, Prabhakar Raghavan

*Consulting Associate Professors:* Kurt Akeley, Federico Barbagli, Pei Cao

*Consulting Assistant Professor:* Martin Casado

*Visiting Professors:* Eneko Agirre, Michel Beaudoin-Lafon, Adrian Butscher, Thomas Funkhouser, Hu Liu, Wendy Mackay, Robert Tarjan

\* Recalled to active duty.

*Mail Code:* 94305-9025

*Phone:* (650) 723-2273

*Web Site:* <http://www.cs.stanford.edu>

Courses offered by the Department of Computer Science are listed under the subject code CS on the *Stanford Bulletin's* ExploreCourses web site.

The Department of Computer Science (CS) operates and supports computing facilities for departmental education, research, and administration needs. All CS students have access to the departmental student machine for general use (mail, news, etc.), as well as computer labs with public workstations located in the Gates Building. In addition, most students have access to systems located in their research areas.

Each research group in Computer Science has systems specific to its research needs. These systems include workstations (PCs, Macs), multi-CPU computer clusters, and local mail and file servers. Servers and workstations running Linux or various versions of Windows are commonplace. Support for course work and instruction is provided on systems available through Information Technology Services (ITS) and the School of Engineering (SoE).

### MISSION OF THE UNDERGRADUATE PROGRAM IN COMPUTER SCIENCE

The mission of the undergraduate program in Computer Science is to develop students' breadth of knowledge across the subject areas of computer sciences, including their ability to apply the defining processes of computer science theory, abstraction, design, and implementation to solve problems in the discipline. Students take a set of core courses. After learning the essential programming techniques and the mathematical foundations of computer science, students take courses in areas such as programming techniques, automata and complexity theory, systems programming, computer architecture, analysis of algorithms, artificial intelligence, and applications. The program prepares students for careers in government, law, and the corporate sector, and for graduate study.

### LEARNING OUTCOMES

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to be able to:

1. apply the knowledge of mathematics, science, and engineering.
2. design and conduct experiments, as well to analyze and interpret data.
3. design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
4. function on multidisciplinary teams.
5. identify, formulate, and solve engineering problems.
6. understand professional and ethical responsibility.
7. communicate effectively.
8. understand the impact of engineering solutions in a global, economic, environmental, and societal context.
9. demonstrate a working knowledge of contemporary issues.
10. apply the techniques, skills, and modern engineering tools necessary for engineering practice.
11. transition from engineering concepts and theory to real engineering application.

## GRADUATE PROGRAMS IN COMPUTER SCIENCE

The University's basic requirements for the M.S. and Ph.D. degrees are discussed in the "Graduate Degrees" section of this bulletin.

## COMPUTER SCIENCE COURSE CATALOG NUMBERING SYSTEM

The first digit of a CS course number indicates its general level of sophistication:

001-099	Service courses for nontechnical majors
100-199	Other service courses, basic undergraduate
200-299	Advanced undergraduate/beginning graduate
300-399	Advanced graduate
400-499	Experimental
500-599	Graduate seminars

The tens digit indicates the area of Computer Science it addresses:

00-09	Introductory, miscellaneous
10-19	Hardware and Software Systems
20-39	Artificial Intelligence
40-49	Software Systems
50-59	Mathematical Foundations of Computing
60-69	Analysis of Algorithms
70-79	Computational Biology and Interdisciplinary Topics
90-99	Independent Study and Practicum

## BACHELOR OF SCIENCE IN COMPUTER SCIENCE

The department offers both a major in Computer Science and a minor in Computer Science. Further information is available in the *Handbook for Undergraduate Engineering Programs* published by the School of Engineering. The Computer Science major offers a number of tracks (programs of study) from which students can choose, allowing them to focus their program on the areas of most interest. These tracks also reflect the broad diversity of areas in computing disciplines. The department has an honors program, which is described in the following section.

In addition to Computer Science itself, Stanford offers several interdisciplinary degrees with a substantial computer science component. The Symbolic Systems major (in the School of Humanities and Sciences) offers an opportunity to explore computer science and its relation to linguistics, philosophy, and psychology. The Mathematical and Computational Sciences major (also Humanities and Sciences) allows students to explore computer science along with more mathematics, statistics, and operations research.

## HONORS PROGRAM

The Department of Computer Science (CS) offers an honors program for undergraduates whose academic records and personal initiative indicate that they have the necessary skills to undertake high-quality research in computer science. Admission to the program is by application only. To apply for the honors program, students must be majoring in Computer Science, have a grade point average (GPA) of at least 3.6 in courses that count toward the major, and achieve senior standing (135 or more units) by the end of the academic year in which they apply. Coterminal master's students are eligible to apply as long as they have not already received their undergraduate degree. Beyond these requirements, students who apply for the honors program must find a Computer Science faculty member who agrees to serve as the thesis adviser for the project. Thesis advisers must be members of Stanford's Academic Council.

Students who meet the eligibility requirements and wish to be considered for the honors program must submit a written application to the CS undergraduate program office by May 1 of the year preceding the honors work. The application must include a letter describing the research project, a letter of endorsement from

the faculty sponsor, and a transcript of courses taken at Stanford. Each year, a faculty review committee selects the successful candidates for honors from the pool of qualified applicants.

In order to receive departmental honors, students admitted to the honors program must, in addition to satisfying the standard requirements for the undergraduate degree, do the following:

1. Complete at least 9 units of CS 191 or 191W under the direction of their project sponsor.
2. Attend a weekly honors seminar Winter and Spring quarters.
3. Complete an honors thesis deemed acceptable by the thesis adviser and at least one additional faculty member.
4. Present the thesis at a public colloquium sponsored by the department.
5. Maintain the 3.6 GPA required for admission to the honors program.

## GUIDE TO CHOOSING INTRODUCTORY COURSES

Students arriving at Stanford have widely differing backgrounds and goals, but most find that the ability to use computers effectively is beneficial to their education. The department offers many introductory courses to meet the needs of these students.

For students whose principal interest is an exposure to the fundamental ideas behind computer science and programming, CS 105 is the most appropriate course. It is intended for students in nontechnical disciplines who expect to make some use of computers, but who do not expect to go on to more advanced courses. CS 105 meets the General Education Disciplinary Breadth Requirement in Engineering and Applied Sciences and includes an introduction to programming and the use of modern Internet-based technologies. Students interested in learning to use the computer should consider CS 1C, Introduction to Computing at Stanford.

Students who intend to pursue a serious course of study in computer science may enter the program at a variety of levels, depending on their background. Students with little prior experience or those who wish to take more time to study the fundamentals of programming should take CS 106A followed by CS 106B. Students in CS 106A need not have prior programming experience. Students with significant prior exposure to programming or those who want an intensive introduction to the field should take CS 106X or may start directly in CS 106B. CS 106A uses Java as its programming language; CS 106B and X use C++. No prior knowledge of these languages is assumed, and the prior programming experience required for CS 106B or X may be in any language. In all cases, students are encouraged to discuss their background with the instructors responsible for these courses.

After the introductory sequence, Computer Science majors and those who need a significant background in computer science for related majors in engineering should take CS 103, 107 and 110. CS 103 offers an introduction to the mathematical and theoretical foundations of computer science. CS 107 exposes students to a variety of programming concepts that illustrate critical strategies used in systems development; CS 110 builds on this material, focusing on the development of larger-scale software making use of systems and networking abstractions.

In summary:

For exposure: CS 1C

For nontechnical use: CS 105

For scientific use: CS 106A

For a technical introduction: CS 106A

For significant use: CS 106A,B or 106X, along with 103, 107, and 110

## MASTER OF SCIENCE IN COMPUTER SCIENCE

In general, the M.S. degree in Computer Science is intended as a terminal professional degree and does not lead to the Ph.D. degree. Most students planning to obtain the Ph.D. degree should apply directly for admission to the Ph.D. program. Some students,

however, may wish to complete the master's program before deciding whether to pursue the Ph.D. To give such students a greater opportunity to become familiar with research, the department has instituted a program leading to a master's degree with distinction in research. This program is described in more detail below.

**Admission**—Applications to the M.S. program and all supporting documents must be submitted and received online by the published deadline. Information on admission requirements and deadlines is available at <http://cs.stanford.edu/admissions/>. Exceptions are made for applicants who are already students at Stanford and are applying to the coterminal program. See <https://cs.stanford.edu/wiki/admissions/Applying/Deadlines>.

University requirements for the coterminal M.S. are described in the "Coterminal Bachelor's and Master's Degrees" section of this bulletin. For University coterminal degree program rules and University application forms, see <http://studentaffairs.stanford.edu/registrar/publications#Coterm>.

## REQUIREMENTS

A candidate is required to complete a program of 45 units. At least 36 of these must be graded units, passed with a grade point average (GPA) of 3.0 (B) or better. The 45 units may include no more than 10 units of courses from those listed below in Requirement 1. Thus, students needing to take more than two of the courses listed in Requirement 1 actually complete more than 45 units of course work in the program. Only well-prepared students may expect to finish the program in one year; most students complete the program in six quarters. Students hoping to complete the program with 45 units should already have a substantial background in computer science, including course work or experience equivalent to all of Requirement 1 and some prior course work related to their specialization area.

### *Requirement 1: Foundations*—

Students must complete the following courses, or waive out of them by providing evidence to their advisers that similar or more advanced courses have been taken, either at Stanford or another institution:

1. Logic, Automata, and Computability: CS 103
2. Probability: CS 109 *or* STATS 116 *or* MS&E 220 *or* CME 106
3. Algorithms: CS 161
4. Computer Organization and Systems: CS 107
5. Principles of Computer Systems: CS 110

### *Requirement 2: Significant Software Implementation*—

Students must complete at least one course designated as having a significant software implementation component. The list of such courses includes: CS 140, 143, 144, 145, 148, 210B, 221, 243, 248, 346.

### *Requirement 3: Specialization*—

Students may choose to satisfy this requirement through one of two options, Single Depth or Dual Depth, outlined following. All courses taken for this requirement must be taken for letter grades.

- *Option 1—Single Depth*
  - A program of 27 units in a single area of specialization must be completed. A maximum of 9 units of independent study (CS393, 395, 399) may be counted toward the specialization.
  - Additionally, students must complete three breadth courses from the list of approved breadth courses associated with their chosen specialization. Individual specializations explicitly have different breadth requirements; see the individual specialization sheets at <http://cs.stanford.edu/degrees/mscs/programsheets> for details.
  - Breadth courses may not be waived and must be completed for a letter grade.
- *Option 2—Dual Depth*
  - Students select distinct primary and secondary areas.

- A program of 21 units in the primary area of specialization must be completed. A maximum of 9 units of independent study (CS393, 395, 399) may be counted toward the primary specialization.
- Students must also complete a program of five courses satisfying the requirements for their secondary area of specialization.
- Breadth courses are not required.

### *Specialization Areas*—

Ten approved specialization areas which may be used to satisfy Requirement 3 are listed following. Students may propose to the M.S. program committee other coherent programs that meet their goals and satisfy the basic requirements.

Courses marked with an asterisk (\*) require consent of the faculty adviser. Courses marked with a double asterisk (\*\*) may be waived by students with equivalent course work and with the approval of their adviser.

1. *Artificial Intelligence*—
  - a. CS 221\*\*
  - b. At least four of: CS 223A, 224M, 224N, 224S, 224U, 224W, 226, 227, 228, 229, 231A
  - c. Sufficient depth units from category (b) and the following: CS 124, 205A, 222, 225A, 225B, 227B, 228T, 231B, 246, 262, 270, 273A, 274, 275, 276, 277, 278, 279, 294A\*, 321, 322, 327A, 328, 329, 331, 341, 345, 364A, 364B, 374, 377,\* 379\*; 393\*, 395\*, 399\*; EE 263, 363, 364A, 364B, 376A; ENGR 205, 209A; MS&E 251, 252, 339, 351, 352, 353; PSYCH 202, 205; STATS 202, 315A, 315B
    - Students with a 27- or 21-unit depth option (Option 1 or 2 above) must take 27 or 21 units respectively subject to satisfying the area (a), (b), and (c) requirements above.
    - Students with a secondary area of specialization (per Option 2 above) in Artificial Intelligence must take five total courses satisfying the area (a) and (b) requirements above.
    - Those students who have waived out of CS 221 may take an additional course in either area (b) or (c).
- Artificial Intelligence Breadth Courses*—CS 140, 143, 144 or EE 284, 145, 147, 148, 149, 154, 155, 157, 164, 240, 240E, 242, 243, 244, 244B, 244E, 249A, 255, 258, 259, 261, 268; CME 108, 302; EE 108B, 282.
2. *Biocomputation*—
  - a. at least four of: CS 262, 270, 272, 273A, 274, 278, 279
  - b. Sufficient depth units from category (a) and the following: CS 228, 229, 245, 246, 261, 268, 275, 277, 341, 345, 346, 365, 374, 393\*, 395\*, 399\*; BIOC 218; GENE 203, 211; SBIO 228
    - Students with a 27- or 21-unit depth option (Option 1 or 2 above) must take 27 or 21 units respectively subject to satisfying the area (a) and (b) requirements above.
    - Students with a secondary area of specialization (per Option 2 above) in Biocomputation must take five total courses, three courses of which must come from area (a) and the remaining two courses may come from either area (a) or (b).
- Biocomputation Breadth Courses*—CS 121 or 221, 124, 140, 143, 144 or EE 284, 145, 147, 148, 149, 154, 155, 157, 164, 205A, 222, 223A, 224M, 224N, 224S, 224U, 224W, 226, 227, 227B, 231A, 240, 240E, 242, 243, 244, 244B, 244E, 249A, 255, 258, 259, 276, 279; CME 108, 302; EE 108B, 282.
3. *Computer and Network Security*—
  - a. CS 140\*\*, 144\*\*, 155, 244, 255
  - b. At least three of: CS 142, 240, 241, 244B, 244C, 259, 261, 340, 344, 355, 365
  - c. Sufficient depth units from category (b) and the following: CS 240E, 244E, 245, 294S\*, 295, 341, 344B, 345, 347,



361A, 393\*, 395\*, 399\*; EE 384A, 384B, 384C, 384M, 384S, 384X, 384Y

- Students with a 27- or 21-unit depth option (Option 1 or 2 above) must take 27 or 21 units respectively subject to satisfying the area (a), (b), and (c) requirements above.
- Students with a secondary area of specialization (per Option 2 above) in Computer and Network Security must take five courses; those five courses must satisfy the area (a) requirement and additional courses from area (b) should be taken if any area (a) requirements are waived.

*Computer and Network Security Breadth Courses*—CS 121 or 221, 124, 143, 147, 148, 149, 154, 157, 164, 205A, 222, 223A, 224M, 224N, 224S, 224U, 224W, 226, 227, 227B, 228, 229, 231A, 242, 243, 249A, 258, 262, 268, 270, 273A, 274, 276, 279; CME 108, 302; EE 108B, 282.

4. *Human-Computer Interaction*—

- CS 147\*\*
- One of: CS 247, 294H
- One of: CS 376, 378, 448B
- One of: CS 124, 142, 148
- One of: CS 303; COMM 206, 268; PSYCH 110, 252
- One of: ARTSTUDI 160; ME 203, 216A, 313, 377
- One or more courses from areas (b) through (f), or the following: CS229, 242, 246, 248, 295, 341, 393\*, 395\*, 399\* or any d.school class listed at <http://www.stanford.edu/group/dschool/participate/classes.php>, or any HCI class listed at <http://hci.stanford.edu/courses> noted as counting toward the CS M.S. degree. Such courses must be numbered 100 or above and be taken for at least 3 units to count for this requirement.
  - Students with a 27- or 21-unit depth option (Option 1 or 2 above) must take 27 or 21 units respectively subject to satisfying the area (a) through (g) requirements above.
  - Students with a secondary area of specialization (per Option 2 above) in Human-Computer Interaction must take five courses as follows:
    - one course each from areas (a), (d), (e), and (f)
    - then one course from either area (b) or (c)
  - Students waiving out of the area (a) requirement should take one additional course from areas (b) through (g).

*Human-Computer Interaction Breadth Courses*—CS 121 or 221, 140, 143, 144 or EE 284, 145, 149, 154, 155, 157, 164, 205A, 222, 223A, 224M, 224N, 224S, 224U, 224W, 226, 227, 227B, 228, 231A, 240, 240E, 243, 244, 244E, 249A, 255, 258, 259, 261, 262, 268, 270, 273A, 274, 276, 279; CME 108, 302; EE 108B, 282.

5. *Information Management and Analytics*—

- CS 145\*\*
- At least four of: CS 224N, 224W, 229, 245, 246, 276, 345, 346, 347
- Sufficient depth units from category (b) and the following: CS 224S, 224U, 228, 228T, 231A, 240, 242, 243, 244, 244B, 244C, 249A, 249B, 255, 262, 270, 271, 272, 273A, 274, 275, 279, 315A, 321, 341, 344, 364B, 374, 393\*, 395\*, 399\*; STAT 315A, 315B.
  - Students with a 27- or 21-unit depth option (Option 1 or 2 above) must take 27 or 21 units respectively subject to satisfying the area (a), (b), and (c) requirements above.
  - Students with a secondary area of specialization (per Option 2 above) in Information Management and Analytics must take five courses satisfying the area (a) and (b) requirements above. Note that if CS145 was waived in area (a), students should take an additional course from either area (b) or (c) in its place.

*Information Management and Analytics Breadth Courses*—CS 121 or 221, 124, 140, 147, 148, 149, 154, 155, 157, 164, 205A, 222, 223A, 224M, 226, 227, 227B, 240E, 244E, 258, 259, 261, 268; CME 108, 302; EE 108B, 282.

6. *Mobile and Internet Computing*—

- Two of: CS 140\*\*, 144, 244
- One of: CS 142, 147, 247
- One of: CS 155, 255
- CS 294S
- Sufficient depth units from categories (a) through (d) and the following: CS 224W, 244E, 246, 344, 344E, 364A, 376, 393\*, 395\*, 399\*; EE 359, 384A, 384B, 384C, 384E, 384M, 384P, 384S; COMM 268, 280; PSYCH 252.
  - Students with a 27- or 21-unit depth option (Option 1 or 2 above) must take 27 or 21 units respectively subject to satisfying the area (a) through (e) requirements above.
  - Students with a secondary area of specialization (per Option 2 above) in Mobile and Internet Computing must take five courses satisfying the area (a) through (d) requirements above.

*Mobile and Internet Computing Breadth Courses*—CS 121 or 221, 124, 143, 145, 148, 149, 154, 157, 164, 205A, 222, 223A, 224M, 224N, 224S, 224U, 226, 227, 227B, 228, 229, 231A, 240, 240E, 242, 243, 244B, 249A, 258, 259, 261, 262, 268, 270, 273A, 274, 276, 279; CME 108, 302; EE 108B, 282.

7. *Real-World Computing*—

- At least three of: CS 148, 223A, 231A, 248
- At least three of: CS 205A, 205B, 226, 249A, 249B, 262, 268, 277, 348A, 348B, 374; CME 302, 306, 326
- Sufficient additional units chosen from the above and from the following: CS 225A, 225B, 228, 229, 247, 270, 271, 272, 273A, 274, 294A\*, 327A, 328, 331, 448, 393\*, 395\*, 399\*
  - Students with a 27- or 21-unit depth option (Option 1 or 2 above) must take 27 or 21 units respectively subject to satisfying the area (a), (b), and (c) requirements above.
  - Students with a secondary area of specialization (per Option 2 above) in Real-World Computing must take five total courses satisfying area (a) and two of the three courses in the area (b) requirements above (i.e., three courses in area (a) and two courses in area (b)).

*Real-World Computing Breadth Courses*—CS 121, or 221, 124, 140, 143, 144 or EE 284, 145, 147, 149, 154, 155, 157, 164, 222, 224M, 224N, 224S, 224U, 224W, 227, 227B, 240, 240E, 242, 243, 244, 244B, 244E, 246, 255, 258, 259, 261, 276, 279; CME 108, 302; EE 108B, 282.

8. *Software Theory*—

- CS 242, 243
- At least one of: CS 241, 258, 259
- At least one of: CS 244, 245, 295, 341, 343, 345
- At least one course from the following: CS 255, 261, 268, 355, 361A, 361B, 365
- At least two additional courses chosen from (b), (c), (d), or the following: CS 294S\*, 346, 393\*, 395\*, 399\*
  - Students with a 27- or 21-unit depth option (Option 1 or 2 above) must take 27 or 21 units respectively subject to satisfying the area (a)-(e) requirements above.
  - Students with a secondary area of specialization (per Option 2 above) in Software Theory need to take 5 total courses satisfying the area (a) through (d) requirements above:
    - two courses in area (a)
    - one course each in areas (b) through (d).

*Software Theory Breadth Courses*—CS 121 or 221, 124, 140, 147, 148, 149, 154, 155, 157, 164, 205A, 222, 223A, 224M, 224N, 224S, 224U, 224W, 226, 227, 227B, 228, 229, 231A,

240, 240E, 244B, 244E, 249A, 262, 270, 273A, 274, 276, 279; CME 108, 302; EE 108B, 282.

9. *Systems*—
- CS 140\*\*, 144\*\*, 240, 242
  - At least three of: CS 243, 244, 245, 248, 348B; EE 271, 282
  - At least two additional courses chosen from category (b) and the following: CS 240E, 240H, 244B, 244C, 244E, 246, 249A, 249B, 255, 259, 262, 270, 271, 272, 276, 294S\*, 295, 315A, 315B, 340, 341, 343, 344, 344B, 345, 346, 347, 348A, 349, 374, 448, 393\*, 395\*, 399\*; EE 273, 382A, 382C, 384A, 384B, 384C, 384M, 384S, 384X, 384Y
    - Students with a 27-unit depth option (Option 1 above) must take 27 units subject to satisfying the area (a), (b), and (c) requirements above.
    - Students with a 21-unit depth option (Option 2 above) must take that many units subject to satisfying the area (a) and (b) requirements above, and additional courses may be taken from area (c) if any courses in the area (a) requirement are waived.
    - Students with a secondary area of specialization (per Option 2 above) in Systems need to take five courses; those courses must satisfy the area (a) requirement and additional courses may be taken from area (b).

*Systems Breadth Courses*—CS 121 or 221, 124, 147, 154, 155, 157, 164, 205A, 222, 223A, 224M, 224N, 224S, 224U, 224W, 226, 227, 227B, 228, 229, 231A, 255, 258, 261, 268, 273A, 274, 279; CME 108, 302

10. *Theoretical Computer Science*—
- CS 241 or 258 or 259, 261 (361A or 361B may be used as substitutes for 261)
  - Sufficient additional units chosen from: CS 228, 241, 246, 254, 255, 258, 259, 262, 268, 341, 345, 355, 356, 357, 358, 359,\* 361A, 361B, 364A, 364B, 365, 369,\* 374, 393\*, 395\*, 399\*, 468\*; MS&E 310
    - Multiple CS 359, CS 369, and/or CS 468 courses may be taken as long as they are each on different topics, denoted by different letter suffixes for the courses.
    - Students with a 27- or 21-unit depth option (Option 1 or 2 above) must take 27 or 21 units respectively subject to satisfying the area (a) and (b) requirements above.
    - Students with a secondary area of specialization (per Option 2 above) in Theoretical Computer Science need to take 5 total courses satisfying the area (a) and (b) requirements above:
      - two courses in area (a)
      - three courses in area (b).

*Theoretical Computer Science Breadth Courses*—CS 121 or 221, 124, 140, 143, 144 or EE 284, 145, 147, 148, 149, 154, 155, 157, 164, 205A, 222, 223A, 224M, 224N, 224S, 224U, 224W, 226, 227, 227B, 229, 231A, 240, 240E, 242, 243, 244, 244B, 244E, 249A, 270, 273A, 274, 276, 279; CME 108, 302; EE 108B, 282.

\* With consent of faculty adviser.

\*\* Students with equivalent course work may waive with approval of their adviser.

#### *Requirement 4—*

Additional elective units must be technical courses (numbered 100 or above) related to the degree program and approved by the adviser. All CS courses numbered above 110 (with the exception of CS 196 and 198) taken for 3 or more units are pre-approved as elective courses. Additionally, up to a maximum of 3 units of 500-level CS seminars, CS 300, EE 380, EE 385A, or other 1-2 unit seminars offered in the School of Engineering may be counted as electives. Elective courses may be taken on a satisfactory/no credit basis provided that a minimum of 36 graded units is presented within the 45-unit program.

## MASTER OF SCIENCE WITH DISTINCTION IN RESEARCH

A student who wishes to pursue the M.S. in CS with distinction in research must first identify a faculty adviser who agrees to supervise and support the research work. The research adviser must be a member of the Academic Council and must hold an appointment in Computer Science. The student and principal adviser must also identify another faculty member, who need not be in the Department of Computer Science, to serve as a secondary adviser and reader for the research report. In addition, the student must complete the following requirements beyond those for the regular M.S. in CS degree:

- Research Experience*—The program must include significant research experience at the level of a half-time commitment over the course of three academic quarters. In any given quarter, the half-time research commitment may be satisfied by a 50 percent appointment to a departmentally supported research assistantship, 6 units of independent study (CS 393, 395, or 399), or a prorated combination of the two (such as a 25 percent research assistantship supplemented by 3 units of independent study). This research must be carried out under the direction of the primary or secondary adviser.
- Supervised Writing and Research*—In addition to the research experience outlined in the previous requirement, students must enroll in at least 3 units of independent research (CS 393, 395, or 399) under the direction of their primary or secondary adviser. These units should be closely related to the research described in the first requirement, but focused more directly on the preparation of the research report described in the next section. The writing and research units described in parts (1) and (2) may be counted toward the 45 units required for the degree.
- All independent study units (CS 393, 395, 399) must be taken for letter grades and a GPA of 3.0 (B) or better must be maintained.
- Research Report*—Students must complete a significant report describing their research and its conclusions. The research report represents work that is publishable in a journal or at a high-quality conference, although it is presumably longer and more expansive in scope than a typical conference paper. A copy of the research report must be submitted to the student services office in the department three weeks before the beginning of the examination period in the student's final quarter. Both the primary and secondary adviser must approve the research report before the distinction-in-research designation can be conferred.

## JOINT M.S. AND LAW DEGREE

Law students interested in pursuing an M.S. in Computer Science must apply for admission to the Computer Science Department either (i) concurrently with applying to the Law School; or (ii) after being admitted to the Law School, but no later than the earlier of: (a) the end of the second year of Law School; or (b) the Computer Science Department's admission deadline for the year following that second year of Law School.

In addition to being admitted separately to the Law School and the Computer Science Department, students must secure permission from both academic units to pursue degrees in those units as part of a joint degree program.

J.D./M.S. students may elect to begin their course of study in either the Law School or the Computer Science Department. Faculty advisors from each academic unit participate in the planning and supervising of the student's joint program. Students must be enrolled full-time in the Law School for the first year of law studies. Otherwise, enrollment may be in the graduate school or the Law School, and students may choose courses from either program regardless of where enrolled. Students must satisfy the requirements for both the J.D. degree as specified by the Law School and the M.S. degree as specified in this Bulletin.

The Law School approves courses from the Department of Computer Science that may count toward the J.D. degree, and the Computer Science Department approves courses from the Law School that may count toward the M.S. degree in Computer Science. In either case, approval may consist of a list applicable to all joint-degree students or may be tailored to each individual student program. No more than 45 units of approved courses may be counted toward both degrees. No more than 36 units of courses that originate outside the Law School may count toward the Law degree. To the extent that courses under this joint degree program originate outside of the Law School but count toward the Law degree, the Law School credits permitted under Section 17(1) of the Law School Regulations shall be reduced on a unit-per-unit basis, but not below zero. The maximum number of Law School credits that may be counted toward the M.S. in Computer Science is the greater of: (i) 12 units; or (ii) the maximum number of units from courses outside of the department that M.S. candidates in Computer Science are permitted to count toward the M.S. in the case of a particular student's individual program. Tuition and financial aid arrangements are normally through the school in which the student is then enrolled.

## DOCTOR OF PHILOSOPHY IN COMPUTER SCIENCE

Applications to the Ph.D. program and all supporting documents must be submitted and received online by the published deadline. Please see <http://www-cs.stanford.edu/admissions/> for admissions requirements and the application deadline. Changes or updates to the admission process are posted in September.

The following are general department requirements. Contact the Computer Science Ph.D. administrator for details.

1. A student should plan and complete a coherent program of study covering the basic areas of computer science and related disciplines. The student's adviser has primary responsibility for the adequacy of the program, which is subject to review by the Ph.D. program committee.
2. The first year of the Ph.D. program is spent working with 1-3 different professors on a rotating basis. The intent is to allow the first-year Ph.D. student to work with a variety of professors before aligning with a permanent program adviser. Students who don't need the full year to find a professor to align with have the option of aligning within the first or second quarter.
3. Each student, to remain in the Ph.D. program, must satisfy the breadth requirement covering introductory-level graduate material in major areas of computer science. A student must fulfill two breadth-area requirements in each of three general areas by the end of the second year in the program. If students have fulfilled the six breadth-area requirements they are eligible to apply for candidacy prior to the second year in the program. An up-to-date list of courses that satisfy the breadth requirements can be found at <http://cs.stanford.edu/degrees/phd/Main/>. The student must completely satisfy the breadth requirement by the end of the second year in the program and must pass a qualifying exam in the general area of their expected dissertation by the end of the third year in the program.
4. As part of the training for the Ph.D., the student is also required to complete at least 4 units (a unit is 10 hours per week for one quarter) as a course assistant or instructor for courses in Computer Science numbered 100 or above.
5. The Reading Committee form and Oral Thesis Proposal must be submitted within one year of passing the qualifying exam.
6. The most important requirement is the dissertation. After passing the required qualifying examination, each student must secure the agreement of a member of the department faculty to act as the dissertation adviser. The dissertation adviser is often the student's program adviser.
7. The student must pass a University oral examination in the form of a defense of the dissertation. This is typically held

after all or a substantial portion of the dissertation research has been completed.

8. The student is expected to demonstrate the ability to present scholarly material orally in the dissertation defense.
9. The dissertation must be accepted by a reading committee composed of the principal dissertation adviser, a second member from within the department, and a third member chosen from within or outside of the University. The department requires at least two committee members to be affiliated with the Computer Science department. The principal adviser and at least one of the other committee members must be Academic Council members.

## PH.D. MINOR IN COMPUTER SCIENCE

For a minor in Computer Science, a candidate must complete 20 non-duplicate units of Computer Science course work numbered 200 or above. At least three of the courses must be master's core courses to provide breadth and one course numbered 300 or above to provide depth. One of the courses taken must include a significant programming project to demonstrate programming efficiency. Courses must be taken for a letter grade and passed with a grade of 'B' or better. Applications for a minor in Computer Science are submitted at the same time as admission to candidacy.

## TEACHING AND RESEARCH ASSISTANTSHIPS IN COMPUTER SCIENCE

Graduate student assistantships are available. Half-time assistants receive a tuition scholarship for 8, 9, or 10 units per quarter during the academic year, and in addition receive a monthly stipend.

Duties for half-time assistants during the academic year involve approximately 20 hours of work per week. Course assistants (CAs) help an instructor teach a course by conducting discussion sections, consulting with students, and grading examinations. Research assistants (RAs) help faculty and senior staff members with research in computer science. Most course and research assistantships are held by Ph.D. students. If there is an insufficient number of Ph.D. students to staff teaching and research assistantships, then these positions are open to master's students. However, master's students should not plan on being appointed to an assistantship.

Students with fellowships may have the opportunity to supplement their stipends by serving as graduate student assistants.

## OVERSEAS STUDIES COURSES IN COMPUTER SCIENCE

For course descriptions and additional offerings, see the listings in the *Stanford Bulletin's* ExploreCourses web site (<http://explorecourses.stanford.edu>) or the Bing Overseas Studies web site (<http://bosp.stanford.edu>). Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

## ELECTRICAL ENGINEERING

*Emeriti: (Professors)* Clayton W. Bates, Richard Bube, John Cioffi \*, Von R. Eshleman, Michael J. Flynn \*, Gene F. Franklin \*, Joseph W. Goodman, Robert M. Gray \*, Stephen E. Harris \*, Martin E. Hellman, Umran S. Inan \*, Thomas Kailath \*, Gordon S. Kino \*, Albert Macovski \*, Laurence A. Manning, Edward J. McCluskey \*, Malcolm M. McWhorter, James D. Meindl, Richard H. Pantell \*, R. Fabian W. Pease \*, Anthony E. Siegman, Leonard Tyler \*, Robert L. White, Bernard Widrow \*, Bruce A. Wooley \*; (*Associate Professor*) Bruce B. Lusignan;

(*Professors, Research*) Donald L. Carpenter \*, Aldo da Rosa \*, Antony Fraser-Smith \*, C. Robert Helms, Ingolf Lindau \*, David Luckham, Arogyaswami J. Paulraj \*, Calvin F. Quate

*Chair:* Mark Horowitz

*Vice Chairs:* Robert W. Dutton, Dwight G. Nishimura

*Associate Chair (Admissions):* Howard Zebker

*Chair (Academic Affairs Committee):* Dwight G. Nishimura

*Professors:* Nicholas Bambos, Dan Boneh, Stephen P. Boyd, Thomas M. Cover, Donald C. Cox, William J. Dally, Robert W. Dutton, Abbas El Gamal, Hector Garcia-Molina, Bernd Girod, Andrea G. Goldsmith, Patrick Hanrahan, James S. Harris, John L. Hennessy, Lambertus Hesselink, Mark A. Horowitz, Roger T. Howe, Joseph M. Kahn, Gregory T. A. Kovacs, Thomas H. Lee, Marc Levoy, Nick McKeown, Teresa H. Y. Meng, David A. B. Miller, Dwight G. Nishimura, Oyekunle Olukotun, Brad G. Osgood, John M. Pauly, James D. Plummer, Krishna Saraswat, Fouad A. Tobagi, Shan X. Wang, Jennifer Widom, H. S. Philip Wong, S. Simon Wong, Yoshihisa Yamamoto, Howard Zebker

*Associate Professors:* Dawson Engler, Shanhui Fan, John T. Gill III, Christoforos E. Kozyrakis, Sanjay Lall, Subhasish Mitra, Andrea Montanari, Boris Murmann, Balaji Prabhakar, Mendel Rosenblum, Krishna V. Shenoy, Olav Solgaard, Benjamin Van Roy, Jelena Vuckovic, Tsachy Weissman

*Assistant Professors:* Audrey Ellerbee, Sachin Katti, Philip Levis, Ada Poon

*Professors (Research):* James F. Gibbons, Leonid Kazovsky, Butrus Khuri-Yakub, Yoshio Nishi, Piero Pianetta

*Courtesy Professors:* Stacey Bent, Emmanuel Candes, David Cheriton, Amir Dembo, David L. Dill, Per Enge, Gary Glover, Peter Glynn, Leonidas Guibas, Monica S. Lam, David G. Luenberger, John C. Mitchell, Sandy Napel, Richard Olshen, Norbert Pelc, Zhi-Xun Shen, Julius Smith, Claire Tomlin, Brian Wandell, Yinyu Ye, Shoucheng Zhang

*Courtesy Associate Professors:* Kwabena Boahen, Hari Manoharan, David Mazieres, Michael McConnell, Andrew Ng, Daniel Spielman, Barbara van Schewick

*Courtesy Assistant Professors:* Sigrid Close, Kerwyn C. Huang, Ramesh Johari, Amin Saberi

*Lecturers:* Dennis Allison, Craig Burkhart, Andrew Freeman, Wendy Ju, Roger Melen, John Provine, Hamid Rategh, Dieter Scherer, Jason Stinson, Howard Swain, James Weaver

*Consulting Professors:* Richard Dasher, Leslie Field, Silvano Gai, Fred M. Gibbons, Dimitry Gorinevsky, Bob S. Hu, Theodore Kamins, David Leeson, Madihally Narasimha, Gurudatta Parulkar, Ronald Schafer, David Su, Simon Sze, John Wenstrand

*Consulting Associate Professors:* Micah Siegel, Katelijn Vleugels, Jun Ye

*Consulting Assistant Professor:* Jatinder Singh

*Visiting Professors:* David Allstot, Michael Black, Byuung-Gook Park, Tianling Ren, Thomas Wiegand, Zhiping Yu

*Visiting Associate Professors:* Yonina Eldar, Maneesh Sahani, Lin Zhang

*Visiting Assistant Professors:* Ofer Levi, Damon Wischik

\* recalled to active duty

*Mail Code:* 94305-9505

*Phone:* (650) 723-3931; *Fax:* (650) 723-1882

*Web Site:* <http://ee.stanford.edu>

Courses offered by the Department of Electrical Engineering are listed under the subject code EE on the *Stanford Bulletin's* ExploreCourses web site.

## MISSION OF THE UNDERGRADUATE PROGRAM IN ELECTRICAL ENGINEERING

The mission of the undergraduate program of the Department of Electrical Engineering is to augment the liberal education expected of all Stanford undergraduates, to impart a basic understanding of electrical engineering built on a foundation of physical science, mathematics, computing, and technology, and to

provide majors in the department with knowledge of electrical engineering principles along with the required supporting knowledge of mathematics, science, computing, and engineering fundamentals. The program develops students' skills in performing and designing experimental projects and communicating their findings to the scientific community effectively. Students in the major are required to select one sub-discipline for specialization. Choices include computer hardware, computer software, controls, circuits and devices, bioelectronics and bioimaging, fields and waves, signal process and communications, and solid state and photonic devices. The program prepares students for careers in government agencies, the corporate sector, or for future study in graduate or professional schools.

## LEARNING OUTCOMES

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. The educational objectives of the program are:

1. *Technical knowledge*—provide a knowledge of electrical engineering principles along with the required supporting knowledge of computing, engineering fundamentals, mathematics, and science. The program must include depth in at least one specialty area, currently including computer hardware, computer software, controls, circuits, fields and waves, communication and signal processing, and semiconductor and photonic devices.
2. *Laboratory and design skills*—develop the basic skills needed to perform and design experimental projects. Develop the ability to formulate problems and projects and to plan a process for solution, taking advantage of diverse technical knowledge and skills.
3. *Communications skills*—develop the ability to organize and present information and to write and speak effective English.
4. *Preparation for further study*—provide sufficient breadth and depth for successful subsequent graduate study, postgraduate study, or lifelong learning programs.
5. *Preparation for the profession*—provide an appreciation for the broad spectrum of issues arising in professional practice, including economics, ethics, leadership, professional organizations, safety, service, and teamwork.

## UNDERGRADUATE PROGRAMS IN ELECTRICAL ENGINEERING

To major in Electrical Engineering (EE), undergraduates should follow the depth sequence in the "Undergraduate Degree in Electrical Engineering" section of this bulletin. Students are required to have a program planning sheet approved by their adviser and the department prior to the end of the quarter following the quarter in which they declare their major and at least one year prior to graduation. Program sheets for the general EE requirements and for each of the EE specialty sequences may be found at <http://ughb.stanford.edu>. Majors must receive at least a 2.0 grade point average (GPA) in courses taken for the EE depth requirement; all classes must be taken for a letter grade.

Students interested in a minor should consult the "Minor in Electrical Engineering" section of this bulletin.

A Stanford undergraduate may work simultaneously toward the B.S. and M.S. degrees. University requirements for the coterminal M.A. or M.S. are described in the "Coterminal Bachelor's and Master's Degrees" section of this bulletin. For University coterminal degree program rules and University application forms, see <http://studentaffairs.stanford.edu/registrar/publications#Coterm>.

## HONORS PROGRAM

The Department of Electrical Engineering offers a program leading to a Bachelor of Science in Electrical Engineering with honors. This program offers a unique opportunity for qualified

undergraduate majors to conduct independent study and research at an advanced level with a faculty mentor, graduate students, and fellow undergraduates.

Admission to the honors program is by application. Declared EE majors with a grade point average (GPA) of at least 3.5 in Electrical Engineering are eligible to submit an application. Applications must be submitted by Autumn quarter of the senior year, be signed by the thesis adviser and second reader (one must be a member of the EE Faculty), and include an honors proposal. Students need to declare honors on Axess.

In order to receive departmental honors, students admitted to the honors program must:

1. maintain a grade point average (GPA) of at least 3.5 in EE courses.
2. complete at least 10 units of EE 191 for a letter grade with their project adviser.
3. submit two final copies of the honors thesis approved by the adviser and second reader.
4. attend poster and oral presentation in the Electrical Engineering Honors Symposium held at the end of Spring Quarter or present in another suitable forum approved by the faculty adviser.

## GRADUATE PROGRAMS IN ELECTRICAL ENGINEERING

University regulations governing the M.S., Engineer, and Ph.D. degrees are described in the "Graduate Degrees" section of this bulletin.

The profession of electrical engineering demands a strong foundation in physical science and mathematics, a broad knowledge of engineering techniques, and an understanding of the relationship between technology and man. Curricula at Stanford are planned to offer the breadth of education and depth of training necessary for leadership in the profession. To engage in this profession with competence, four years of undergraduate study and at least one year of postgraduate study are recommended. For those who plan to work in highly technical development or fundamental research, additional graduate study is desirable.

A one- to two-year program of graduate study in Electrical Engineering may lead to the degree of Master of Science. The program is typically completed in five academic quarters. A two- to three-year program, offering a wider selection of engineering course work, more opportunity for study in the related fields of engineering, mathematics, and physics, and in particular, more independent work and individual guidance, may lead to the degree of Engineer.

The degree of Doctor of Philosophy is offered under the general regulations of the University. The doctoral program, requiring a minimum of 135 units of graduate study, should be considered by those with the ability and desire to make a life work of research or teaching.

*Application for Admission*—Applications for graduate admission in Electrical Engineering (EE) should be completed electronically at <http://gradadmissions.stanford.edu>. For information concerning Electrical Engineering graduate admissions, see <http://ee-admissions.stanford.edu>. The application deadline for admission for Autumn Quarter 2012-13 is December 13, 2011.

## ELECTRICAL ENGINEERING COURSE CATALOG NUMBERING SYSTEM

Electrical Engineering courses are typically numbered according to the year in which the courses are normally taken.

010-099	first or second year
100-199	second through fourth year
200-299	mezzanine courses for advanced undergraduates or graduate students
300-399	first graduate year
400-499	second or third graduate year
600-799	special summer courses

The Department of Electrical Engineering (EE) offers courses in the following areas:

- Biomedical Sensing and Imaging
- Communication Systems
- Computer Hardware
- Computer Software Systems
- Control and System Engineering
- Dynamic Systems and Optimization
- Electronic Circuits
- Electronic Devices, Sensors, and Technology
- Fields, Waves, and Radioscience
- Image Systems
- Lasers, Optoelectronics, and Quantum Electronics
- Network Systems
- Signal Processing
- Solid State Materials and Devices

## MASTER OF SCIENCE IN ELECTRICAL ENGINEERING

Students with undergraduate degrees in physics, mathematics, or related sciences, as well as in various branches of engineering, are invited to apply for admission. They should typically be able to complete the master's degree in five academic quarters; note that many courses are not taught during the summer. Students with undergraduate degrees in other fields may also be admitted for graduate study; see below.

The master's degree program may provide advanced preparation for professional practice or for teaching at the junior college level, or it may serve as the first step in graduate work leading to the degree of Engineer or Ph.D. The faculty does not prescribe specific courses to be taken. Each student, with the help of a program adviser, prepares an individual program and submits it to the faculty for approval. The master's program proposal must be submitted to the department office during the first quarter of graduate study; modifications may be made until one quarter prior to degree conferral. Detailed requirements and instructions are in the *Handbook for Graduate Students in Electrical Engineering at Stanford University* (<http://ee.stanford.edu/gradhandbook>). Programs of at least 45 units that meet the following guidelines are normally approved. Cognate (extradepartmental) courses of the appropriate level are considered as Electrical Engineering courses.

1. A sequence of three or more letter-graded electrical engineering courses numbered above 200, to provide depth in one area. The student must maintain an average 3.0 grade point average (GPA) or better in both the depth area and overall courses taken.
2. At least one letter-graded EE course numbered above 200 in each of three distinct course areas outside of the area selected under item 1 to provide breadth. Two courses are not considered to be in distinct areas if they can be found under a common depth area.
3. Enough additional units of EE courses so that items 1 through 3 total at least 21 units of letter-graded EE courses numbered above 200, including at least 9 units of such courses numbered in the 300s or 400s. Some 600- or 700-level summer courses may also be considered for inclusion in the M.S. program. Special studies units may not be used.
4. Additional course work to bring the total to 45 or more quarter units
  - a. of which at least 36 must be letter-graded units
  - b. of which 36 units must be at or above the 100 level
  - c. of which 30 units must be in technical areas such as engineering, mathematics, and science
  - d. thesis and special studies units cannot be included.
5. Either (a) one formal EE seminar course for credit, or (b) attend a minimum of eight informal or formal EE research seminars, and submit with the final M.S. program a list of the seminars with a paragraph describing the content and the

signature of the M.S. adviser. This requirement is to ensure that students sample the many available research seminars.

Capable students without formal undergraduate preparation in electrical engineering may also be admitted for graduate study. Such students may have graduated in any field and may hold either the B.S. or B.A. degree. Each student, with the help of an adviser, prepares a program of study to meet particular needs and submits it to the faculty for approval. A student with adequate preparation in mathematics through calculus and college physics including electricity can usually complete the M.S. degree requirements within two academic years. A student with some additional preparation in electrical engineering may be able to complete the M.S. requirements in only one academic year.

Graduate study in EE demands that students be adequately prepared in circuits, digital systems, fields, lab work, mathematics, and physics. Skill in using modern computing facilities is essential for electrical engineers, and an increasing number of courses routinely require it. This skill should be acquired early in the program, either by taking one of the regular computer science courses or one of the special short courses given by the Computation Center, or by self-study.

It is the student's responsibility, in consultation with an adviser, to determine whether the prerequisites for advanced courses have been met. Prerequisite courses ordinarily taken by undergraduates may be included as part of the graduate program of study. However, if the number of these is large, the proposed program may contain more than the typical 45 units, and the time required to meet the degree requirements may be increased.

Students working toward the Master of Science degree in Electrical Engineering who are considering a Ph.D. or Engineer degree program in Electrical Engineering at Stanford must request the addition of a new degree program by submitting a Graduate Program Authorization Petition for approval by the department. The petition must be submitted and approved at least one quarter prior to M.S. degree completion. Once the M.S. degree in EE has been conferred, a student may not register for additional course work without this approval. Permission to study beyond the M.S. degree is normally granted to students who were originally admitted to the Ph.D. program if the student:

1. has passed the Ph.D. qualifying examination within the past year, or
2. has a written commitment from a regular member of the EE faculty to serve as an Engineer or Ph.D. dissertation adviser, and has a satisfactory academic record to date.

Students originally admitted only for the M.S. degree and not to the Ph.D. program may petition the EE graduate admissions committee during Autumn Quarter of their second year at Stanford for a change of status to the Ph.D. program with permission to take the Ph.D. qualifying exam in January. Requirements for the petition include a grade point average of 3.5 on Stanford courses and a written statement of support from an EE faculty member with whom the student has conducted preliminary research through directed reading (EE 390 or 391) or as part of a 300-level project course. Decisions are based on performance and the strength of the support letter. If admitted to the Ph.D. program, permission to study beyond the M.S. degree is normally granted under the same conditions as those described above for students originally admitted to the Ph.D. program. Students not admitted to the Ph.D. program are normally granted permission to continue past the M.S. degree only if there is a written commitment from a regular member of the EE faculty to serve as an Engineer dissertation supervisor. The student should file for candidacy for the Engineer degree within one quarter of receiving the M.S.

### **JOINT ELECTRICAL ENGINEERING AND LAW DEGREE (J.D./M.S.)**

The Department of Electrical Engineering and the School of Law offer a joint degree program leading to an M.S. degree in EE combined with a J.D. degree. The J.D./M.S. program is designed for students who wish to prepare themselves for careers that involve both Law and Electrical Engineering.

Students interested in this joint degree program must apply to and gain admission separately from the Department of Electrical Engineering and the School of Law, and as an additional step, secure consent from both academic units to pursue both degrees simultaneously. Interest in the program should be noted on a student's application to each academic unit. A student currently enrolled in either the Department of Electrical Engineering or the School of Law may apply for admission to the other academic unit and for joint degree status after commencing study in that unit.

Joint degree students may elect to begin their study in either the Department of Electrical Engineering or the School of Law. Faculty advisers from each academic unit participate in the planning and supervising of the student's joint program. In the first year of the joint degree program, students must be enrolled full-time in the School of Law. Students must satisfy the requirements for both the J.D. and the M.S. degrees as specified in the *Stanford Bulletin*.

The Electrical Engineering Department approves courses from the Law School that may count toward the M.S. degree in Electrical Engineering, and the Law School approves courses from the Department of Electrical Engineering that may count toward the J.D. degree. In either case, approval may consist of a list applicable to all joint degree students or may be tailored to each individual student's program.

No more than 45 quarter hours of approved courses may be counted toward both degrees. No more than 36 quarter hours of courses that originate outside the School of Law may count toward the Law degree. To the extent that courses under this joint degree program originate outside of the School of Law but count toward the Law degree, the School of Law credits permitted under Section 17(1) of the Law School Regulations shall be reduced on a unit-per-unit basis but not below zero.

The maximum number of School of Law units that may be counted toward the M.S. degree in Electrical Engineering is the greater of:

1. 12 units  
or
2. the maximum number of units from courses outside of the department that M.S. candidates in Electrical Engineering are permitted to count toward the M.S. degree under general departmental guidelines, or as set forth in the case of a particular student's individual program.

Tuition and financial aid arrangements are typically administered through the school in which the student is enrolled.

### **THE HONORS COOPERATIVE PROGRAM**

Many of the department's graduate students are supported by the Honors Cooperative Program (HCP), which makes it possible for academically qualified engineers and scientists in nearby companies to be part-time graduate students in Electrical Engineering while continuing nearly full-time professional employment. Prospective HCP students follow the same admission process and must meet the same admission requirements as full-time graduate students. For more information regarding the Honors Cooperative Program, see the "School of Engineering" section of this bulletin.

### **ENGINEER DEGREE IN ELECTRICAL ENGINEERING**

The degree of Engineer requires a minimum of 90 units of residency. Units completed at Stanford towards a master's degree in an Engineering discipline may be used towards the 90-unit residency requirement for the Engineer degree. A student who received an M.S. degree elsewhere can transfer in 45 units towards the 90-unit requirement for an Engineer's degree. This requires the student to fill out the Application for Graduate Residency Credit form to be filed with the Degree Progress Office in the Registrar's Office.

Work toward the degree of Engineer in Electrical Engineering normally includes the requirements for work toward the master's

degree in Electrical Engineering, including qualifications for admission.

An additional year allows time for a broader program, or a more concentrated program, or whatever arrangement may seem suitable to the candidate, the adviser, and the department. Advanced study at other universities, or in other departments at Stanford, may be allowed within the foregoing consideration. The equivalent of approximately one quarter is devoted to independent study and thesis work with faculty guidance. The thesis is often of the nature of a professional report on the solution of a design problem. The degree of Engineer differs from the Ph.D. in that it prepares for professional engineering work rather than theoretical research. The candidate may select courses that are suitable for either the degree of Engineer or the Ph.D. degree and decide later which program to pursue.

Applicants currently working toward the Stanford M.S. degree in Electrical Engineering should request permission to continue graduate studies beyond the master's degree, using the Graduate Program Authorization Petition form obtained from the Department of Electrical Engineering office.

During the first quarter of work beyond the M.S. degree, formal application for admission to candidacy for the degree of Engineer is made on a form that can be obtained from the department office. The student prepares his or her academic study plan with the help of the thesis adviser and submits it to the academic associate for approval. The form should contain a list of all graduate courses completed at Stanford and elsewhere and all courses yet to be completed. For the most recent information, see <http://ee.stanford.edu/gradhandbook>.

## DOCTOR OF PHILOSOPHY IN ELECTRICAL ENGINEERING

The University requirements for the Ph.D. degree are described in the "Graduate Degrees" section of this bulletin.

Admission to a graduate program does not imply that the student is a candidate for the Ph.D. degree. Advancement to candidacy requires superior academic achievement, satisfactory performance on a qualifying examination, and sponsorship by two faculty members. Enrollment in EE 391, Special Studies, is recommended as a means for getting acquainted with a faculty member who might be willing to serve as a supervisor.

Students admitted to the Ph.D. program should submit an application to take the department qualifying examination (given each Winter Quarter). Upon completion of the qualifying examination and after securing agreement by two faculty members to serve as dissertation advisers, the student should file an Application for Doctoral Candidacy. Students are expected to apply for candidacy prior to the end of their second year in the graduate program. The Ph.D. in Electrical Engineering is a specialized degree, and is built on a broad base of physics, mathematics, and engineering skills. The course program is expected to reflect competency in Electrical Engineering and specialized study in other areas relevant to the student's research focus. Normally the majority of units are drawn from EE department or cognate courses, with typically 9 units from related advanced physics, mathematics, engineering, or computer science courses, depending on the area of research. Only after receiving department approval of the Application for Candidacy, does the student become a candidate for the Ph.D. degree.

Requirements may be summarized as follows. The student must complete:

1. a minimum of 135 units of residence with graduate standing at Stanford
2. one or more qualifying examinations given by the faculty of the Department of Electrical Engineering
3. an approved course of study in Electrical Engineering
4. an approved program of research and a written dissertation, based on research, which must be a contribution to knowledge
5. an oral examination that is a defense of dissertation research and is taken near the completion of the doctoral program.

For the most recent information, see <http://ee.stanford.edu/gradhandbook>.

## FINANCIAL ASSISTANCE

The department awards a limited number of fellowships, teaching and course assistantships, and research assistantships to incoming graduate students. Applying for financial assistance is part of the admission application.

## PH.D. MINOR IN ELECTRICAL ENGINEERING

For a minor in Electrical Engineering (EE), the student must fulfill the M.S. depth requirement, complete a total of at least 20 units of course work at the 200-plus level in Electrical Engineering (of which 15 units must be letter-graded), and be approved by the department's Ph.D. Degree Committee. A grade point average (GPA) of at least 3.35 on these courses is required.

## AREAS OF RESEARCH IN ELECTRICAL ENGINEERING

Candidates for advanced degrees participate in the research activities of the department as paid research assistants or as students of individual faculty members. At any one time, certain areas of research have more openings than others. A new applicant should express a second choice of research interest in the event that there are no vacancies in the primary area of interest. At present, faculty members and students are actively engaged in research in the following areas:

- Biomedical Devices and Bioimaging
- Communication Systems: wireless, optical, wireline
- Control, Learning, and Optimization
- Electronic and Magnetic Devices
- Energy: solar cells, smart grid, load control
- Environmental and Remote Sensing: sensor nets, radar systems, space
- Fields and Waves
- Graphics, HCI, Computer Vision, Photography
- Information Theory and Coding: Image and data compression, denoising
- Integrated Circuit Design: MEMs, sensors, analog, RF
- Network Systems and Science: Next gen internet, wireless networks
- Nano and Quantum Science
- Nanofabrication Science and Technology
- Photonic Devices
- Systems Software: OS, compilers, languages
- Systems Hardware: architecture, VLSI, embedded systems

For additional information, see the Department of Electrical Engineering's Research page at <http://ee.stanford.edu/research.php>.

## OVERSEAS STUDIES COURSES IN ELECTRICAL ENGINEERING

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses web site (<http://explorecourses.stanford.edu>) or the Bing Overseas Studies web site (<http://bosp.stanford.edu>). Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

## SPRING QUARTER

### KYOTO

OSPKYOTO 33. Digital Systems II. 4 units, Kozyrakis, GER:DB:EngrAppSci

# MANAGEMENT SCIENCE AND ENGINEERING

*Emeriti: (Professors)* James L. Adams, Kenneth J. Arrow, Richard W. Cottle, Donald A. Dunn, B. Curtis Eaves, Frederick S. Hillier, Donald L. Iglehart, Michael M. May, William J. Perry, Henry E. Riggs, David A. Thompson, Arthur F. Veinott, Jr.

*Chair:* Peter W. Glynn

*Professors:* Nicholas Bambos, Stephen R. Barley, Margaret L. Brandeau, Robert C. Carlson, Kathleen M. Eisenhardt, Peter W. Glynn, Warren H. Hausman, Ronald A. Howard, David G. Luenberger, M. Elisabeth Paté-Cornell, Robert I. Sutton, James L. Sweeney, Yinyu Ye

*Associate Professors:* Samuel S. Chiu, Ashish Goel, Pamela J. Hinds, Ramesh Johari, Riitta Katila, Amin Saberi, Ross D. Shachter, Edison T. S. Tse, Benjamin Van Roy

*Assistant Professors:* Charles E. Eesley, Feryal Erhun, Kay Giesecke

*Professors (Research):* Siegfried S. Hecker, Walter Murray, Michael A. Saunders, John P. Weyant

*Professors (Teaching):* Thomas H. Byers, Robert E. McGinn

*Courtesy Professors:* Anat Admati, Stephen P. Boyd, Walter Powell, Tim Roughgarden

*Affiliated Faculty:* Seenu Srinivasan

*Lecturers:* Steve Blank, Andrei Z. Broder, Jon Feiber, Hill Huntington, Vanja Josifovski, Ann Miura-Ko, Mary Morrison, Donna Novitsky, Lena Ramfelt, Heidi Roizen, Tina Seelig, Rosanne Siino, Lynda Kate Smith

*Consulting Professors:* Peter Haas, Gerd Infanger, Thomas Kosnik, James E. Matheson, Burke Robinson, Sam L. Savage, Behnam Tabrizi

*Consulting Associate Professors:* Adam B. Borison, Gregory L. Hamm, Samuel Holtzman, Hervé Kieffel, Michael Lyons, Audrey MacLean, Jan Pietzsch, Dariush Rafinejad, F. Victor Stanton

*Consulting Assistant Professors:* Blake E. Johnson, Arik Lifschitz, James A. Primbs

*Visiting Professor:* Olivier de La Grandville

*Visiting Associate Professors:* Charles Feinstein, Yee-Tien Fu

*Visiting Assistant Professor:* Peter Woehrmann

*Director of the Industrial Affiliates Program:* Yinyu Ye

*Department Offices:* Huang Engineering Center, 475 Via Ortega, 94305-4121

*Mail Code:* 94305-4026

*Web Site:* <http://stanford.edu/dept/MSandE>

Courses offered by the Department of Management Science and Engineering are listed under the subject code MS&E on the *Stanford Bulletin's* ExploreCourses web site.

In December 1999, the Board of Trustees authorized the creation of the Department of Management Science and Engineering from the Department of Industrial Engineering and Engineering Management and the Department of Engineering-Economic Systems and Operations Research. Its main objective is to be the leader at the interface of engineering, business, and public policy. The department's mission is, through education and research, to advance the design, management, operation, and interaction of technological, economic, and social systems. The department's engineering research strength is integrated with its educational program at the undergraduate, master's, and doctoral levels: graduates of the program are trained as engineers and future leaders in technology, policy, and industry. Research and teaching activities are complemented by an outreach program that encourages the transfer of ideas to the environment of Silicon Valley and beyond.

Management Science and Engineering (MS&E) provides programs of education and research by integrating three basic strengths:

1. depth in conceptual and analytical foundations
2. comprehensive coverage of functional areas of application
3. interaction with other Stanford departments, Silicon Valley industry, and organizations throughout the world.

The analytical and conceptual foundations include decision and risk analysis, dynamic systems, economics, optimization, organizational science, and stochastic systems. The functional areas of application include entrepreneurship, finance, information, marketing, organizational behavior, policy, production, and strategy. Close associations with other engineering departments and with industry enrich the programs by providing opportunities to apply MS&E methods to important problems and by motivating new theoretical developments from practical experience. MS&E's programs also provide a basis for contributing to other areas such as biotechnology, defense policy, environmental policy, information systems, and telecommunications.

## MISSION OF THE UNDERGRADUATE PROGRAM IN MANAGEMENT SCIENCE AND ENGINEERING

The mission of the undergraduate program in Management Science and Engineering is to provide students with the fundamentals of engineering systems analysis so that they are able to plan, design, and implement complex economic and technical management systems. The program builds on the foundational courses for engineering including calculus, engineering fundamentals, and physics or chemistry as well as management science. Students may select courses in computer science, information, organizational theory, mathematical modeling, optimization, probability, statistics and finance or production. To allow for greater in-depth exploration in a particular area, students then choose a concentration area. The major prepares students for a variety of career paths, including facilities and process management, investment banking, management consulting or for graduate school in industrial engineering, operations research, economics, public policy, medicine, law, or business.

## LEARNING OUTCOMES

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to be able:

1. to apply the knowledge of mathematics, science, and engineering;
2. to design and conduct experiments;
3. to design a system or components to meet desired needs;
4. to identify, formulate, and solve engineering problems;
5. to use techniques, skills, and modern engineering tools necessary for engineering practice;
6. to function on multidisciplinary teams;
7. to communicate effectively;
8. to recognize the need for and demonstrate an ability to engage in life-long learning;
9. to obtain the background necessary for admission to top professional graduate engineering or business programs;
10. to understand professional and ethical responsibility;
11. to obtain the broad education necessary to understand the impact of engineering solutions in a global and societal context; and
12. to obtain a knowledge of contemporary issues pertinent to the field of management science and engineering.

## GRADUATE PROGRAMS IN MANAGEMENT SCIENCE AND ENGINEERING

MS&E, in collaboration with other departments of the University, offers programs leading to the degrees of Master of Science and Doctor of Philosophy. The department also offers a



coterminal B.S./M.S. degree, and a dual master's degree in cooperation with each of the other departments in the School of Engineering.

For University coterminal degree program rules and University application forms, see <http://registrar.stanford.edu/shared/publications.htm#Coterm>.

Applicants for admission as graduate students in MS&E must submit the results of the verbal, quantitative, and analytical parts of the Graduate Record Examination. The deadline for application to the doctoral program is December 6, 2011, and the deadline for application to the master's program is January 10, 2012.

Except in unusual circumstances, admission is limited to the Autumn Quarter because courses are arranged sequentially with basic courses and prerequisites offered early in the academic year.

*Assistantships and Fellowships*—A limited number of fellowships and assistantships are awarded each year. Applicants admitted to the doctoral program, who have indicated on their application that they would like to be considered for financial aid, are automatically considered for these assistantships and fellowships.

Information about loan programs and need-based aid for U.S. citizens and permanent residents can be obtained from the Financial Aid Office.

## CAREERS IN MS&E

MS&E helps students prepare for professional careers in business, government, industry, non-profit institutions, and universities. Graduates have pursued careers in consulting, enterprise management, financial analysis, government policy analysis, industrial research, line management, product development, project management, strategic planning, and university teaching and research. Some have founded companies specializing in financial services, high technology products, management and systems consulting, or software. Other graduates have helped establish new analytical capabilities in existing firms or government agencies.

Many graduates have become leaders in technology-based businesses, which have an increasing need for well-educated, analytically oriented people who understand both business and technology. The Department of MS&E is attractive to people with engineering, mathematical science, and physical science backgrounds as it complements their technical abilities with the conceptual frameworks needed to analyze problems of investment, management, marketing, operations, production, and strategic planning in a technical environment.

## PROFESSIONAL EDUCATION

The Stanford Center for Professional Development (SCPD) provides opportunities for employees of some local and remote companies to take courses at Stanford.

The Honors Cooperative Program (HCP) provides opportunities for employees of SCPD Member companies to earn an M.S. degree, over a longer period, by taking one or two courses per academic quarter. Some courses are only offered on campus; HCP students may attend those courses at Stanford to meet the degree requirements. It is possible to complete this program as a remote HCP student although the remote offerings are limited. Students must apply for a degree program through the standard application process, and must meet the standard application deadlines.

The non-degree option (NDO) allows employees of some local companies to take courses for credit from their company sites before being admitted to a degree program. Students apply to take NDO courses each quarter through the Stanford Center for Professional Development. Up to 18 units taken as an NDO student may be applied toward a degree program. For additional information about the NDO application process and deadlines, see <http://scpd.stanford.edu>, or contact SCPD at (650) 725-3000.

The department offers a certificate program within the framework of the NDO program. A certificate can be obtained by

completing three MS&E core courses, plus one MS&E elective course for a total of four courses. For further information, see <http://scpd.stanford.edu/scpd/programs/certs/managementSci.htm>.

## BACHELOR OF SCIENCE IN MANAGEMENT SCIENCE AND ENGINEERING

The program leading to the B.S. degree in Management Science and Engineering (MS&E) is outlined in the School of Engineering section of this bulletin; more information is contained in the School of Engineering's *Handbook for Undergraduate Engineering Programs*. Students are encouraged to plan their academic programs as early as possible, ideally in the freshman or sophomore year. Students should not wait until they are declaring a major to consult with the department's student services staff. This is particularly important for students who would like to study overseas or pursue another major or minor.

The undergraduate curriculum in Management Science and Engineering provides students training in the fundamentals of engineering systems analysis to prepare them to plan, design, and implement complex economic and technological management systems where a scientific or engineering background is necessary or desirable. Graduates are prepared for work in a variety of career paths, including facilities and process management, investment banking, management consulting, or graduate study in industrial engineering, operations research, economics, public policy, medicine, law, or business.

The educational objectives of the undergraduate degree program are:

- *Principles and Skills*—provide students with a basic understanding of management science and engineering principles, including analytical problem solving and communications skills.
  - *Preparation for Practice*—prepare students for practice in a field that sees rapid changes in tools, problems, and opportunities.
  - *Preparation for Continued Growth*—prepare students for graduate study and self development over an entire career.
  - *Preparation for Service*—develop in students the awareness, background, and skills necessary to become responsible citizens, employees, and leaders.
- In particular, the department wants to help students develop:
- an ability to apply knowledge of math, science, and engineering
  - an ability to design and conduct experiments
  - an ability to design a system or components to meet desired needs
  - an ability to identify, formulate, and solve engineering problems
  - an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice
  - an ability to function on multidisciplinary teams
  - an ability to communicate effectively
  - a recognition of the need for and an ability to engage in life-long learning
  - background necessary for admission to top professional graduate engineering or business programs
  - an understanding of professional and ethical responsibility
  - the broad education necessary to understand the impact of engineering solutions in a global and societal context
  - a knowledge of contemporary issues pertinent to the field of management science and engineering.

The program builds on the foundational courses for engineering, including calculus, engineering fundamentals, and physics or chemistry.

The department core, taken for all concentrations, includes courses in computer science, deterministic optimization,

information, organization theory, a senior project, and finance or production. Through the core, students in the program are exposed to the breadth of faculty interests, and are in a good position to choose a concentration during the junior year.

The five concentrations are designed to allow a student to explore one area of the department in greater depth.

1. *Financial and Decision Engineering*: focuses on the design and analysis of financial and strategic plans. It features accounting, decision analysis, economics, finance, investment science, and stochastic models.
2. *Operations Research*: provides a more mathematical program, based on algorithms, theory, and applications in economics and operations.
3. *Organization, Technology, and Entrepreneurship*: focuses on understanding and design of organizations, particularly technology-based issues. It features courses on innovation, product development, entrepreneurship, work and manufacturing systems, information systems, and human-computer interaction.
4. *Production and Operations Management*: focuses on the design and analysis of manufacturing, production, and service systems.
5. *Policy and Strategy*: focuses on the design and analysis of public policies and corporate strategies, especially those with technology-based issues. It features a core in microeconomics and modeling approaches, and policy-focused courses in topics such as national security, energy and environment, and health care, and strategy-focused courses in topics such as entrepreneurship, innovation, and product development.

Students interested in a minor should see the "Minor in MS&E" section of this bulletin.

MS&E also participates with the departments of Computer Science, Mathematics, and Statistics in a program leading to a B.S. in Mathematical and Computational Science. See the "Mathematical and Computational Science" section of this bulletin.

## MASTER OF SCIENCE IN MANAGEMENT SCIENCE AND ENGINEERING

The M.S. degree programs require a minimum of 45 units beyond the equivalent of a B.S. degree at Stanford. All programs represent substantial progress in the major field beyond the bachelor's degree.

University requirements for the master's degree are described in the "Graduate Degrees" section of this bulletin.

The M.S. program in Management Science and Engineering (MS&E) prepares individuals for a lifelong career addressing critical technical and managerial needs in private and public decision making. Department requirements for the M.S. degree provide breadth across some of the areas of the department, and flexibility for meeting individual objectives of depth in a particular area of concentration. The master's degree may be a terminal degree program with a professional focus, or a preparation for a more advanced graduate program. The M.S. degree can normally be earned in one academic year (three academic quarters) of full-time work, although students may choose to continue their education by taking additional MS&E courses beyond that year. Background requirements, taken in addition to degree requirements, must be met by students who have had insufficient course work in mathematical sciences, computer science, engineering and/or natural sciences.

Students must take a minimum of 45 course units as follows:

1. At least five core courses
2. At least three other courses in an area of concentration of their choice
3. A course in probability, unless a college-level course in probability has already been passed
4. A project course requirement
5. The remaining units in elective courses.

*Background Requirements*—Students must have had or must

take the following (or equivalent) courses before the M.S. degree is conferred: MATH 41, 42, 51, Calculus, 15 units; CS 106A, Programming Methodology, 5 units, and an additional 15 units of engineering, mathematical sciences, or natural sciences. These courses do not count toward the 45 units of the M.S. degree. Courses taken to meet MS&E background requirements may be at either the undergraduate or graduate level, and may be taken as credit/no credit. These additional background requirements would typically be met by students who have a bachelor's degree in engineering, or mathematical or natural sciences.

*Core (Depth) Courses*—M.S. students must take at least five courses out of the following eleven options:

- MS&E 201. Dynamic Systems *or* MS&E 251. Stochastic Decision Models
- MS&E 211. Linear and Nonlinear Optimization
- MS&E 220. Probabilistic Analysis
- MS&E 221. Stochastic Modeling *or* MS&E 223. Simulation
- MS&E 240. Accounting *or* MS&E 242. Investment Science
- MS&E 241. Economic Analysis
- MS&E 252. Decision Analysis *or* MS&E 250A. Risk Analysis
- MS&E 261. Production Systems
- MS&E 270. Strategy in Technology-Based Companies
- MS&E 271. Global Entrepreneurial Marketing
- MS&E 280. Organizational Behavior

Students may not waive core courses. They may, however, petition to substitute an approved, more advanced MS&E course in the same area. Courses used to satisfy the core requirement must be taken for a letter grade, must be taken for a minimum of three units each, and may not also be used to satisfy the concentration requirement.

*Courses in an Area of Concentration (Breadth)*—Students must complete a departmentally approved set of three or more letter-graded courses taken for a minimum of three units each, in an area of concentration of one of the following types:

1. An area of concentration in the MS&E department
2. An area of concentration in one of the seven other departments of the School of Engineering
3. In exceptional cases, a coherent area of concentration designed by the student. Petitions for student-designed concentrations must list the three proposed courses (taken for three units or more and at the 200-level or above) and include a brief justification. The petition must be submitted to student services no later than the fifth week of the quarter prior to graduation.

*Project Course Requirement*—Students must take either a designated project course or two designated integrated project courses. The project course(s) must be taken for a letter grade, must be taken for a minimum of three units, and may also be used to satisfy the core or concentration requirement.

Additional requirements are:

1. At least 45 units must be in courses numbered 100 and above.
2. At least 27 units must be in courses numbered 200 and above in MS&E, taken for a letter grade and a minimum of two units each, and at least 36 letter-graded units must be in MS&E or closely related fields. Closely related fields include any department in the School of Engineering, mathematics, statistics, economics, sociology, psychology, or business.
3. The degree program must be completed with a grade point average (GPA) of 3.0 or higher.
4. A maximum of three units of language courses (numbered 100 and above).
5. A maximum of three units of 1-unit courses such as seminars, colloquia, workshops, in any department, and a maximum of one unit of MS&E 208A, B, or C, Curricular Practical Training.
6. A maximum of 18 non-degree option (NDO) units through the Stanford Center for Professional Development (SCPD).
7. Courses in athletics may not be applied toward the degree.

See the student services office or department web site for complete listing of project, integrated project, and approved concentrations.

## ENERGY AND ENVIRONMENT TRACK

The Energy and Environment M.S. track is designed for students interested in energy and environmental issues from the perspectives of public policy, nongovernmental organizations, or corporations. This track includes: core courses that provide the conceptual background in economics, decisions, strategy, investment, and organizational behavior; courses in energy resources, natural resource economics, and energy/environmental policy analysis; and an individually designed concentration emphasizing policy, strategy, and/or technology. Seminars provide insights into current corporate strategy, public policy, and research community developments. Energy/environmental project courses give practice in applying methodologies and concepts. Students can complete the program in one year or may extend the program up to two years, taking additional courses for greater depth and breadth. For additional information, see <http://www.stanford.edu/dept/MSandE/academics/energyenvironm ent.html>.

## DUAL MASTER'S DEGREE PROGRAM

The dual degree program enables a small group of graduate students to obtain two master's degrees simultaneously. Students complete the course requirements for each department. A total of 90 units is required to complete the dual master's degree.

*Admission*—For the dual degree, admission to two departments is required, but is coordinated by designated members of both admissions committees who make recommendations to the committees of their respective departments. Students may apply to only one department initially. After the first quarter at Stanford, students may apply to be admitted to the second department.

*Advising*—Every student in the dual degree program has one adviser in each department.

## JOINT MS&E AND LAW DEGREES

The School of Law and the Department of Management Science and Engineering offer joint degree programs leading to a J.D. degree and an M.S. degree in MS&E, or to a J.D. and Ph.D. in MS&E. These programs are designed for students who wish to prepare themselves for careers in areas relating to both law and to the decision making, policy making, and problem solving knowledge and skills developed in the MS&E program. Students interested in either joint degree program must apply and gain admission separately to the School of Law and the Department of Management Science and Engineering and, as an additional step, must secure consent from both academic units to pursue degrees in those units as part of a joint degree program. Interest in either joint degree program should be noted on the student's admission applications and may be considered by the admission committee of each program. Alternatively, an enrolled student in either the Law School or MS&E may apply for admission to the other program and for joint degree status in both academic units after commencing study in either program.

Joint degree students may elect to begin their course of study in either the School of Law or MS&E. Students are assigned to a joint program committee composed of at least one faculty member from Law and one from MS&E. This committee plans the student's program jointly with the student. Students must be enrolled full time in the Law School for the first year of law studies, and it is recommended that students devote exclusively one Autumn Quarter to the MS&E M.S. program to initiate their MS&E work. After that time, enrollment may be in MS&E or Law, and students may choose courses from either program regardless of where enrolled. A candidate in the joint J.D./Ph.D. program should spend a substantial amount of full time residency in MS&E. Students must satisfy the requirements for both the J.D. and the M.S. or Ph.D. degrees as specified in this bulletin or by the School of Law.

The Law School may approve courses from MS&E or courses in the student's MS&E program from outside of the Department of Management Science and Engineering that may count toward the J.D. degree, and MS&E may approve courses from the Law School that may count toward the M.S. or Ph.D. degree in MS&E. In either case, approval may consist of a list applicable to all joint degree students or may be tailored to each individual student's program. The lists may differ depending on whether the student is pursuing an M.S. or a Ph.D. in MS&E.

In the case of a J.D./M.S. program, no more than 45 units of approved courses may be counted toward both degrees. In the case of a J.D./Ph.D. program, no more than 54 units of approved courses may be counted toward both degrees. In either case, no more than 36 units of courses that originate outside the Law School may count toward the law degree. To the extent that courses under this joint degree program originate outside the Law School but count toward the law degree, the law credits permitted under Section 17(1) of the Law School Regulations are reduced on a unit-per-unit basis, but not below zero. The maximum number of law school credits that may be counted toward the M.S. in MS&E is the greater of: (a) 18 units in the case of the M.S., or (b) the maximum number of hours from courses outside the department that an M.S. candidate in MS&E is permitted to count toward the applicable degree under general departmental guidelines or under departmental rules that apply in the case of a particular student.

Tuition and financial aid arrangements are normally through the school in which the student is then enrolled.

## DOCTOR OF PHILOSOPHY IN MANAGEMENT SCIENCE AND ENGINEERING

University requirements for the Ph.D. degree are described in the "Graduate Degrees" section of this bulletin.

The Ph.D. degree in MS&E is intended for students primarily interested in a career of research and teaching, or high-level technical work in universities, industry, or government. The program requires three years of full-time graduate study, at least two years of which must be at Stanford. Typically, however, students take about four to five years after entering the program to complete all Ph.D. requirements. The Ph.D. is generally organized around the requirement that the students acquire a breadth across some of the eight areas of the department, and depth in one of them. These fields of study are:

- Decision analysis and risk analysis
- Economics and finance
- Information science and technology
- Organization, technology, and entrepreneurship
- Policy and strategy
- Probability and stochastic systems
- Production and operations management
- Systems modeling and optimization

Each student admitted to the Ph.D. program must satisfy a breadth requirement and pass a qualification procedure. The purpose of the qualification procedure is to assess the student's command of the field and to evaluate his or her potential to complete a high-quality dissertation in a timely manner. The student must complete specified course work in one of the eight areas of the department, or the Systems Program which is a combination of several areas. The qualification decision is based on the student's grade point average (GPA), on the one or two preliminary papers prepared by the student, and on the student's performance in an area examination. Considering this evidence, the department faculty votes on advancing the student to candidacy in the department at large. The Ph.D. requires a minimum of 135 units, at least 54 of which must be in courses of 3 units or more. At least 48 course units in courses of 3 units or more must be taken for a letter grade. Finally, the student must pass a University oral examination and complete a Ph.D. dissertation. During the course of the Ph.D. program, students who do not have a master's degree

are strongly encouraged to complete one, either in MS&E or in another Stanford department.

*Breadth Requirement—*

1. The breadth requirement is to be satisfied by a choice of four courses spanning four out of the above mentioned eight areas of the department. The list of courses satisfying the breadth requirement is available from the MS&E student services office.
2. The Ph.D. candidacy form must contain four courses that satisfy the breadth requirement.
3. Courses chosen to satisfy the breadth requirement must be taken for letter grades.
4. At least one of the four courses chosen to satisfy the breadth requirement must be at the 300 level.

*Qualification Procedure Requirements—*The qualification procedure is based both on breadth across the department's disciplines and depth in an area of the student's choice. The qualification process must be completed by the end of the month of May of the student's second year of graduate study in the department. The performance of all doctoral students is reviewed every year at a department faculty meeting at the end of May or beginning of June. Ph.D. qualification decisions are made at that time and individual feedback is provided.

The Ph.D. qualification requirements comprise these elements:

1. *Grade Point Average:* A student must maintain a GPA of at least 3.4 in the four courses chosen to satisfy the breadth requirements, and a GPA of at least 3.4 in the set of all courses taken by the student within the department. In both cases, the GPA is computed on the basis of the nominal number of units for which each course is offered.
2. *Paper(s):* A student may choose between two options, either of which is to be completed before the Spring Quarter of the student's second year. The first option involves one paper supervised by a primary faculty adviser and a faculty consultant. This paper should be written in two quarters. The second option involves two shorter sequential tutorials, with two different faculty advisers. Each tutorial should be completed in one quarter. In both options, the student chooses the faculty adviser(s)/consultant with the faculty members' consent.  
A student may register for up to 3 units per tutorial and up to 6 units for a paper. These paper or tutorial units do not count towards the 54 course units required for the Ph.D., and letter grades are not given.
3. *Area Qualification:* In addition, during the second year, a student must pass an examination in one of the eight areas of the MS&E department or the Systems Program, a combination of several areas, which is of the student's choice. This area examination is written, oral, or both, at the discretion of the area faculty administering the exam.
4. *Area Course Requirement:* Students must complete the depth requirements of one of the eight fields of study of the MS&E department or the Systems Program which is a combination of several areas. Courses used to satisfy depth requirements must be taken for a letter grade. The Ph.D. requirements for the eight areas of the MS&E department are available from the MS&E student services office.

## PH.D. MINOR IN MANAGEMENT SCIENCE AND ENGINEERING

Students pursuing a Ph.D. in another department who wish to receive a Ph.D. minor in Management Science and Engineering should consult the MS&E student services office. A minor in MS&E may be obtained by completing 20 units of approved graduate-level MS&E courses, of which at least 6 units must be at the 300-level. Courses approved for the minor must form a coherent program, and must include one course from at least three of the eleven MS&E Master of Science core options. The program must include a minimum of 16 letter-graded units, and a minimum grade point average of 3.3 must be achieved in these courses.

## MATERIALS SCIENCE AND ENGINEERING

*Emeriti: (Professors)* Clayton W. Bates, John C. Bravman, Richard H. Bube, Theodore H. Geballe,\* Stig B. Hagstrom,\* Robert A. Huggins,\* William D. Nix,\* Oleg D. Sherby, John C. Shyne, William A. Tiller, Robert L. White\*; Robert S. Feigelson\* (*Professor, Research*)

*Chair:* Robert Sinclair

*Associate Chair:* Reinhold H. Dauskardt

*Professors:* David M. Barnett, Arthur I. Bienenstock, Bruce M. Clemens, Reinhold H. Dauskardt, Friedrich B. Prinz, Robert Sinclair, Shan X. Wang

*Associate Professors:* Mark L. Brongersma, Yi Cui, Michael D. McGehee, Paul C. McIntyre

*Assistant Professors:* Jennifer A. Dionne, Sarah C. Heilshorn, Aaron M. Lindenberg, Nicholas A. Melosh, Evan J. Reed, Alberto Sallee

*Courtesy Professors:* Stacey F. Bent, Curtis W. Frank, Sanjiv Gambhir, Geoffrey C. Gurtner, James S. Harris, Michael T. Longaker, Yoshio Nishi, James D. Plummer, Krishna Saraswat, Jonathan F. Stebbins, Joachim Stohr

*Courtesy Associate Professor:* Wei Cai, Ian R. Fisher

*Lecturers:* Ann Marshall, Arturas Vailionis

*Acting Assistant Professor:* Christopher M. Earhart

*Consulting Professors:* Robert Fontana, Turgut Gur, Michael A. Kelly, Rommel Noufi, Baylor Triplett, Robert M. White

*Consulting Associate Professors:* Geraud Dubois

\* Recalled to active duty.

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*Mail Code:* 94305-4034

*Phone:* (650) 723-2534

*Email:* matsciengr@stanford.edu

*Web Site:* <http://mse.stanford.edu>

Courses offered by the Department of Materials Science and Engineering are listed under the subject code MATSCI on the *Stanford Bulletin's* ExploreCourses web site.

The Department of Materials Science and Engineering is concerned with the relation between the structure and properties of materials, factors that control the internal structure of solids, and processes for altering their structure and properties, particularly at the nanoscale.

## MISSION OF THE UNDERGRADUATE PROGRAM IN MATERIALS SCIENCE AND ENGINEERING

The mission of the undergraduate program in Materials Science and Engineering is to provide students with a strong foundation in materials science and engineering with emphasis on the fundamental scientific and engineering principles which underlie the knowledge and implementation of material structure, processing, properties, and performance of all classes of materials used in engineering systems. Courses in the program develop students' knowledge of modern materials science and engineering, teach them to apply this knowledge analytically to create effective and novel solutions to practical problems, and develop their communication skills and ability to work collaboratively. The program prepares students for careers in industry and for further study in graduate school.

The B.S. in Materials Science and Engineering provides training for the materials engineer and also preparatory training for graduate work in materials science. Capable undergraduates are encouraged to take at least one year of graduate study to extend their course work through the coterminial degree program which leads to an M.S. in Materials Science and Engineering. Coterminial degree programs are encouraged both for undergraduate majors in

Materials Science and Engineering and for undergraduate majors in related disciplines.

The department also hosts the School of Engineering undergraduate major in Engineering Physics leading to a B.S. in Engineering.

## GRADUATE PROGRAMS IN MATERIALS SCIENCE ENGINEERING

Graduate programs lead to the degrees of Master of Science, Engineer, and Doctor of Philosophy. Graduate students can specialize in any of the areas of materials science and engineering.

### FACILITIES

The department is based in the William F. Durand Building, with extensive facilities in the Jack A. McCullough building and the Gordon and Betty Moore Materials Research Building. These buildings house offices for the chair and most of the faculty, for the administrative and technical staff, and for most graduate students, along with lecture and seminar rooms. Facilities for teaching and research are also available, including equipment for electrical measurements; mechanical testing of bulk and thin film materials; fracture and fatigue of advanced materials; metallography; optical, scanning, transmission electron microscopy, and atomic force microscopy; UHV sputter deposition; vacuum annealing treatments; wet chemistry; and x-ray diffraction. The McCullough/Moore Complex is also the home for the Center for Magnetic Nanotechnology, with corresponding facilities for magnetic measurements, and to the Stanford Nanocharacterization Laboratory (SNL). The Rapid Prototyping Laboratory (RPL), housing material deposition and removal stations, is a joint facility with Mechanical Engineering, and is housed in Building 530. The department maintains a microcomputer cluster for its students, which is linked to the internet.

Depending on the needs of their programs, students and faculty also conduct research in a number of other departments and independent laboratories. Chief among these are the Stanford Nanofabrication Facility (SNF), the Geballe Laboratory for Advanced Materials (GLAM) (<http://stanford.edu/group/glam>), and the Stanford Synchrotron Radiation Laboratory.

The Stanford Nanofabrication Facility (SNF) is a laboratory joining government and industrially funded research on microelectronic materials, devices, and systems. It houses a 10,000 square foot, class 100 clean room for Si and GaAs integrated circuit fabrication; a large number of electronic test, materials analysis, and computer facilities; and office space for faculty, staff, and students. In addition, the Center for Integrated Systems (CIS) provides startup research funds and maintains a fellow-mentor program with industry.

## BACHELOR OF SCIENCE IN MATERIALS SCIENCE AND ENGINEERING

### MISSION STATEMENT

The mission of the Materials Science and Engineering Program is to provide students with a strong foundation in materials science and engineering. The program's curriculum places special emphasis on the fundamental scientific and engineering principles which underlie the knowledge and implementation of materials structure, processing, properties, and performance of all classes of materials used in engineering systems. Courses in the program develop students' knowledge of modern materials science and engineering and teach them to apply this knowledge analytically to create effective and novel solutions to practical problems. The program prepares students for careers in industry or for further study in graduate school.

The undergraduate program provides training in solid state fundamentals and materials engineering. Students desiring to specialize in this field during their undergraduate period may do so by following the curriculum outlined in the "Undergraduate

Degree in Materials Science and Engineering" section of this bulletin as well as the *School of Engineering Undergraduate Handbook*. The University's basic requirements for the bachelor's degree are discussed in the "Undergraduate Degrees and Programs" section of this bulletin. Electives are available so that students with broad interests can combine materials science and engineering with work in another science or engineering department.

Students interested in the minor should see the "Minor in Materials Science and Engineering" section of this bulletin.

## COTERMINAL B.S./M.S. PROGRAM IN MATERIALS SCIENCE AND ENGINEERING

Stanford undergraduates who wish to continue their studies for the Master of Science degree in Materials Science and Engineering through the coterminal program may apply for admission after they have earned 120 units toward graduation (UTG) as shown on the undergraduate unofficial transcript. Applicants must submit their application no later than eight weeks before the start of the proposed admit quarter. The application must give evidence that the student possesses the potential for strong academic performance at the graduate level. Scores from the Graduate Record Exam (GRE) General Test must be reported before action can be taken on an application.

Materials science is a highly integrated and interdisciplinary subject, and so applications from students of any engineering or science undergraduate major are encouraged.

Information and other requirements pertaining to the coterminal program may be obtained from the department's student services office in Durand 115.

University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees" section of this bulletin. For University coterminal degree program rules and University application forms, also see <http://studentaffairs.stanford.edu/registrar/publications#Coterm>.

## MASTER OF SCIENCE IN MATERIALS SCIENCE ENGINEERING

The University's basic requirements for the M.S. degree are discussed in the "Graduate Degrees" section of this bulletin. The following are specific departmental requirements.

The Department of Materials Science and Engineering requires a minimum of 45 units for a master's degree to be taken in residence at Stanford. Master's Program Proposal forms should be filled out, signed by the student's academic adviser, and submitted to the department's student services manager by the end of the student's first quarter of study. Final changes to the master's program must be submitted no later than one academic quarter prior to the quarter of expected degree conferral. Stanford Materials Science undergraduates who are pursuing or who plan to pursue a coterminal M.S. degree may have more flexibility in their programs and should consult with their academic advisers regarding appropriate core course and elective choices.

Degree requirements are as follows:

1. A minimum of 30 units of Materials Science and Engineering (MATSCI) course work, including core and lab courses specified below, taken for a letter grade. Research units, one-unit seminars, MATSCI 299 and courses in other departments (i.e., where students cannot enroll in a class with a MATSCI subject code) cannot be counted for this requirement.
2. Of these 30 units Materials Science requirements, students must include a or b.
  - a. three classes from MATSCI 201-210 core courses and three MATSCI 171, 172, 173 laboratory courses. Student may fulfill one laboratory requirement from another engineering department.
  - b. four classes from MATSCI 201-210 core courses and any two MATSCI 171, 172, 173 laboratory courses. Student

- may fulfill one laboratory requirement from another engineering department.
3. 15 units of approved course electives that result in a technically coherent program. Of the 15 units of elective courses:
    - a. 12 of the 15 units must be taken for a letter grade (except for those submitting an M.S. report).
    - b. a maximum of three units may be seminars.
    - c. if writing a master's research report, a minimum of 6 and a maximum of 15 units of Materials Science research units (MATSCI 200) may be counted. M.S. research units may only be counted if writing an M.S. research report. See student services manager for approval.
    - d. a maximum of three units may be undergraduate units, but not courses below the 100 level (offered at Stanford University).
    - e. a maximum of five units may be used for a foreign language course (not including any remedial English courses or courses in the student's native language if other than English).
    - f. the combination of seminar, undergraduate, and language units may not exceed six units total.
    - g. the combination of research, seminar, undergraduate, and language units may not exceed 15 units total.
    - h. activity units may not be counted toward a graduate degree.
  4. A minimum grade point average (GPA) of 2.75 for degree course work taken at Stanford.

All proposed degree programs are subject to approval by the department's student services manager and the Academic Degree Committee, which has responsibility for assuring that each proposal is a technically coherent program.

### MASTER'S RESEARCH REPORT

Students wishing to take this option must include 6-15 Materials Science research units on their program proposal and the name of the faculty member supervising the research. Students using 15 units of research toward the degree must participate in a more complex and demanding research project than those using fewer units.

The report must be approved by two faculty members of which one must be a faculty member from the department. One faculty member is the student's research adviser. The other faculty member must be approved by the department's student services manager. Three copies of the report (one copy for each approving faculty member and one for the department file), in final form and signed by the two faculty members must be submitted. The report is not an official University thesis but is intended to demonstrate to department faculty an ability to conduct and report directed research. Refer to the *Materials Science and Engineering Student Handbook* for further clarification concerning this report.

As a general guide line, a 6-9 units of master's research is a normal load for most students. The report should reflect the number of units taken. For instance, 3-4 laboratory reports are required for a 3-unit laboratory course. Accordingly, the level expected for 9 units of research would be at least equivalent to three such courses.

Students are advised to submit their thesis draft to the readers by the end of fifth week of the quarter in which the units are to be assigned to allow time for comments and revisions. A copy of final draft should be submitted to faculty and student services manager by last day of classes. The appropriate grade for satisfactory progress in the research project prior to submission of the report is 'N' (continuing); the 'S' grade is given only when the report is fully approved by both faculty members.

In cases where students decide to pursue research after the initial program submission deadline, they should submit a revised M.S. Program Proposal at least two quarters before the degree is granted. The total combined units of Materials Science research units, seminars, language courses, and undergraduate courses cannot exceed 15. If a master's research report is not to be

submitted, units of MATSCI 200 cannot be applied to the department's requirement of 45 units for the master's degree.

### HONORS COOPERATIVE PROGRAM

Some of the department's graduate students participate in the Honors Cooperative Program (HCP), which makes it possible for academically qualified engineers and scientists in industry to be part-time graduate students in Materials Science while continuing professional employment. Prospective HCP students follow the same admissions process and must meet the same admissions requirements as full-time graduate students. For information regarding the Honors Cooperative Program, see Graduate Programs in the "School of Engineering" section of this bulletin.

### PETITION PROCESS FOR TRANSFER FROM M.S. TO PH.D. DEGREE PROGRAM

Students admitted to the graduate program are admitted specifically into either the M.S. or the Ph.D. program. A student admitted to the M.S. program should not assume admission to the Ph.D. program. Admission to the Ph.D. program is required for the student to be eligible to work towards the Ph.D. degree.

A student in the M.S. program may petition to be admitted to the Ph.D. program by filing an M.S. to Ph.D. Transfer Petition. This petition must be accompanied by a one-page statement of purpose stating the reasons why the student wishes to transfer to the Ph.D. program, an updated transcript, and two letters of recommendation from members of the Stanford faculty, including one from the student's prospective adviser and at least one from a Materials Science faculty member belonging to the Academic Council. The M.S. to Ph.D. Transfer Petition is due to the student services manager by the end of the second week of Spring Quarter during the student's first year in the M.S. program. Only students enrolled in the 200 series core course sequence are eligible to petition, and a grade point average (GPA) of 3.5 or better in the core courses is required.

Transferring to the Ph.D. program is a competitive process and only highly qualified M.S. students may be admitted. Faculty consider the student's original application to the graduate program as well as the material provided with the transfer petition.

### ENGINEER IN MATERIALS SCIENCE ENGINEERING

The University's basic requirements for the degree of Engineer are outlined in the "Graduate Degrees" section of this bulletin.

A student wishing to enter the Engineer program must have completed the requirements of the M.S. in Materials Science and Engineering, and must file a petition requesting admission to the program, stating the type of research to be done and the proposed supervising professor. Once approved, the Application for Candidacy must be submitted to the department's student services manager by the end of the second quarter in the Engineer program. Final changes in the Application for Candidacy form must be submitted no later than one academic quarter prior to degree conferral.

The 90-unit program must include 9 units of graduate courses in Materials Science with a MATSCI subject code (exclusive of research units, seminars, colloquia, and MATSCI 400, Participation in Teaching) beyond the requirements for the M.S. degree, and additional research or other units to meet the 90-unit University minimum requirement. A grade point average (GPA) of 3.0 must be maintained for all degree course work taken at Stanford.

Completion of an acceptable thesis is required. The Engineer thesis must be approved by two Academic Council faculty members, one of whom must be a member of the department, and submitted in triplicate.

## DOCTOR OF PHILOSOPHY IN MATERIALS SCIENCE ENGINEERING

The University's basic requirements for the Ph.D. degree are outlined in the "Graduate Degrees" section of this bulletin.

Degree requirements for the department are as follows:

1. Students must submit a Ph.D. program plan consisting of at least 135 units,\* which contains a minimum of 48 core, approved technical and seminar units.† For these 48 units:
  - a. 30 units Materials Science and Engineering required core courses (MATSCI 201\*\*, 202, 203, 204, 205, 206, 207, 208, 209, 210) must be taken, with at least six core courses (including MATSCI 203, 204, 207) during the first year
  - b. 15 elective graduate technical units directly relevant to Materials Science and Engineering must be taken (units not to include MATSCI 300, Ph.D. Research, MATSCI 400, Participation in Materials Science Teaching, or MATSCI 299, Practical Training)
  - c. all core and technical classes must be for a letter grade
  - d. first-year Ph.D. students are required to take the Materials Science Colloquium, MATSCI 230 (1 unit), each quarter of their first year (not counted as technical course units). Please note that attendance is required, roll is taken, and that more than two absences results in an automatic 'NP' grade.
2. The remaining 87 units are to be at least 75 units of MATSCI 300, Ph.D. research, and up to 12 units of other courses (may include MATSCI 400, Participation in Materials Science Teaching, and a maximum 3 units of MATSCI 299, Practical Training).
3. Students must consult with their Academic Adviser on program planning. The program planning sheet must be submitted with the approval of the student's Dissertation Adviser on joining that research group, and no later than the end of spring quarter of the first year. For students with a non-MATSCI Dissertation Adviser, the MATSCI Academic/Co-Adviser must also approve the list of proposed courses. Any proposed deviations from the requirements can only be considered by petition.
4. Ph.D. students are required to obtain an M.S. degree in Materials Science normally by the end of their third year. A Graduate Program Authorization Petition and a M.S. Program Proposal must be submitted prior to taking the qualifying examination. Courses taken for the 48 core and technical units of Ph.D. work may count towards the M.S. degree requirements.
5. A departmental oral qualifying examination must be passed by the end of January of the second year. A grade point average (GPA) of 3.5 from the six core classes taken is required for admission to the Ph.D. qualifying exam. Students who have passed the Ph.D. Qualifying exam are required to complete the Application for Candidacy for the Ph.D. degree by the end of the quarter in which they pass the exam. Final changes in the Application for Candidacy form must be submitted no later than one academic quarter prior to degree conferral.
6. Maintain a GPA of 3.0 in all degree courses taken at Stanford.
7. Students must present the results of the dissertation at the University Ph.D. oral examination.
8. Current students subject to either this set of requirements or a prior set must obtain the approval of their adviser before filing a revised program sheet, and should as far as possible adhere to the intent of the new requirements.
9. Students may reference the list of Advanced Speciality Courses and Cognate Courses provided below as guidance for their selection of technical units. As noted above, Academic Adviser approval is required.

\* At least 90 units must be taken in residence at Stanford. Students entering with an M.S. degree in Materials Science from another university may request to transfer up to 45 units of equivalent work toward the total of 135 required units.

† Students may, if they have sufficient background, petition out of some of the required core courses. To petition, students must have prior consent from their academic adviser, and consent from the instructor of the core course. That instructor provides an oral or written examination that the petitioning student must pass.

\*\* EE 222/223 is accepted in place of this requirement.

### ADVANCED SPECIALTY COURSES

*Biomaterials*—APPPHYS 292; BIOPHYS 228; CHEMENG 260, 310, 355; ME 284A,B, 381, 385, 457; MATSCI 380, 381, 382  
*Electronic Materials Processing*—EE 212, 216, 311, 316, 410; MATSCI 312  
*Materials Characterization*—APPPHYS 216, CHEMENG 345; EE 329; MATSCI 320, 321, 322, 323, 325, 326  
*Mechanical Behavior of Solids*—AA 252, 256; MATSCI 251, 353, 358; ME 335A,B,C, 340, 340A,B, 345  
*Physics of Solids and Computation*—APPPHYS 272, 273; EE 222, 223, 228, 327, 328, 329, 335; MATSCI 331,343, 347; ME 344A,B  
*Soft Materials*—CHEMENG 260, 310, 460; MATSCI 343; ME 455

### COGNATE COURSES

- AA 252. Techniques of Failure Analysis
- AA 256. Mechanics of Composites
- APPPHYS 216. X-Ray and VUV Physics
- APPPHYS 270. Magnetism and Long Range Order in Solids
- APPPHYS 272,273. Solid State Physics I,II
- APPPHYS 292. Introductory Biophysics
- BIOPHYS 228. Computational Structural Biology
- CHEMENG 260. Polymer Science and Engineering
- CHEMENG 310. Microhydrodynamics
- CHEMENG 345. Fundamentals and Applications of Spectroscopy
- CHEMENG 355. Advanced Biochemical Engineering
- CHEMENG 460. Polymer Surfaces and Interfaces
- EE 212. Integrated Circuit Fabrication Processes
- EE 216. Principles and Models of Semiconductor Devices
- EE 222,223. Applied Quantum Mechanics I,II
- EE 228. Basic Physics for Solid State Electronics
- EE 311. Advanced Integrated Circuit Fabrication Processes
- EE 312. Micromachined Sensors and Actuators
- EE 316. Advanced VLSI Devices
- EE 327. Properties of Semiconductor Materials
- EE 328. Physics of Advanced Semiconductor Devices
- EE 329. The Electronic Structure of Surfaces and Interfaces
- EE 335. Introduction to Information Storage Systems
- EE 410. Integrated Circuit Fabrication Laboratory
- ENGR 31. Chemical Principles with Application to Nanoscale Science and Technology
- ENGR 50. Introduction to Materials Science, Nanotechnology Emphasis
- ENGR 50E. Introduction to Materials Science, Energy Emphasis
- ENGR 50M. Introduction to Materials Science, Biomaterials Emphasis
- ME 284A,B. Cardiovascular Bioengineering
- ME 329. Physical Solid Mechanics
- ME 335A,B,C. Finite Element Analysis
- ME 340A. Theory and Applications of Elasticity
- ME 340B. Elasticity in Microscopic Structures
- ME 344A. Computational Nanotechnology
- ME 344B. Nanomaterials Modeling
- ME 345. Fatigue Design and Analysis
- ME 381. Orthopaedic Bioengineering
- ME 385. Tissue Engineering Lab
- ME 455. Complex Fluids and Non-Newtonian Flows
- ME 457. Fluid Flow in Microdevices
- PHYSICS 230,231. Quantum Mechanics

## PH.D. MINOR IN MATERIALS SCIENCE AND ENGINEERING

The University's basic requirements for the Ph.D. minor are outlined in the "Graduate Degrees" section of this bulletin. A minor requires 20 units of graduate work of quality and depth to be approved by the advanced degree committee of the department. Individual programs must be submitted to the student services manager at least one quarter prior to degree conferral and approved as are other academic plans.

## MECHANICAL ENGINEERING

*Emeriti:* (Professors) James L. Adams, Peter Bradshaw\*, Daniel B. DeBra, Robert H. Eustis, Thomas J. R. Hughes, James P. Johnston, Thomas R. Kane, William M. Kays, Joseph B. Keller, Charles H. Kruger, Robert H. McKim, Robert J. Moffat,\* M. Godfrey Mungal\*, J. David Powell, Charles R. Steele,\* Douglass J. Wilde;\* (*Professors, Research*) Richard M. Christensen, Elliot Levinthal, Sidney A. Self, Kenneth J. Waldron, Felix E. Zajac

*Chair:* Friedrich B. Prinz

*Vice Chair:* Kenneth E. Goodson

*Group Chairs:* Mark R. Cutkosky (Design), Scott L. Delp (Biomechanical Engineering), Parviz Moin (Flow Physics and Computational Engineering), Peter M. Pinsky (Mechanics and Computation), Juan G. Santiago (Thermosciences)

*Professors:* Thomas P. Andriacchi, David M. Barnett, Craig T. Bowman, Brian J. Cantwell, Mark A. Cappelli, Dennis R. Carter, Mark R. Cutkosky, Scott L. Delp, John K. Eaton, Christopher F. Edwards, Charbel Farhat, Kenneth E. Goodson, Ronald K. Hanson, David M. Kelley, Thomas W. Kenny, Larry J. Leifer, Sanjiva K. Lele, Reginald E. Mitchell, Parviz Moin, Drew V. Nelson, Peter M. Pinsky, Friedrich B. Prinz, Bernard Roth, Juan G. Santiago, Eric S. G. Shaqfeh, Sheri D. Sheppard

*Associate Professors:* Wei Cai, Eric F. Darve, J. Christian Gerdes, Ellen Kuhl, Marc E. Levenston, Allison M. Okamura, Beth L. Pruitt

*Assistant Professors:* Gianluca Iaccarino, Adrian J. Lew, Ali Mani, Sindy K.-Y. Tang, Xiaolin Zheng

*Professor (Teaching):* David W. Beach

*Associate Professor (Research):* Heinz G. Pitsch

*Associate Professor (Teaching):* Shilajeet S. Banerjee

*Courtesy Professors:* Fu-Kuo Chang, Reinhold Dauskardt, Ralph S. Greco, Oussama Khatib, Paul Yock

*Courtesy Associate Professor:* Margot G. Gerritsen, Nicholas Giori, Charles A. Taylor

*Courtesy Professors (Research):* J. Kenneth Salisbury, R. Lane Smith

*Courtesy Professor (Teaching):* Shelley V. Goldman

*Senior Lecturers:* Vadim Khayms, J. Craig Milroy

*Acting Associate Professor:* Kurt A. Beiter

*Consulting Professors:* Gary S. Beaupre, J. Edward Carryer, Shuichi Fukuda, David M. Golden, Barry M. Katz, Paul Mitiguy, Johannes Schoonman, George Toyne, Stephen P. Walch, Edith Wilson, Albert Yu

*Consulting Associate Professors:* Mehdi Asheghi, Gary D. Lichtenstein, William Moggridge, R. Matthew Ohline, Sunil Puria, Paul Saffo, Lester K. Su, Marc F. Theeuwes

*Consulting Assistant Professors:* Michael Barry, Brendan J. Boyle, William R. Burnett, Dev Patnaik

\* Recalled to active duty.

*Student Services:* Building 530, Room 125

*Mail Code:* 94305-3030

*Student Services Phone:* (650) 725-7695

*Web Site:* <http://me.stanford.edu>

Courses offered by the Department of Mechanical Engineering are listed under the subject code ME on the *Stanford Bulletin's* ExploreCourses web site.

The programs in the Department of Mechanical Engineering (ME) emphasize a mix of applied mechanics, biomechanical engineering, computer simulations, design, and energy science and technology. Since mechanical engineering is a broad discipline, the undergraduate program can be a springboard for graduate study in business, law, medicine, political science, and other professions where understanding technology is important. Both undergraduate and graduate programs provide technical background for work in biomechanical engineering, environmental pollution control, ocean engineering, transportation, and other multidisciplinary problems that concern society. In all programs, emphasis is placed on developing systematic procedures for analysis, communication of work and ideas, practical and aesthetic aspects in design, and responsible use of technology.

## MISSION OF THE UNDERGRADUATE PROGRAM IN MECHANICAL ENGINEERING

The mission of the undergraduate program in Mechanical Engineering is to provide students with a balance of intellectual and practical experiences that enable them to address a variety of societal needs. The curriculum encompasses elements from a wide array of disciplines built around the themes of biomedicine, computational engineering, design, energy, and multiscale engineering. Course work may include mechatronics, computational simulation, solid and fluid dynamics, microelectromechanical systems, biomechanical engineering, energy science and technology, propulsion, sensing and control, nano- and micro-mechanics, and design. The program prepares students for entry-level work as mechanical engineers and for graduate studies in either an engineering discipline or another field where a broad engineering background is useful.

## LEARNING OUTCOMES

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. an ability to apply knowledge of mathematics, science, and engineering.
2. an ability to design and conduct experiments, as well as to analyze and interpret data.
3. an ability to design a system, component, or process to meet desired needs.
4. an ability to function on multidisciplinary teams.
5. an ability to identify, formulate, and solve engineering problems.
6. an understanding of professional and ethical responsibility.
7. an ability to communicate effectively.
8. the broad education necessary to understand the impact of engineering solutions in a global and societal context.
9. a recognition of the need for and an ability to engage in life-long learning.
10. a knowledge of contemporary issues.
11. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
12. the ability to apply advanced mathematics through multivariate calculus and differential equations.
13. the ability to work professionally in both thermal and mechanical systems areas including the design and realization of such systems.

## GRADUATE PROGRAMS IN MECHANICAL ENGINEERING

### ADMISSION AND FINANCIAL ASSISTANCE

To be eligible for admission to the department, a student must have a B.S. degree in engineering, physics, or a comparable science program. To apply for the Ph.D. degree, applicants must



have already completed an M.S. degree. Applications for Ph.D. and HCP (Honors Co-op) programs are accepted throughout the year. M.S. applications for fellowship aid must be received by the first Tuesday in December. The department annually awards, on a competitive basis, a limited number of fellowships, teaching assistantships, and research assistantships to incoming graduate students. Research assistantships are used primarily for post-master's degree students and are awarded by individual faculty research supervisors, not by the department.

Mechanical engineering is a varied profession, ranging from primarily aesthetic aspects of design to highly technical scientific research. Disciplinary areas of interest to mechanical engineers include biomechanics, energy conversion, fluid mechanics, materials, nuclear reactor engineering, propulsion, rigid and elastic body mechanics, systems engineering, scientific computing, and thermodynamics, to name a few. No mechanical engineer is expected to have a mastery of the entire spectrum.

A master's degree program leading to the M.S. is offered in Mechanical Engineering, and a master's degree program leading to the M.S. is offered in Engineering with a choice of the following fields of study: Biomechanical Engineering, Product Design, and an individually designed major. Fields of study are declared on Axxess.

### POST-MASTER'S DEGREE PROGRAMS

The department offers two post-master's degrees: Engineer and Doctor of Philosophy. Post-master's research generally requires some evidence that a student has research potential before a faculty member agrees to supervision and a research assistantship appointment. It is most efficient to carry out preliminary research during the M.S. degree program, if interested in a post-master's degree.

### DEPARTMENTAL GROUPS

The department has five groups: Biomechanical Engineering; Design; Flow Physics and Computation; Mechanics and Computation; and Thermosciences. Each maintains its own labs, shops, and offices.

*The Biomechanical Engineering (BME) Group* has teaching and research activities which focus primarily on musculoskeletal biomechanics, neuromuscular biomechanics, cardiovascular biomechanics, and rehabilitation engineering. Research in other areas including hearing, ocean, plant, and vision biomechanics exists in collaboration with associated faculty in biology, engineering, and medicine. The group has strong research interactions with the Mechanics and Computation and the Design groups, and the departments of Neurology, Radiology, and Surgery in the School of Medicine.

*The Design Group* emphasizes cognitive skill development for creative design. It is concerned with automatic control, computer-aided design, creativity, design aesthetics, design for manufacturability, design research, experimental stress analysis, fatigue and fracture mechanics, finite element analysis, human factors, kinematics, manufacturing systems, microcomputers in design, micro-electromechanics systems (MEMS), robotics, and vehicle dynamics. The group offers undergraduate and graduate programs in Product Design (jointly with the Department of Art and Art History) and is centrally involved in the Institute of Design; for further information, see <http://dschool.stanford.edu>.

*The Flow Physics and Computation Group (FPC)* is developing new theories, models, and computational tools for accurate engineering design analysis and control of complex flows (including acoustics, chemical reactions, interactions with electromagnetic waves, plasmas, and other phenomena) of interest in aerodynamics, electronics cooling, environmental engineering, materials processing, planetary entry, propulsion and power systems, and other areas. FPC research emphasizes modeling and analysis of physical phenomena in engineering systems. Students and research staff are developing new methods and tools for generation, access, display, interpretation and post-processing of

large databases resulting from numerical simulations of physical systems. Research in FPC ranges from advanced simulation of complex turbulent flows to active flow control. Faculty teach graduate and undergraduate courses in acoustics, aerodynamics, computational fluid mechanics, computational mathematics, fluid mechanics, combustion, and thermodynamics and propulsion.

*The Mechanics and Computational Group* covers biomechanics, continuum mechanics, dynamics, experimental and computational mechanics, finite element analysis, fluid dynamics, fracture mechanics, micromechanics, nanotechnology, and simulation based design. Qualified students can work as research project assistants, engaging in thesis research in association with the faculty director and fellow students. Projects include analysis, synthesis, and control of systems; biomechanics; flow dynamics of liquids and gases; fracture and micro-mechanics, vibrations, and nonlinear dynamics; and original theoretical, computational, and experimental investigations in the strength and deformability of elastic and inelastic elements of machines and structures.

*The Thermosciences Group* conducts experimental and analytical research on both fundamental and applied topics in the general area of thermal and fluid systems. Research strengths include high Reynolds number flows, microfluidics, combustion and reacting flows, multiphase flow and combustion, plasma sciences, gas physics and chemistry, laser diagnostics, microscale heat transfer, convective heat transfer, and energy systems. Research motivation comes from applications including air-breathing and space propulsion, bioanalytical systems, pollution control, electronics fabrication and cooling, stationary and mobile energy systems, biomedical systems, and materials processing. Emphasis is on fundamental experiments leading towards advances in modeling, optimization, and control of complex systems.

### FACILITIES

The department groups maintain modern laboratories that support undergraduate and graduate instruction and graduate research work.

The Structures and Composites Laboratory, a joint activity with the Department of Aeronautics and Astronautics, studies structures made of fiber-reinforced composite materials. Equipment for fabricating structural elements includes autoclave, filament winder, and presses. X-ray, ultrasound, and an electron microscope are available for nondestructive testing. The lab also has environmental chambers, a high speed impactor, and mechanical testers. Lab projects include designing composite structures, developing novel manufacturing processes, and evaluating environmental effects on composites.

Experimental facilities are available through the interdepartmental Structures and Solid Mechanics Research Laboratory, which includes an electrohydraulic materials testing system, a vehicle crash simulator, and a shake table for earthquake engineering and related studies, together with highly sophisticated auxiliary instrumentation. Facilities to study the micromechanics of fracture areas are available in the Micromechanics/Fracture Laboratory, and include a computer-controlled materials testing system, a long distance microscope, an atomic force microscope, and other instrumentation. Additional facilities for evaluation of materials are available through the Center for Materials Research, Center for Integrated Circuits, and the Gintzon Laboratory. Laboratories for biological experimentation are accessible through the School of Medicine. Individual accommodation is available for the work of each research student.

Major experimental and computational laboratories engaged in bioengineering work are located in the Biomechanical Engineering Group. Other Biomechanical Engineering Group activities and resources are associated with the Rehabilitation Research and Development Center of the Veterans Administration Palo Alto Health Care System. This major national research center has computational and prototyping facilities. In addition, the Rehabilitation Research and Development Center houses the Electrophysiology Laboratory, Experimental Mechanics

Laboratory, Human Motor Control Laboratory, Rehabilitation Device Design Laboratory, and Skeletal Biomechanics Laboratory. These facilities support graduate course work as well as Ph.D. student research activities.

Computational and experimental work is also conducted in various facilities throughout the School of Engineering and the School of Medicine, particularly the Advanced Biomaterials Testing Laboratory of the Department of Materials Science and Engineering, the Orthopaedic Research Laboratory in the Department of Functional Restoration, and the Vascular Research Laboratory in the Department of Surgery. In collaboration with the School of Medicine, facilities throughout the Stanford Medical Center and the Veterans Administration Palo Alto Health Care System conduct biological and clinical work.

The Design Group has facilities for lab work in experimental mechanics and experimental stress analysis. Additional facilities, including MTS electrohydraulic materials test systems, are available in the Solid Mechanics Research Laboratory. Design Group students also have access to Center for Integrated Systems (CIS) and Ginzton Lab microfabrication facilities.

The group also maintains the Product Realization Laboratory (PRL), a teaching facility offering students integrated experiences in market definition, product design, and prototype manufacturing. The PRL provides coaching, design manufacturing tools, and networking opportunities to students interested in product development. The ME 310 Design Project Laboratory has facilities for CAD, assembly, and testing of original designs by master's students in the engineering design program. A Smart Product Design Laboratory supports microprocessor application projects. The Center for Design Research (CDR) has an excellent facility for concurrent engineering research, development, and engineering curriculum creation and assessment. Resources include a network of high-performance workstations. For worldwide web mediated concurrent engineering by virtual, non-collocated, design development teams, see the CDR web site at <http://cdr.stanford.edu>. In addition, CDR has several industrial robots for student projects and research. These and several NC machines are part of the CDR Manufacturing Sciences Lab. The Manufacturing Modeling Laboratory (MML) addresses various models and methods that lead to competitive manufacturing. MML links design for manufacturing (dfM) research at the Department of Mechanical Engineering with supply chain management activities at the Department of Management Science and Engineering. The Rapid Prototyping Laboratory consists of seven processing stations including cleaning, CNC milling, grit blasting, laser deposition, low temperature deposition, plasma deposition, and shot peening. Students gain experience by using ACIS and Pro Engineer on Hewlett Packard workstations for process software development. The Design Group also has a Product Design Loft in which students in the Joint Program in Design develop graduate thesis projects.

The Flow Physics and Computation Group has a 32 processor Origin 2000, 48-node and 85-node Linux cluster with high performance interconnection and an array of powerful workstations for graphics and data analysis. Several software packages are available, including all the major commercial CFD codes. FPC is strongly allied with the Center for Turbulence Research (CTR), a research consortium between Stanford and NASA, and the Center for Integrated Turbulence Simulations (CITS), which is supported by the Department of Energy (DOE) under its Accelerated Strategic Computing Initiative (ASCI). The Center for Turbulence Research has direct access to major national computing facilities located at the nearby NASA-Ames Research Center, including massively parallel super computers. The Center for Integrated Turbulence Simulations has access to DOE's vast supercomputer resources. The intellectual atmosphere of the Flow Physics and Computation Group is greatly enhanced by the interactions among CTR's and CITS's postdoctoral researchers and distinguished visiting scientists.

The Mechanics and Computation Group has a Computational Mechanics Laboratory that provides an integrated computational

environment for research and research-related education in computational mechanics and scientific computing. The laboratory houses Silicon Graphics, Sun, and HP workstations and servers, including an 8-processor SGI Origin2000 and a 16-processor networked cluster of Intel-architecture workstations for parallel and distributed computing solutions of computationally intensive problems. Software is available on the laboratory machines, including commercial packages for engineering analysis, parametric geometry and meshing, and computational mathematics. The laboratory supports basic research in computational mechanics as well as the development of related applications such as simulation-based design technology.

The Thermosciences Group has four major laboratory facilities. The Heat Transfer and Turbulence Mechanics Laboratory concentrates on fundamental research aimed at understanding and improved prediction of turbulent flows and high performance energy conversion systems. The laboratory includes two general-purpose wind tunnels, a pressurized high Reynolds number tunnel, two supersonic cascade flow facilities, three specialized boundary layer wind tunnels, and several other flow facilities. Extensive diagnostic equipment is available, including multiple particle-image velocimetry and laser-Doppler anemometry systems.

The High Temperature Gas Dynamics Laboratory includes research on sensors, plasma sciences, cool and biomass combustion and gas pollutant formation, and reactive and non-reactive gas dynamics. Research facilities include diagnostic devices for combustion gases, a spray combustion facility, laboratory combustors including a coal combustion facility and supersonic combustion facilities, several advanced laser systems, a variety of plasma facilities, a pulsed detonation facility, and four shock tubes and tunnels. The Thermosciences Group and the Design Group share the Microscale Thermal and Mechanical Characterization laboratory (MTMC). MTMC is dedicated to the measurement of thermal and mechanical properties in thin-film systems, including microfabricated sensors and actuators and integrated circuits, and features a nanosecond scanning laser thermometry facility, a laser interferometer, a near-field optical microscope, and an atomic force microscope. The activities at MTMC are closely linked to those at the Heat Transfer Teaching Laboratory (HTTL), where undergraduate and master's students use high-resolution probe stations to study thermal phenomena in integrated circuits and thermally-actuated microvalves. HTTL also provides macroscopic experiments in convection and radiative exchange.

The Energy Systems Laboratory is a teaching and research facility dedicated to the study of energy conversion systems. The lab includes three dynamometers for engine testing, a computer-controlled variable engine valve controller, a fuel-cell experimental station, a small rocket testing facility, and a small jet engine thrust stand.

The Guidance and Control Laboratory, a joint activity of the Department of Aeronautics and Astronautics and the Department of Mechanical Engineering, specializes in construction of electromechanical systems and instrumentation, particularly where high precision is a factor. Work ranges from robotics for manufacturing to feedback control of fuel injection systems for automotive emission control. The faculty and staff work in close cooperation with both the Design and Thermosciences Groups on device development projects of mutual interest.

Many computation facilities are available to department students. Three of the department's labs are equipped with super-minicomputers. Numerous smaller minicomputers and microcomputers are used in the research and teaching laboratories.

Library facilities at Stanford beyond the general library include Engineering, Mathematics, and Physics department libraries.

## BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING

Undergraduates seeking to major in Mechanical Engineering should see the curriculum outlined in the "Undergraduate Degree

in Mechanical Engineering" section of this bulletin. The University's basic requirements for the bachelor's degree are discussed in the "Undergraduate Degrees" section of this bulletin. Courses taken for the departmental major (mathematics; science; science, technology, and society; engineering fundamentals; and engineering depth) must be taken for a letter grade if the instructor offers the option.

A Product Design program offered by the Design Group leads to the B.S. in Engineering (Product Design). A major in Biomechanical Engineering offered by the Biomechanical Engineering Group leads to the B.S. in Engineering (Biomechanical Engineering); this may be appropriate for students preparing for medical school or graduate bioengineering studies.

**Grade Requirements**—To be recommended by the department for a B.S. in Mechanical Engineering, a student must achieve the minimum grade point average (GPA) set by the School of Engineering (2.0 in engineering fundamentals and mechanical engineering depth).

Students interested in the minor should see the "Minor in Mechanical Engineering" section of this bulletin.

## HONORS PROGRAM

The Department of Mechanical Engineering offers a program leading to a B.S. in Mechanical Engineering with honors. This program offers a unique opportunity for qualified undergraduate engineering majors to conduct independent study and research at an advanced level with a faculty mentor.

Mechanical Engineering majors who have a grade point average (GPA) of 3.5 or higher in the major may apply for the honors program. Students who meet the eligibility requirement and wish to be considered for the honors program must submit a written application to the Mechanical Engineering student services office no later than the second week of Autumn Quarter in the senior year. The application to enter the program can be obtained from the ME student services office, and must contain a one-page statement describing the research topic and include an unofficial Stanford transcript. In addition, the application must be approved by a Mechanical Engineering faculty member who agrees to serve as the thesis adviser for the project. Thesis advisers must be members of Stanford's Academic Council.

In order to receive departmental honors, students admitted to the program must:

1. maintain the 3.5 GPA required for admission to the honors program.
2. submit a completed thesis draft to the adviser by April 25. Further revisions and final endorsement by the adviser are to be finished by May 15, when two bound copies are to be submitted to the Mechanical Engineering student services office.
3. present the thesis at the Mechanical Engineering Poster Session held in mid-April.

## COGNATE COURSES

- ARTSTUDI 60. Design I: Fundamental Visual Language
- ARTSTUDI 160. Design II: The Bridge
- CHEMENG 25. Biotechnology
- CS 106A. Programming Methodology
- ENGR 14. Applied Mechanics: Statics
- ENGR 15. Dynamics
- ENGR 25. Biotechnology
- ENGR 30. Engineering Thermodynamics
- ENGR 31. Chemical Principles with Application to Nanoscale Science and Technology
- ENGR 40. Introductory Electronics
- ENGR 70A. Programming Methodology
- ENGR 102M. Technical/Professional Writing for Mechanical Engineers
- ENGR 105. Feedback Control Design
- ENGR 205. Introduction to Control Design Techniques

## COTERMINAL B.S./M.S. PROGRAM IN MECHANICAL ENGINEERING

Stanford undergraduates who wish to continue their studies for the Master of Science degree in the coterminal program must have earned a minimum of 120 units towards graduation. This includes allowable Advanced Placement (AP) and transfer credit. Applicants must submit their application no later than the quarter prior to the expected completion of their undergraduate degree. This is normally Winter Quarter (late January) prior to Spring Quarter graduation. The application must provide evidence of potential for strong academic performance as a graduate student. The Mechanical Engineering department graduate admissions committee makes decisions on each application. Typically, a GPA of at least 3.5 in engineering, science, and math is expected. Applicants must have completed two of ME 80, 112, 131A, and 131B, and must take the Graduate Record Examination (GRE) before action is taken on the application. Coterminal information, applications deadlines, and forms can be obtained from the ME Student Services Office.

For University coterminal degree program rules and University application forms, see <http://registrar.stanford.edu/shared/publications.htm#Coterm>.

## MASTER OF SCIENCE IN MECHANICAL ENGINEERING

The basic University requirements for the M.S. degree are discussed in the "Graduate Degrees" section of this bulletin.

The master's program consists of 45 units of course work taken at Stanford. No thesis is required, although many students become involved in research projects during the master's program, particularly to explore their interests in working towards a Ph.D. degree. Students whose undergraduate backgrounds are entirely devoid of some of the major subject disciplines of engineering (for example, applied mechanics, applied thermodynamics, fluid mechanics, ordinary differential equations) may need to take some undergraduate courses to fill obvious gaps and prepare themselves to take graduate courses in these areas. Such students may require more than three quarters to fulfill the master's degree requirements, as the makeup courses may only be used as unrestricted electives (see item 4 below) in the M.S. degree program. However, it is not the policy to require fulfillment of mechanical engineering B.S. degree requirements to obtain an M.S. degree.

## MECHANICAL ENGINEERING

The master's degree program requires 45 units of course work taken as a graduate student at Stanford. No thesis is required. However, students who want some research experience during the master's program may participate in research through ME 391 and 392.

Students are encouraged to refer to the most recent *Mechanical Engineering Graduate Student Handbook* provided by the student services office. The department's requirements for the M.S. in Mechanical Engineering are as follows:

1. *Mathematical Fundamentals*: two mathematics courses for a total of at least 6 units from the following list are required: ME 300A, 300B, 300C; CME 302; MATH 106, 109; CS 205A or B; EE 261, 263; STATS 110, 141; ENGR 155C. Other MATH and CME courses with catalog numbers of 200 and above also fulfill the mathematics requirement. Mathematics courses must be taken for a letter grade.
2. *Depth in Mechanical Engineering*: a set of graduate-level courses in Mechanical Engineering to provide depth in one area. The faculty have approved these sets as providing depth in specific areas as well as a significant component of applications of the material in the context of engineering synthesis. These sets are outlined in the *Mechanical Engineering Graduate Student Handbook*. Depth courses must be taken for a letter grade.

3. *Breadth in Mechanical Engineering*: two additional graduate level courses (outside the depth) from the depth/breadth charts listed in the *Mechanical Engineering Graduate Handbook*. Breadth courses must be taken for a letter grade.
4. *Sufficient Mechanical Engineering Course Work*: students must take a minimum of 24 units of course work in mechanical engineering topics. For the purposes of determining mechanical engineering topics, any course on approved lists for the mathematics, depth, and breadth requirements counts towards these units. In addition, any graduate-level course with an ME course number is considered a mechanical engineering topic.
5. *Approved Electives* (to bring the total number of units to at least 39): electives must be approved by an adviser. Graduate engineering, mathematics, and science courses are normally approved. Approved electives must be taken for a letter grade. No more than 6 of the 39 units may come from ME 391/392 (or other independent study/research courses), and no more than 3 may come from seminars. Students planning a Ph.D. should discuss with their advisers the option of taking 391 or 392 during the master's program. ME 391/392 (and other independent study courses) may only be taken on a credit/no credit basis.
6. *Unrestricted electives* (to bring the total number of units submitted for the M.S. degree to 45): students are encouraged to take these units outside engineering, mathematics, or the sciences. Students should consult their advisers on course loads and on ways to use the unrestricted electives to make a manageable program. Unrestricted electives may be taken CR/NC.
7. Within the courses satisfying the requirements above, there must be at least one graduate-level course with a laboratory component. Courses which satisfy this requirement are: ENGR 206, 341; ME203, 210, 220, 218A,B,C,D, 310A,B,C, 317A,B, 318, 323, 324, 348, 354, 367, 382A,B, 385. ME 391/392 (or other independent study courses) may satisfy this requirement if 3 units are taken for work involving laboratory experiments.

Candidates for the M.S. in Mechanical Engineering are expected to have the approval of the faculty; they must maintain a minimum grade point average (GPA) of 2.75 in the 45 units presented for fulfillment of degree requirements (exclusive of independent study courses). All courses used to fulfill mathematics, depth, breadth, approved electives, and lab studies must be taken for a letter grade (excluding seminars, independent study, and courses for which a letter grade is not an option for any student).

Students falling below a GPA of 2.5 at the end of 20 units may be disqualified from further registration. Students failing to meet the complete degree requirements at the end of 60 units of graduate registration are disqualified from further registration. Courses used to fulfill deficiencies arising from inadequate undergraduate preparation for mechanical engineering graduate work may not be applied to the 45 units required for completion of the MS degree.

## ENGINEERING

As described in the "School of Engineering" section of this bulletin, each department in the school may sponsor students in a more general degree, the M.S. in Engineering. Sponsorship by the Department of Mechanical Engineering (ME) requires (1) filing a petition for admission to the program by no later than the day before instruction begins, and (2) that the center of gravity of the proposed program lies in ME. No more than 18 units used for the proposed program may have been previously completed. The program must include at least 9 units of graduate-level work in the department other than ME 300A,B,C, seminars, and independent study. The petition must be accompanied by a statement explaining the program objectives and how it is coherent, contains depth, and fulfills a well-defined career objective. The grade requirements are the same as for the M.S. in Mechanical Engineering.

## COGNATE COURSES

ANTHRO 332. Transformative Design  
 CS 223A. Introduction to Robotics  
 CS 327A. Advanced Robotics  
 ENGR 207B. Linear Control Systems II  
 ENGR 209A. Analysis and Control of Nonlinear Systems  
 ENGR 231. Transformative Design  
 ENGR 240. Introduction to Micro and Nano Electromechanical Systems (M/NEMS)  
 ENGR 341. Micro/Nano Systems Design and Fabrication Laboratory  
 MS&E 250A. Engineering Risk Analysis  
 MS&E 264. Sustainable Product Development and Manufacturing  
 MS&E 289. Clicks and Bricks: Creating Customer Experiences

## MASTER OF SCIENCE IN ENGINEERING, BIOMECHANICAL ENGINEERING

The Master of Science in Engineering: Biomechanical Engineering (MSE:BME) promotes the integration of engineering mechanics and design with the life sciences. Applicants are expected to have an additional exposure to biology and/or bioengineering in their undergraduate studies. Students planning for subsequent medical school studies are advised to contact Stanford's Premedical Advising Office in Sweet Hall.

Students wishing to pursue this program must complete the Graduate Program Authorization form and get approval from the Student Services Office. This form serves to officially add the field to the student's record. This form must be filled out electronically on Axess.

### *Degree Requirements—*

1. Mathematical competence (minimum 6 units) in two of the following areas: partial differential equations, linear algebra, complex variables, or numerical analysis, as demonstrated by completion of two appropriate courses from the following list: ME300A,B,C; MATH106, 109, 113, 131M/P, 132; STATS110, or ENGR155C; CME108, 302. Students who have completed comparable graduate-level courses as an undergraduate, and who can demonstrate their competence to the satisfaction of the instructors of the Stanford courses, may be waived via petition from this requirement by their adviser and the Student Services Office. The approved equivalent courses should be placed in the approved electives category of the program proposal.
2. Graduate Level Engineering Courses (minimum 21 units), consisting of:
  - a. Biomechanical engineering restricted electives (9 units) to be chosen from: ME 280, 281, 284A, 337, 339, 381, 382A,B, 385, or 387.
  - b. Specialty in engineering (9-12 units): A set of three or four graduate level courses in engineering mechanics, materials, controls, or design (excluding bioengineering courses) selected to provide depth in one area. Such sets are approved by the Mechanical Engineering Faculty. Comparable specialty sets composed of graduate engineering courses outside the Mechanical Engineering Department can be used with the approval of the student's adviser. Examples can be obtained from the Biomechanical Engineering Group Office (Durand 223).
  - c. Graduate engineering electives (to bring the total number of graduate level engineering units to at least 21). These electives must contribute to a cohesive degree program, and be approved by the student's adviser. No units may come from bioengineering courses, mathematics courses, or seminars.
3. Life science approved electives (minimum 6 units): Undergraduate or graduate biological/medical science/chemistry courses which contribute to a cohesive program.
4. Biomechanical engineering seminar ME 389.

5. General approved electives (to bring the total number of units to 39): These courses must be approved by the student's adviser. Graduate level engineering, math, and physical science courses and upper division undergraduate or graduate life science courses are normally approved.
6. Unrestricted electives (to bring the total number of units to 45): Students without undergraduate biology are encouraged to use some of these unrestricted units to strengthen their biology background. Students should consult their adviser for recommendations on course loads and on ways to use the unrestricted electives to create a manageable program.

All courses except unrestricted electives must be taken for a letter grade unless letter grades are not an option.

## MASTER OF SCIENCE IN ENGINEERING, PRODUCT DESIGN

The Joint Program in Design focuses on the synthesis of technology with human needs and values to create innovative products, services, and experience designs. This program is offered jointly by the departments of Mechanical Engineering and Art and Art History. It provides a design education that integrates technical, human, aesthetic, and business concerns. Students entering the program from the engineering side earn a Master of Science in Engineering degree with a concentration in Product Design, and those from the art side a Master of Fine Arts. Students complete the core product design courses in their first year of graduate study at Stanford before undertaking the master's project in their second year.

### DEGREE REQUIREMENTS

Students must complete the following courses. Students making unsatisfactory degree progress by the end of the first year may not advance to the thesis year per the faculty's discretion. A minimum cumulative GPA of 2.75 is required for degree conferral.

<i>Subject and Catalog Number</i>	<i>Units</i>
ME 203. Manufacturing and Design	4
ME 216A. Advanced Product Design: Needfinding	4
ME 311. Design Strategy and Leadership	3
ME 312. Advanced Product Design: Formgiving	3
ME 313. Human Value and Innovation in Design	3
ME 316A,B,C. Product Design Master's Project*	9
ME 365. Structure of Design Research	1-3
ARTSTUDI 60. Design I: Fundamental Visual Language	3
ARTSTUDI 160. Design II: The Bridge	3
ARTSTUDI 360A,B,C. Master's Project*	9
Approved Electives**	18
<b>Total Units</b>	<b>60-62</b>

Note: All required and approved electives must be taken for a letter grade unless prior approval is granted to take a class CR/NC.

\* ME 316A,B,C and ARTSTUDI 360A,B,C are taken concurrently for three quarters during the second year.

\*\* Students may choose classes (at the 200 level or higher) from any of the schools at the University to fulfill their elective requirement. However, electives that are not already pre-approved must be approved by the student's adviser via petition prior to enrollment. Electives should be chosen to fulfill career objectives; students may focus their energy in engineering, entrepreneurship and business, psychology, or other areas relevant to design. Taking a coherent sequence of electives focused on a subject area is recommended. For example, the patent, negotiation, and licensing classes (ME 207, 208, 265) constitute a sequence most relevant to potential inventors. The classes in the Graduate School of Business (STRAMGT S353, 356/366) and MS&E 273 constitute a coherent sequence in entrepreneurship and new venture formation. Students interested in social entrepreneurship should apply to the d.school course ME 206A,B, Extreme Affordability.

*Pre-approved electives list:* The following courses are pre-approved for fulfilling the 18-unit elective requirement for the master's degree in Engineering/Product Design. Electives taken that are not on this list must be approved via petition prior to enrollment. These must be taken for a letter grade unless prior approval is obtained.

ME 204.	The Designer's Voice
ME 207.	Negotiation
ME 208.	Patent Law and Strategy for Innovators and Entrepreneurs

ME 212.	Calibrating the Instrument
ME 222.	Design for Sustainability
ME 265.	Technology Licensing and Commercialization
ME 297.	Forecasting the Future of Engineering
ME 315.	The Designer in Society
MS&E 273.	Technology Venture Formation
STRAMGT 353.	Entrepreneurship: Formation of New Ventures
STRAMGT 356/366.	Evaluating Entrepreneurial Opportunities

*Additional requirements:* As part of their master's degree program, students are required to take at least one course offered by the Hasso Plattner Institute of Design (the d.School). All d.School courses require applications submitted the quarter prior to the start of class. These classes are considered pre-approved electives that fulfill part of the 18 units elective requirement.

ME206 A/B.	Entrepreneurial Design for Extreme Affordability
ME 228.	Creating Infectious Action
ME 325.	Software Design Experience
MS&E 287.	Prototyping Organizational Change
MS&E 485.	Crosscultural Design
ENGR 231.	Transformative Design
ENGR 280.	From Play to Innovation
ENGR 281.	Design and Media

## ENGINEER IN MECHANICAL ENGINEERING

The basic University requirements for the degree of Engineer are discussed in the "Graduate Degrees" section of this bulletin.

This degree requires an additional year of study beyond the M.S. degree and includes a research thesis. The program is designed for students who wish to do professional engineering work upon graduation and who want to engage in more specialized study than is afforded by the master's degree alone.

Admission standards are substantially the same as indicated under the master's degree. However, since thesis supervision is required and the availability of thesis supervisors is limited, admission is not granted until the student has personally engaged a faculty member to supervise a research project. This most often involves a paid research assistantship awarded by individual faculty members (usually from the funds of sponsored research projects under their direction). Thus, individual arrangement between student and faculty is necessary. Students studying for the M.S. degree at Stanford who wish to continue to the Engineer degree ordinarily make such arrangements during the M.S. degree program. Students holding master's degrees from other universities are invited to apply and may be admitted providing they are sufficiently well qualified and have made thesis supervision and financial aid arrangements.

Department requirements for the degree include a thesis; up to 18 units of credit are allowed for thesis work (ME 400). In addition to the thesis, 27 units of approved advanced course work in mathematics, science, and engineering are expected beyond the requirements for the M.S. degree; the choice of courses is subject to approval of the adviser. Students who have not fulfilled the Stanford M.S. degree requirements are required to do so, with allowance for approximate equivalence of courses taken elsewhere; up to 45 units may be transferable. A total of 90 units is required for degree conferral.

Candidates for the degree must have faculty approval and have a minimum grade point average (GPA) of 3.0 for all courses (exclusive of thesis credit and other independent study courses) taken beyond those required for the master's degree.

## DOCTOR OF PHILOSOPHY IN MECHANICAL ENGINEERING

The basic University requirements for the Ph.D. degree are discussed in the "Graduate Degree" section of this bulletin. The Ph.D. degree is intended primarily for students who desire a career

in research, advanced development, or teaching; for this type of work, a broad background in mathematics and the engineering sciences, together with intensive study and research experience in a specialized area, are the necessary requisites.

Ph.D. students must have a master's degree from another institution, or must fulfill the requirements for the Stanford M.S. degree in Mechanical Engineering or another discipline.

In special situations dictated by compelling academic reasons, Academic Council members who are not members of the department's faculty may serve as the principal dissertation adviser when approved by the department. In such cases, a member of the department faculty must serve as program adviser and as a member of the reading committee, and agree to accept responsibility that department procedures are followed and standards maintained.

Admission involves much the same consideration described under the Engineer degree. Since thesis supervision is required, admission is not granted until the student has personally engaged a member of the faculty to supervise a research project. Once a student has obtained a research supervisor, this supervisor becomes thereafter the student's academic adviser. Research supervisors may require that the student pass the departmental qualifying examination before starting research and before receiving a paid research assistantship. Note that research assistantships are awarded by faculty research supervisors and not by the department.

Prior to being formally admitted to candidacy for the Ph.D. degree, the student must demonstrate knowledge of engineering fundamentals by passing a qualifying examination. The academic level and subject matter of the examination correspond approximately to the M.S. program described above. Typically, the exam is taken shortly after the student completes the M.S. degree requirements. The student is required to have a minimum graduate Stanford GPA of 3.5 to be eligible for the exam (grades from independent study courses are not included in the GPA calculation). Once the student's faculty sponsor has agreed that the exam should be scheduled, the student must submit an application folder containing several items including a curriculum vitae, research project abstract, and preliminary dissertation proposal. Information, examination dates, and deadlines may be obtained from the department's student services office.

Ph.D. candidates must complete a minimum of 27 units (taken for a letter grade) of approved formal course work (excluding research, directed study, and seminars) in advanced study beyond the M.S. degree. The courses should consist primarily of graduate courses in engineering and sciences, although the candidate's adviser may approve a limited number of upper-level undergraduate courses and courses outside of engineering and sciences, as long as such courses contribute to a strong and coherent program. In addition to this 27-unit requirement, all Ph.D. candidates must participate each quarter in one of the following (or equivalent) seminars: ME 389, 390, 393, 394, 395, 396 397; AA 297; ENGR 298, 311A/B. The department has a breadth requirement for the Ph.D. degree. This may be satisfied either by a formal minor in another department (generally 20 units) or by at least 9 units of course work (outside of the primary research topic) which are approved by the principal dissertation adviser. If a minor is taken, 9 units from the minor requirements can be counted towards the depth requirement.

The Ph.D. thesis normally represents at least one full year of research work and must be a substantial contribution to the field. Students may register for course credit for thesis work (ME 500) to help fulfill University academic unit requirements, but there is no minimum limit on registered dissertation units, as long as students are registered in at least 8 units per quarter prior to TGR. Candidates should note that only completed course units are counted toward the requirement, so ungraded courses or courses with an "N" grade must be cleared before going TGR. Questions should be directed to the department student services office.

The final University oral examination (dissertation defense) is conducted by a committee consisting of a chair from another department and four faculty members of the department or

departments with related interests. Usually, the committee includes the candidate's adviser, reading committee members, plus two more faculty. The examination consists of two parts. The first is open to the public and is scheduled as a seminar talk, usually for one of the regular meetings of a seminar series. The second is conducted in private and covers subjects closely related to the dissertation topic.

## PH.D. MINOR IN MECHANICAL ENGINEERING

Students who wish a Ph.D. minor in ME should consult with the ME student services office. A minor in ME may be obtained by completing 20 units of approved graduate-level ME courses. Courses approved for the minor must form a coherent program and must be chosen from those satisfying requirement 2 for the M.S. in Mechanical Engineering.

See the *Mechanical Engineering Graduate Student Handbook* produced by the Mechanical Engineering student services office for more information.

## MECHANICAL ENGINEERING COURSE CATALOG NUMBERING SYSTEM

The department uses the following course numbering system:

010-099	Freshman and Sophomore
100-199	Junior and Senior
200-299	Advanced Undergraduate and Beginning Graduate
300-399	Graduate
400-499	Advanced Graduate
500	Ph.D. Thesis

# SCHOOL OF HUMANITIES AND SCIENCES

*Dean:* Richard P. Saller

*Senior Associate Deans:* Ralph L. Cohen, Stephen D. Krasner,  
Debra M. Satz

*Senior Associate Dean for Finance and Administration:* Adam R.  
Daniel

*Associate Dean for Faculty Affairs:* Tina Kass

*Associate Dean for Graduate and Undergraduate Studies:* Susan J.  
Weersing

*Assistant Dean and Data and Technology Manager for Graduate  
and Undergraduate Studies and Diversity Programs:* Ayodele  
Thomas

*Graduate Diversity Recruitment Specialist:* Joseph L. Brown

*Department Chairs:* James Ferguson (Anthropology), James  
Fishkin (Communication), Hester Gelber (Religious Studies),  
Gavin Jones (English), Steven Kahn (Physics), Steven  
Kerckhoff (Mathematics), Jonathan Levin (Economics), Helen  
Longino (Philosophy), Hideo Mabuchi (Applied Physics),  
James McClelland (Psychology), W.E. Moerner (Chemistry),  
Josiah Ober (Political Science), Steven Palumbi (Hopkins  
Marine Station), Alice Rayner (Drama), Gabriella Safran  
(Division of Literature, Cultures, and Languages), Steve Sano  
(Music), Walter Scheidel (Classics), Robert Simoni (Biology),  
Nancy Troy (Art and Art History), Andrew Walder (Sociology),  
Ban Wang (East Asian Languages and Cultures), Tom Wasow  
(Linguistics), Karen Wigen (History), Wing Wong (Statistics)

*Lecturer:* Ayodele Thomas

The School of Humanities and Sciences, with over 40 departments and interdepartmental degree programs, is the primary locus for the liberal arts education offered by Stanford University. Through exposure to the humanities and arts, undergraduates study the ethical, aesthetic, and intellectual dimensions of the human experience, past and present, and are thereby prepared to make thoughtful and imaginative contributions to the culture of the future. Through the study of social, political, and economic events, they acquire theories and techniques for the analysis of specific societal issues, as well as general cross-cultural perspectives on the human condition. And through exposure to the methods and discoveries of mathematics and the sciences, they become well-informed participants and leaders in today's increasingly technological societies.

The research environment within the school offers both undergraduate and graduate students the intellectual adventure of working on their own research projects side by side with the school's distinguished faculty. While a few of the school's graduate programs offer professional degrees such as the Master of Fine Arts, most are academic and research programs leading to the Ph.D. Doctoral programs emphasize original scholarly work by the graduate students, often at the frontiers of knowledge, and normally require the students to participate in the supervised teaching of undergraduates. Indeed, in the school, as in the University more broadly, graduate students are of central importance in developing a community of scholars.

The fact that so many different disciplines lie within the same organization is one reason why the school has had great success in promoting interdisciplinary teaching and research programs. Whether engaged in studies as wide ranging as ethics, policy, and technological issues, or by applying contemporary social and philosophical theories to classical literature, the school's undergraduates, graduate students, and faculty are challenging the

barriers among scholarly disciplines. The school continues to strive for a balance between teaching and research, the academy and society.

## ORGANIZATION

The School of Humanities and Sciences includes the departments of Anthropology, Applied Physics, Art and Art History, Biology (and the Hopkins Marine Station), Chemistry, Classics, Communication, Division of Literatures, Cultures, and Languages, Drama, East Asian Languages and Cultures, Economics, English, History, Linguistics, Mathematics, Music, Philosophy, Physics, Political Science, Psychology, Religious Studies, Sociology, and Statistics.

The school also includes 21 interdepartmental degree programs: African and African American Studies; African Studies; American Studies; Archaeology; Biophysics; Comparative Studies in Race and Ethnicity; East Asian Studies; Feminist Studies; Financial Mathematics; Human Biology; Interdisciplinary Studies in Humanities; International Policy Studies; International Relations; Latin American Studies; Mathematical and Computational Science; Modern Thought and Literature; Public Policy; Russian, East European and Eurasian Studies; Science, Technology, and Society; Symbolic Systems; and Urban Studies.

In addition, the school sponsors programs that do not currently grant degrees: Astronomy; Black Performing Arts; Buddhist Studies; Creative Writing; Ethics in Society; History and Philosophy of Science; the Institute for Gender Research; the Institute for Social Science Research; Islamic Studies; Jewish Studies; Medieval Studies; and the Social Science History Institute.

Faculty and academic staff of the School of Humanities are listed under their respective departments or programs.

## DEGREES OFFERED

Candidates for the degree of Bachelor of Arts, Bachelor of Science, Bachelor of Arts and Sciences, Master of Arts, Master of Fine Arts, Master of Science, Doctor of Musical Arts, or Doctor of Philosophy should consult the department or program in which they intend to specialize.

## AFRICAN AND AFRICAN AMERICAN STUDIES

*Acting Director:* Arnetha Ball

*Associate Director:* Cheryl Brown

*Advisory Committee:* H. Samy Alim (Education), Jan Barker-Alexander (Director, Black Community Services Center), James Campbell (History), Clayborne Carson (History), Linda Darling-Hammond (Education), Harry Elam (Drama), Michele Elam (English), Shelley Fisher Fishkin (English), Allyson Hobbs (History), Vaughn Rasberry (English), John R. Rickford (Linguistics), Joel Samoff (African Studies)

*Affiliated Faculty:* David Abernethy (Political Science, emeritus), Samy Alim (Education), R. Lanier Anderson (Philosophy), Anthony Antonio (Education), Arnetha Ball (Education), Richard Banks (Law), Lucius Barker (Political Science, emeritus), Don Barr (Sociology), Shasad Bashir (Religious Studies), Carl Bielefeldt (Religious Studies), Jennifer Brody (Drama), Bryan Brown (Education), Cheryl Brown (Associate Director, Program in African and African American Studies), Albert Camarillo (History), James Campbell (History), Clayborne Carson (History), Prudence Carter (Education), Gordon Chang (History), Wanda Corn (Art and Art History, emerita), Linda Darling-Hammond (Education), David Degusta (Anthropology), Sandra Drake (English, emerita), Jennifer Eberhardt (Psychology), Paulla Ebron (Anthropology), Harry Elam (Vice Provost), Michele Elam (English), Corey Fields (Sociology), James Ferguson (Anthropology), Shelley Fisher Fishkin (English), Charlotte Fonrobert (Religious Studies), Sean

Hanretta (History), Aleta Hayes (Drama), Gina Hernandez (Director, Identity Diversity, and Aesthetics), Allyson Hobbs (History), Gavin Jones (English), Terry Karl (Political Science), Anthony Kramer (Drama), Teresa LaFromboise (Education), Brian Lowery (Graduate School of Business), Lisa Malkki (Anthropology), Hazel Markus (Psychology), Barbaro Martinez-Ruiz (Art and Art History), Monica McDermott (Sociology), Tania Mitchell (Director, Service Learning in Comparative Studies in Race and Ethnicity), Robert Moses (Drama), Paula Moya (English), Elisabeth Mudimbe-Boyi (French and Comparative Literature), Susan Olzak (Sociology), David Palumbo-Liu (Comparative Literature), Arnold Rampersad (English), Vaughn Rasberry (English), John R. Rickford (Linguistics), Richard Roberts (History), Sonia Rocha (Sociology), Michael Rosenfeld (Sociology), José Saldívar (English), Ramón Saldívar (English), Joel Samoff (African Studies), Gary Segura (Director, Comparative Studies in Race and Ethnicity), Paul Sniderman (Political Science), C. Matthew Snipp (Sociology), Ewart Thomas (Psychology), Jeane Tsai (Psychology), Elizabeth Whal (Executive Director, Center for Comparative Studies in Race and Ethnicity), Jeremy Weinstein (Political Science), Bryan Wolf (American Art and Culture), Yvonne Yarbo-Bejarno (Spanish and Portuguese)

*Program Offices:* 450 Serra Mall, Building 360, Suite 362

*Mail Code:* 94305-2084

*Phone:* (650) 723-3782

*Email:* aaas@stanford.edu

*Web Site:* <http://aaas.stanford.edu>

Courses offered by the Program in African and African American Studies are listed under the subject code AFRICAAM on the *Stanford Bulletin's* ExploreCourses web site.

## UNDERGRADUATE PROGRAM IN AFRICAN AND AFRICAN AMERICAN STUDIES

The Program in African and African American Studies (AAAS), established in 1968, was the first ethnic studies program developed at Stanford University and the first African and African American Studies program at a private institution in the U.S. The AAAS program provides an interdisciplinary introduction to the study of peoples of African descent as a central component of American culture, offering a course of study that promotes research across disciplinary and departmental boundaries as well as providing research training and community service learning opportunities for undergraduates. It has developed an extensive network of Stanford scholars who work in race studies specific to AAAS and in concert with the Center for Comparative Studies in Race and Ethnicity.

AAAS encourages an interdisciplinary program of study drawn from fields including anthropology, art, art history, economics, education, drama, history, languages, linguistics, literature, music, philosophy, political science, psychology, religion, and sociology. The program emphasizes rigorous and creative scholarship and research, and fosters close academic advising with a faculty adviser, the AAAS Associate Director, and the Director.

AAAS is an interdisciplinary program (IDP) affiliated with the Center for Comparative Studies in Race and Ethnicity (CCSRE) and offers a major independent of it. CCSRE offers additional majors in Asian American Studies, Chicana/o Studies, Comparative Studies in Race and Ethnicity, and Native American Studies.

## MISSION STATEMENT FOR THE UNDERGRADUATE PROGRAM IN AFRICAN AND AFRICAN AMERICAN STUDIES

The mission of the undergraduate program in African and African American Studies is to provide students with an

interdisciplinary introduction to the study of people of African descent as a central component of American culture. Courses in the major promote research across disciplinary and departmental boundaries as well as provide students with research training and community service learning opportunities. Courses of study are drawn from anthropology, art, art history, economics, education, drama, history, languages, linguistics, literature, music, philosophy, political science, psychology, religion, and sociology among others. The program provides an intellectual background for students considering graduate school or professional careers.

## LEARNING OUTCOMES

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. an interdisciplinary understanding of scholarship related to the African diaspora and Africa, drawing on interdisciplinary course work and each student's individualized concentration.
2. the ability to identify and critically assess different disciplinary, methodological, and interpretive approaches to the study of the African Americans, Africans, and/or people of the African diaspora.
3. an understanding of comparative approaches to race
4. skills in disciplinary methods necessary for their study.
5. the ability to express their interpretive and analytical arguments in clear, effective prose.

## BACHELOR OF ARTS IN AFRICAN AND AFRICAN AMERICAN STUDIES

### MAJOR

Majors must complete a total of 60 units, which include the following:

1. AFRICAAM 105. Introduction to African and African American Studies (WIM),  
or ENGLISH 143. Introduction to African American Literature  
and  
ENGLISH 152D. W. E. B. Du Bois as Writer and Philosopher (WIM)  
or ENGLISH 172G. Great Works of the African American Literary Tradition
2. One 5 unit course on Africa, approved by the AAAS Director and Associate Director
3. AFRICAAM 200X. Honors Thesis and Senior Thesis Seminar ( )
4. 40 units from other AAAS core and cognate courses.

At least 10 of these units must be core courses, which are defined as courses that are primarily focused on Africa, African American Studies, the Caribbean, or the African Diaspora.

Students also work closely with a faculty adviser, the AAAS associate director, and the AAAS director in developing a coherent thematic emphasis within their major that reflects their scholarly interests in the field.

### THEMATIC EMPHASIS

AAAS majors select a thematic emphasis, devoting at least 25 units in their major program of study toward their emphasis. Selecting an emphasis allows students to customize their curriculum and synthesize course work taken across various departments and programs into a coherent focus. Emphases offered include:

- Africa
- African Americans
- Diaspora
- Identities, Diversity, and Aesthetics (IDA)
- Gender
- Class



- Theory
- Historical Period
- Education

All emphases (those listed as well as proposed alternatives) must be approved by the director and a course plan developed and approved by the director, associate director, and faculty adviser within the first year of declaring the major.

### HONORS PROGRAM

AAAS offers a special program leading to honors in African and African American Studies. Students accepted to this program must complete an honors thesis on an approved topic, on which work normally begins in the junior year and be completed by mid-May of the senior year. The honors thesis is intended to enable students to synthesize skills to produce a document or project demonstrating a measure of competence in their specialty.

The honors program begins with extensive advising from the faculty adviser and a petition for honors, approved no later than the Spring Quarter of the junior year. Students must enroll in AFRICAAM 200X, Honors Thesis and Senior Thesis Seminar, during Autumn Quarter of the senior year and may take up to an additional 10 units of honors work to be distributed across Winter and Spring quarters of senior year. Senior Research units are taken in addition to the required courses for the major. In May of the senior year, honors students share their research findings in a public presentation to which faculty and students are invited.

Majors who have maintained a grade point average (GPA) of at least 3.5 in the major may apply for the honors program. Forms are available in the AAAS office.

### CORE COURSES

<i>Subject and Catalog Number</i>	<i>Units</i>
AFRICAAM 105. Intro to African and African American Studies (WIM)	5
AFRICAAM 106: Race, Ethnicity, and Linguistic Diversity in the Classroom	5
AFRICAAM 123/ENGLISH 172G. Great Works of the African American Tradition	5
AFRICAAM 200X. Honors Thesis and Senior Thesis Seminar	5
AFRICAAM 43/ENGLISH 143. Introduction to African and African American Literature	5
AFRICAAM 152/ENGLISH 152D. W. E. B. Du Bois and American Culture (WIM)	5
AFRICAAM 123/ENGLISH 172G. Great Works of the African American Tradition	5
FRENLIT 133. Literature and Society: Introduction to Francophone Literature from Africa and the Caribbean	4
HISTORY 145B. Africa in the 20th Century	5
HISTORY 166. Introduction to African American History: The Modern African American Freedom Struggle	4-5
LINGUIST 65. African American Vernacular English	3-5
POLISCI 225R. Black Politics in the Post-Civil Rights Era (not given this year)	5
SOC 144. Race and Crime in America	5

### AAAS COURSES

- AFRICAAM 12. Presidential Politics: Race, Class, Faith and Gender in the 2008 Election
- AFRICAAM 16N/SOC 16N: African Americans and Social Movements
- AFRICAAM 40. The Muse, Musings, and Music
- AFRICAAM 47/History 47/147 History of South Africa
- AFRICAAM 50B/HISTORY 50B: 19th Century America
- AFRICAAM 54/HISTORY 54N. African American Women's Lives
- AFRICAAM 56N/ENGLISH 56N: Mixed Race in the New Millennium: Crossings of Kin, Culture, and Faith
- AFRICAAM 60/RELIGST 60. Nation, Diaspora, and the Gods of African America
- AFRICAAM 64/HISTORY 64C/164C. From Freedom to Freedom Now: African American History 1865-1965
- AFRICAAM 75. Black Cinema

- AFRICAAM 75B. Black Sitcoms
- AFRICAAM 101. African and African American Lecture Series: Race and Faith
- AFRICAAM 105R/RELIGST 105. Race, Faith, and Migration
- AFRICAAM 112: Urban Education
- AFRICAAM 121X/EDUC 121 Hip Hop, Youth Identities, and the Politics of Language
- AFRICAAM 145. Writing Race, Writing Faith: An Exploration of the Poetics and Politics of Spirituality in Black Literature
- AFRICAAM 150B /HISTORY 150B: 19th-Century America
- AFRICAAM 155D: Racial Identity in the American Imagination
- AFRICAAM 166/HISTORY 166: Introduction to African American History: The Modern African American Freedom Struggle
- AFRICAAM 176/DRAMA 176 Black Women Playwrights, 1900-the present
- AFRICAAM 200Y. Thesis Research
- AFRICAAM 200Z. Thesis Research
- AFRICAAM 204F/ HISTORY 204F: The Modern Tradition of Non-Violent Resistance
- AFRICAAM 255/HISTORY 255D/355D. Racial Identity in the American Imagination

### COGNATE COURSES

- AFRICAST 111/211. Education for All? The Global and Local in Public Policy Making in Africa
- AFRICAST 112/212. Aids, Literacy, and the Land: International Aid and the Problems of Development in Africa
- AMELANG 100A,B,C. Beginning Amharic
- AMELANG 102A,B,C. Advanced Amharic
- AMELANG 106A,B,C. Beginning Swahili
- AMELANG 107A,B,C. Intermediate Swahili
- AMELANG 108A,B,C. Advanced Swahili
- AMELANG 133A,B,C. The African Forum
- AMELANG 156A,B,C. Beginning Zulu
- AMELANG 157A,B,C. Intermediate Zulu
- AMELANG 158A,B,C. Advanced Zulu
- AMSTUD 105. From Blues to Rap: Representing Music in African American Literature
- ARTHIST 160A/360A. Twentieth-Century African American Art
- ARTHIST 192/392. Introduction to African Art
- ARTHIST 234A. Harlem Renaissance
- ARTHIST 256A. Critical Race Art History
- CASA 36. Life on the Streets: Anthropology of United States Urban Life
- CASA 72. Dance and Culture in Latin America
- CASA 88. Theories of Race and Ethnicity
- CASA 119. The State in Africa
- CHICANST 180E. Introduction to Chicana/o Life and Culture
- COMM 148. Hip-Hop and Don't Stop: Introduction to Modern Speech Communities
- COMM 246. Language and Discourse: Race, Class, and Gender
- COMPLIT 41Q. Ethnicity and Literature
- COMPLIT 147. Comparative Approaches to African American and Asian American Literature
- COMPLIT 148. Introduction to Asian American Cultures
- COMPLIT 241. Comparative Fictions of Ethnicity
- CSRE 198. Internship for Public Service
- CSRE 203A. The Changing Face of America: Civil Rights and Education Strategies for the 21st Century
- DANCE 42. Dances of Latin America
- DANCE 43. Afro-Brazilian and Afro-Peruvian Dance

- DANCE 44. Jazz Dance I
- DANCE 51. Congolese Dance
- DANCE 58. Beginning Hip-Hop
- DANCE 59. Intermediate-Advanced Hip Hop
- DANCE 105. Contemporary Afro Styles and Dance Making: Technique, Rhythm, and Architecture
- DANCE 106. Essence of Contemporary Dance Performance: African Styles on Stage
- DANCE 144. Jazz Dance II
- DANCE 145. Jazz Dance III
- DRAMA 17N. Salt of the Earth: The Docudrama in America
- DRAMA 110. Identity, Diversity, and Aesthetics: The Institute for the Diversity in the Arts
- DRAMA 155D. Performances of Race, Race-ing Performance
- DRAMA 163. Performance and America
- DRAMA 168. African American Drama: Traditions and Revisions
- DRAMA 169. Contemporary Dramatic Voices of Color
- DRAMA 177. Playwriting
- DRAMA 179F. Flor y Canto: Poetry Writing Workshop
- DRAMA 179G. Indigenous Identity in Diaspora: People of Color Art Practice in North America
- DRAMA 219. Contemporary African American Drama
- ECON 116. American Economic History
- ECON 148. Urban Economics
- EDUC 103B/337. Race, Ethnicity, and Linguistic Diversity In Classrooms: Sociocultural Theory and Practices
- EDUC 156A. Understanding Racial and Ethnic Identity
- EDUC 177. Education of Immigrant Students
- EDUC 193C. Peer Counseling: The African American Community
- EDUC 201A. History of African American Education
- EDUC 201B. Education for Liberation
- EDUC210. History of Education in the United States
- EDUC 245. Understanding Racial and Ethnic Identity Development
- EDUC 336X. Language, Identity, and Classroom Learning
- ENGLISH 143. Introduction to African American Literature
- ENGLISH 45/145. Writings by Women of Color
- ENGLISH 55N. American Sports, American Lives
- ENGLISH 69Q. Sources of Global Challenges Today, Possibilities for Global Solutions: A Literary Exploration
- ENGLISH 146C. Hemingway, Hurston, Faulkner, and Fitzgerald
- ENGLISH 172E. The Literature of the Americas
- ENGLISH 172G. Great Works of the African American Literary Tradition
- ENGLISH 172P. African American Poetry
- ENGLISH 374. Writing Race and Nation: Mark Twain and Paul Lawrence Dunbar
- FEMSTUD 140 J. Black Feminist Theory
- FRENLIT 133. Literature and Society: Introduction to Francophone Literature from Africa and the Caribbean
- FRENLIT 248. Literature, History, and Representation
- HISTORY 45S: Colonial Anthropologists and the
- HISTORY 48N: African History through Literature and Film
- HISTORY 48Q. South Africa: Contested Transitions
- HISTORY 50A: Colonial and Revolutionary America
- HISTORY 52N. The Harlem Renaissance
- HISTORY 54N. African American Women's Lives
- HISTORY 58N: Thomas Jefferson and His World
- HISTORY 60S: Beyond the Nation: International Social
- HISTORY 61. The Constitution and Race
- HISTORY 64. Introduction to Race and Ethnicity in the American Experience
- HISTORY 106A: Global Human Geography: Asia and Africa
- HISTORY 145A: Africa Until European Conquest
- HISTORY 145B. Africa in the 20th Century
- HISTORY 147G. African History in Novels and Film
- HISTORY 150A. Colonial and Revolutionary America
- HISTORY 150B. 19th-Century America
- HISTORY 150C. The United States in the Twentieth Century
- HISTORY 151. Slavery and Freedom in American History
- HISTORY 158. The United States Since 1945
- HISTORY 164C: From Freedom to Freedom Now: African American History, 1865-1965
- HISTORY 243S. Human Origins: History, Evidence, and Controversy
- HISTORY 245E. Health and Society in Africa
- HISTORY 245G. Law and Colonialism in Africa
- HISTORY 246. Successful Futures for Africa: An Inventory of the 1970s-2000s
- HISTORY 246S. Popular Culture in Africa
- HISTORY 248S. African Societies and Colonial States
- HISTORY 255D. Racial Identity in the American Imagination
- HISTORY 260. California's Minority-Majority Cities
- HISTORY 261. Race, Gender, and Class in Jim Crow America
- HISTORY 299M. Martin Luther King, Jr. Research and Education Institute
- HUMBIO 122S. Social Class, Race, Ethnicity, Health
- HUMBIO 129/INDE 244. Ethnicity and Medicine
- IHUM 68A/68B. Performing Religion
- LINGUIST 65. African American Vernacular English
- LINGUIST 152. Sociolinguistics and Pidgin Creole Studies
- MUSIC 18A. Jazz History: Ragtime to Bebop (1900-1940)
- MUSIC 18B. Jazz History: Bebop to Present (1940-Present)
- MUSIC 20A. Jazz Theory
- MUSIC 20B. Advanced Jazz Theory
- MUSIC 20C. Jazz Arranging and Composition
- MUSIC 153. The Soul Tradition in African American Music
- MUSIC 161B. Jazz Orchestra
- PHIL 177. Philosophical Issues Concerning Race and Racism
- POLISCI 125V. Minority Representation and the Voting Rights Act
- POLISCI 136. Philosophical Issues Concerning Race and Racism
- POLISCI 141. The Global Politics of Human Rights
- POLISCI 221. Tolerance and Democracy
- POLISCI 221T. Politics of Race and Ethnicity in the United States
- POLISCI 325S. Race and Place in American Politics
- POLISCI 327. Minority Behavior and Representation
- PSYCH 75. Cultural Psychology
- PSYCH 180. Social Psychological Perspectives on Stereotyping and Prejudice
- PSYCH 215. Mind, Culture, and Society
- SOC 45Q: Understanding Race and Ethnicity in American
- SOC 46N: Race, Ethnic, and National Identities: Imagined Communities
- SOC 138. American Indians in Comparative Historical Perspective
- SOC 139. American Indians in Contemporary Society
- SOC 141A. Social Class, Race, Ethnicity, Health
- SOC 143. Prejudice, Racism, and Social Change
- SOC 144. Race and Crime in America
- SOC 145. Race and Ethnic Relations
- SOC 146: Introduction to Comparative Studies in Race and Ethnicity
- SOC 147/247. Comparative Ethnic Conflict
- SOC 148: Racial Identity
- SOC 149. The Urban Underclass
- SOC 150: Race and Political Sociology

## MINOR IN AFRICAN AND AFRICAN AMERICAN STUDIES

Students who minor in AAAS complete a minimum of 30 units from the list of AAAS courses. These courses must include:

1. AFRICAAM 105. Introduction to African and African American Studies
2. one course from the social sciences list
3. one course from the humanities list

See the "Bachelor of Arts in African and African American Studies" section of this bulletin to view the humanities and social sciences lists.

Students should seek to develop a coherent theme in their course selections in consultation with the program director or associate director. An appointment should be made to discuss the rationale for the Minor theme preceding submission of the declaration forms.

## OVERSEAS STUDIES COURSES IN AFRICAN AND AFRICAN AMERICAN STUDIES

For course descriptions and additional offerings, see the listings in the *Stanford Bulletin's* ExploreCourses web site (<http://explorecourses.stanford.edu>) or the Bing Overseas Studies web site (<http://bosp.stanford.edu>). Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

### WINTER QUARTER

#### CAPE TOWN

- OSPCPTWN 10 Minding Opportunity Gaps: Educational & Social Policy in South Africa, 4 units, Carter
- OSPCPTWN 11 Education & Schooling in Post- Apartheid South Africa, 4-5 unites,Carter
- OSPCPTWN 18 Xhosa Language and Culture, 2 units, Tyam
- OSPCPTWN 24A Targeted Research Project in Community Health and Development 3 units, Stanton
- OSPCPTWN 32 Learning, Development and Social Change: Service-Learning in the Contemporary South African, 3-5 units, McMillan
- OSPCPTWN 33 From Apartheid to Democracy: Namibia and South Africa, 4 units, Saunders
- OSPCPTWN 38 Genocide: The African Experience, 4 units, Adhikari
- OSPCPTWN 44 Negotiating Home, Citizenship and the South African City, 4 units, Oldfield

#### PARIS

- OSPPARIS 186F Contemporary African Literature in French, 4 units, Mercier

### SPRING QUARTER

#### CAPE TOWN

- OSPCPTWN 18 Xhosa Language and Culture, 2 units, Tyam
- OSPCPTWN 22 Preparation for Community-Based Research in Community Health and Development, 3 units, Stanton
- OSPCPTWN 24B Targeted Research Project in Community Health and Development, 5 units Stanton
- OSPCPTWN 31 Theory and Politics of Foreign Aid, 3 units, Klingebiel
- OSPCPTWN 32 Learning, Development and Social Change: Service-Learning in the Contemporary South African, 3-5 units, McMillan
- OSPCPTWN 36 The Archaeology of Southern African Hunter Gatherers, 4 units, Parkington

- OSPCPTWN 68 Cities in the 21st Century: Urbanization, Globalization and Security, 4 units, Simons

## AFRICAN STUDIES

*Emeriti:* David B. Abernethy, John Baugh, Joan Bresnan, Susan Cashion, Sandra E. Drake, Peter Egbert, James. L. Gibbs, Jr., William B. Gould, Bruce F. Johnston, William R. Leben, Bruce Lusignan, Hans N. Weiler, Sylvia Wynter

*Director:* Jeremy Weinstein

*Professors:* Jean-Marie Apostolidès (French, Drama), Ellen Jo Baron (Pathology), Michele Barry (Medicine), Joel Beinin (History), John Boothroyd (Microbiology and Immunology), Elisabeth Mudimbe-Boyi (French and Italian, Comparative Literature), James T. Campbell (History), Martin Carnoy (Education), Harry Elam (Drama), James Fearon (Political Science), James Ferguson (Anthropology), Terry Lynn Karl (Political Science), Richard Klein (Anthropology), David Laitin (Political Science), Michael McFaul (Political Science), Yvonne Maldonado (Pediatrics, Infectious Diseases), Lynn Meskell (Anthropology), Julie Parsonnet (Infectious Diseases), Mary L. Polan (Obstetrics and Gynecology), John Rickford (Linguistics), Richard Roberts (History)

*Associate Professors:* Prudence L. Carter (Education), Paulla A. Ebron (Anthropology), Liisa Malkki (Anthropology), Hugh Brent Solvason (Psychiatry and Behavioral Sciences)

*Assistant Professors:* Jenna Davis (Civil and Environmental Engineering), David DeGusta (Anthropology), Oliver Fringer (Civil and Environmental Engineering), Sean A. Hanretta (History), Barbaro Martinez-Ruiz (Art History), Kathryn Miller (History), Grant Parker (Classics), Jeremy Weinstein (Political Science)

*Professor (Research):* David Katzenstein (School of Medicine)

*Associate Professor (Teaching):* Robert Siegel (Microbiology and Immunology)

*Assistant Professor (Clinical):* Brian Blackburn (Infectious Diseases)

*Senior Lecturers:* Khalil Barhoum (African and Middle Eastern Languages), Helen Stacy (Law)

*Lecturers:* Byron Bland (Stanford Center on Conflict and Negotiation), Jonathan Greenberg (Law), Ramzi Salti (African and Middle Eastern Languages), Galen Sibanda (African and Middle Eastern Languages), Timothy Stanton (Bing Overseas Studies)

*Consulting Professors:* Anne Firth-Murray (Human Biology), Joel Samoff (Center for African Studies)

*Curators:* Karen Fung (African Collection Curator, Green Library), Thomas Seligman (Director, Cantor Arts Center, and Lecturer, Art and Art History), Barbara Thompson (Phyllis Wattis Curator of the Arts of Africa and the Americas, Cantor Arts Center)

*Senior Research Fellows:* Coit Blacker (Freeman Spogli Institute), Larry Diamond (Hoover Institution), Stephen Stedman (Freeman Spogli Institute, Center for International Security and Cooperation)

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*Mail Code:* 94305-6045

*Phone:* (650) 723-0295

*Email:* [africanstudies@stanford.edu](mailto:africanstudies@stanford.edu)

*Web Site:* <http://africanstudies.stanford.edu>

Courses offered by the Center for African Studies are listed under the subject code AFRICAST on the *Stanford Bulletin's* ExploreCourses web site.

The Center for African Studies coordinates an interdisciplinary program in African Studies for undergraduates and graduate students. The program seeks to enrich understanding of the interactions among the social, economic, cultural, historical, linguistic, genetic, geopolitical, ecological, and biomedical factors that shape and have shaped African societies. By arrangement with

the Stanford/Berkeley Joint Center for African Studies, graduate students may incorporate courses from both institutions into their programs. Contact the center for information regarding courses offered at the University of California, Berkeley.

Courses in African Studies are offered by departments and programs throughout the University. Each year the center sponsors a seminar to demonstrate to advanced undergraduates and graduate students how topics of current interest in African Studies are approached from different disciplinary perspectives.

Course offerings in African languages are also coordinated by the Center for African Studies. Along with regular courses in several levels of Arabic, Swahili, Xhosa, and Zulu, the center arranges with the African and Middle Eastern Languages and Literatures Program in the Stanford Language Center to offer instruction in other African languages; in recent years, it has offered courses in Amharic, Bambara, Chichewa, Ewe, Fulani, Hausa, Igbo, Shona, Twi, Wolof, and Yoruba.

The Center for African Studies offers a master of arts degree for graduate students. Undergraduates and graduate students not pursuing the master's degree can specialize in African Studies under the arrangements listed below.

## UNDERGRADUATE PROGRAMS IN AFRICAN STUDIES

Undergraduates may choose an African Studies focus from:

1. A minor in African Studies offers students the ability to combine a focus on Africa with their major in any other discipline. This offers the students a strong regional specialization. For requirements see the "Minor in African Studies" section of this bulletin.
2. A major in a traditionally defined academic department such as Anthropology, History, or Political Science. These departments afford ample opportunity to enroll in courses outside the major, leaving the student free to pursue the interdisciplinary study of Africa.
3. Interdepartmental majors, such as African and African American Studies or International Relations, which offer coordinated and comprehensive interdisciplinary course sequences, permitting a concentration in African Studies.
4. An individually designed major. Under the supervision of a faculty adviser and two other faculty members, the student can plan a program of study focused on Africa that draws courses from any department or school in the University. If approved by the dean's advisory committee on individually designed majors, the program becomes the curriculum for the B.A. degree.

## CERTIFICATE IN AFRICAN STUDIES

Students may apply for a certificate in African Studies. Requirements for the certificate are the same as for the minor; however, students may double-count courses applied toward their major or graduate studies. The principal difference between the minor and the certificate is that the certificate does not appear on the transcript. For more information and an application, contact the center.

## GRADUATE STUDY IN AFRICAN STUDIES

For those who wish to specialize in Africa at the graduate level, African Studies can be designated a field of concentration within the master's and doctoral programs of some academic departments. Students in such departments as Anthropology, History, Political Science, and Sociology, and in the School of Education, may declare African Studies as the area of specialization for their master's and Ph.D. thesis work. Some other departments, programs, and institutes such as the International Comparative Education Program also permit students to specialize in African Studies. Stanford graduate students who are U.S. citizens or permanent residents may request an academic year application for a Foreign Language and Area Studies (FLAS) Fellowship. Students need not be enrolled at Stanford to apply for the summer

fellowship. The deadline for both is January 8. For more information or an application, contact the Center.

## FINANCIAL AID

The Center for African Studies offers a limited number of Foreign Language and Area Studies (FLAS) fellowships to U.S. citizens and permanent residents who undertake full-time study of an African language as part of their graduate training.

## MINOR IN AFRICAN STUDIES

The Center for African Studies awards a minor in African Studies. Students majoring in any field qualify for this minor by meeting the following requirements:

1. A minimum of 25 units of Africa-related courses. Students may not double-count courses for completing major and minor requirements.
2. At least one quarter's exposure to a sub-Saharan African language. The Center for African Studies and the Special Languages Program may arrange instruction in any of several languages spoken in West, East, Central, and Southern Africa.
3. One introductory course that deals with more than one region of Africa.
4. A minimum 25-page research paper, with a focus on Africa. This paper may be an extension of a previous paper written for an African Studies course.
5. A designated focus of study, either disciplinary or regional, through a three-course concentration.

Upon completion of requirements, final certification of the minor is made by the Center for African Studies and appears on the student's transcript.

## COTERMINAL BACHELOR'S AND MASTER OF ARTS IN AFRICAN STUDIES

The one-year master's program in African Studies is designed for students who have experience working, living, or studying in Africa, and little prior course work on the region.

Undergraduates at Stanford may apply for admission to the coterminal master's program in African Studies. Coterminal degree applications will only be accepted from students in their fourth year, meaning that the program must be completed in the fifth year. An exception can only be made for students who completed an honors thesis in their third year. For University coterminal degree program rules and application forms, see <http://registrar.stanford.edu/shared/publications.htm#Coterm>. Requirements for the master's degree are summarized below.

The annual deadline for all applications, including coterminal and master's, is January 8. All applicants must submit an online application, including a 500-word statement of purpose, resume, 15-20 page double-spaced academic writing sample, three letters of recommendation, official transcripts, and Graduate Record Examination scores. TOEFL scores are required of applicants for whom English is not their first language or who did not attend an undergraduate institution where English is the language of instruction. To apply online and for information on graduate admissions, see <http://gradadmissions.stanford.edu>.

## DEGREE REQUIREMENTS

University requirements for the master's degree are described in the "Graduate Degrees" section of this bulletin. A description of the M.A. program is also available from the Center or at <http://ica.stanford.edu/afr/ma>.

The program requires completion of a minimum of 45 graduate units. Upon entering, each student is assigned a faculty adviser who works with the student to develop a customized program of study.

To receive the M.A. degree in African Studies, students must complete:

1. *Core Courses* (15 units): students must complete the core African Studies M.A. course, AFRICAST 301, Dynamics of Change in Africa, in Autumn Quarter. Students elect two

additional graduate courses taught by African Studies academic council members and drawn from a list of approved courses. Students must also complete AFRICAST 302, Research Workshop, in Spring Quarter, in which they present and discuss their research and research interests.

2. *Cognate Courses* (10 units): a minimum of 10 units of graduate-level credit in two cognate courses from the following thematic clusters not chosen as the student's concentration field: culture and society; health, well-being, and the environment; and political economy and security.
3. *Concentration Field* (12-15 units): students choose one area of specialization (culture and society; health, well-being, and the environment; or political economy and security), and a group of three related elective courses for graduate credit from the cognate course listings or elsewhere in the Stanford curriculum in consultation with the student's adviser and with the approval of the CAS director. With approval, introductory courses may be substituted in fields such as advanced undergraduate biology for those interested in epidemic diseases or public health. The academic adviser, in agreement with faculty in the chosen field, guarantees that each set of courses forms part of a coherent program.
4. *Language Requirement*: students take one year of training in an African language, usually at least 3 units per quarter, resulting in intermediate-level proficiency as measured by the American Council on the Teaching of Foreign Languages (ACTFL) or comparable language acquisition standards. Students who have advanced proficiency in an African language must fulfill this requirement by taking another European language spoken in Africa, such as French or Portuguese, by taking another African language to the intermediate-level, or by taking a year-long sequence in Arabic. Students with competency in one or more African languages and one or more other languages widely spoken in Africa, may substitute a program of methodological training including, for example, a sequence of courses in statistics or GIS survey techniques.
5. *Seminar Requirement*: students enroll each quarter in AFRICAST 300, Contemporary Issues in African Studies, 1 unit, in which guest scholars present lectures on African themes and topics.
6. *Thesis Option*: students may elect to write a master's thesis; they may register for up to 10 units of thesis research under the guidance of an Academic Council member. Thesis units may be counted toward the electives within the concentration field unit requirements.
7. *Grade Requirements*: courses to be counted toward the degree, except for AFRICAST 300, must be taken for a letter grade and receive a grade of 'B' or higher.

In addition to AFRICAST courses, the following courses offered in other departments may be used to fulfill optional requirements. To meet requirements for the master's degree, students must take courses at the graduate level which are typically at least at the 200 level.

- AFRICAAM 101. African American Lecture Series: Race and Faith
- AFRICAAM 105. Introduction to African and African American Studies
- AFRICAAM 144. African Women Writers
- ANTHRO 139. Ethnography of Africa
- ECON 106. World Food Economy
- ECON 118. Development Economics
- ECON 214. Development Economics I
- EDUC 202. Introduction to Comparative and International Education
- EDUC 273. Gender and Higher Education: National and International Perspectives
- EDUC 306A. Education and Economic Development
- ENGLISH 171A. English in the World

- FRENLIT 133. Literature and Society in Africa and the Caribbean
- FRENLIT 248. Literature, History, and Representation
- HISTORY 106A. Global Human Geography: Asia and Africa
- HISTORY 145B. Africa in the 20th Century
- HISTORY 299X. Design and Methodology for International Field Research
- HISTORY 305. Graduate Workshop in Teaching
- HISTORY 345B. African Encounters with Colonialism
- HISTORY 346. The Dynamics of Change in Africa
- HISTORY 448A,B. African Societies and Colonial States
- HUMBIO 129. Critical Issues in International Women's Health
- HUMBIO 153. Parasites and Pestilence: Infectious Public Health Challenges
- HUMBIO 156. Global HIV/AIDS
- INTNLREL 161A. Global Human Geography: Asia and Africa
- MED 243. Biomedical and Social Science Responses to the HIV/AIDS Epidemic
- POLISCI 136R. Introduction to Global Justice
- POLISCI 141. The Global Politics of Human Rights
- POLISCI 215. Explaining Ethnic Violence

## OVERSEAS STUDIES COURSES IN AFRICAN STUDIES

For course descriptions and additional offerings, see the listings in the *Stanford Bulletin's* ExploreCourses web site (<http://explorecourses.stanford.edu>) or the Bing Overseas Studies web site (<http://bosp.stanford.edu>). Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

## WINTER QUARTER

### CAPETOWN

- OSPCPTWN 10. Education and Social Policy in South Africa. 4 units, Prudence Carter
- OSPCPTWN 11: Education and Schooling Post-Apartheid South Africa, 4 units, Prudence Carter
- OSPCPTWN 18. Xhosa Language and Culture. 2 units, Nolubabalo Tyam
- OSPCPTWN 24A. Targeted Research Project in Community Health and Development. 3 units, Timothy Stanton
- OSPCPTWN 32. Learning, Development and Social Change: Service-Learning in the Contemporary South African Context. 3-5 units. Janice McMillan, GER:DB:SocSci, EC:GlobalCom
- OSPCPTWN 33. From Apartheid to Democracy: Namibia and South Africa. 4 units, Chris Saunders
- OSPCPTWN 38. Genocide: The African Experience. 4 units, Mohammed Adhikari
- OSPCPTWN 44. Negotiating Home, Citizenship and the South African City. 4 units, Sophie Oldfield

## SPRING QUARTER

### CAPETOWN

- OSPCPTWN 18. Xhosa Language and Culture. 2 units, Nolubabalo Tyam
- OSPCPTWN 22. Preparation for Community-Based Research in Community Health and Development. 3 units, Timothy Stanton
- OSPCPTWN 24B. Targeted Research Project in Community Health and Development. 5 units, Timothy Stanton
- OSPCPTWN 31. Theory and Politics of Foreign Aid. 3 units, Stephan Klingebiel
- OSPCPTWN 32. Learning, Development and Social Change: Service-Learning in the Contemporary South African Context. 3-5 units. Janice McMillan, GER:DB:SocSci, EC:GlobalCom

- OSPCPTWN 36. The Archaeology of Southern African Hunter Gatherers. 5 units, John Parkinson
- OSPCPTWN 68. Cities in the 21st Century: Urbanization, Globalization and Security. 4 units, Mary Simon

## AMERICAN STUDIES

*Director:* Shelley Fisher Fishkin

*Program Coordinators:* Richard Gillam, Judith Richardson

*Committee in Charge:* Shelley Fisher Fishkin (English, Chair), Barton J. Bernstein (History,emeritus), Scott Bukatman (Art and Art History, on leave), James T. Campbell (History), Gordon H. Chang (History), Michele B. Elam (English), James Fishkin (Communication, and by courtesy, Political Science), Estelle Freedman (History), Richard Gillam (American Studies), Leah Gordon (Education), Allyson Hobbs (History), Nicholas Jenkins (English), Gavin Jones (English), Doug McAdam (Sociology), Hilton Obenzinger (English), David Palumbo-Liu (Comparative Literature), Jack Rakove (History, Political Science), Arnold Rampersad (English, emeritus), Vaughn Rasberry (English), Judith Richardson (English), Ramón Saldivar (English, Comparative Literature), Gary Segura (Political Science), Stephen Sohn (English, on leave), Fred Turner (Communication), Caroline Winterer (History), Bryan Wolf (Art and Art History), Gavin Wright (Economics)

*Program Offices:* Building 460

*Mail Code:* 94305-2022

*Phone:* (650) 723-3413

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*Web Site:* <http://amstudies.stanford.edu/>

Courses offered by American Studies Program are listed under the subject code AMSTUD on the *Stanford Bulletin's* ExploreCourses web site.

### MISSION OF THE UNDERGRADUATE PROGRAM IN AMERICAN STUDIES

The mission of the undergraduate program in American Studies is to provide students with a broad understanding of American culture and society. Building on a foundation of courses in history and institutions, literature and the arts, and race and ethnicity, students learn to analyze and interpret America's past and present, forging fresh and creative syntheses along the way. The program is an interdisciplinary major and, beyond the core requirements of the major, students may define and pursue their own interests from fields such as history, literature, art, communication, theatre, African American studies, feminist studies, economics, anthropology, religious studies, Chicana/o studies, law, sociology, education, Native American studies, music, and film. The program is designed to provide students majoring in American Studies with excellent preparation for further study in graduate or professional schools as well as careers in government, business, or other specialized fields.

### LEARNING OUTCOMES

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. higher order, interdisciplinary, historically informed understanding of how to think about American culture and society, drawing on course work in: history and institutions; literature, art, and culture; comparative race and ethnicity; and each student's individualized thematic focus.
2. ability to identify and critically to assess different disciplinary, methodological, and interpretive approaches to the study of Americans and their past.

3. ability to produce their own persuasive, nuanced, fact-based interpretations reflecting a close critical reading and analysis of relevant primary or secondary sources.
4. ability to express their interpretive and analytical arguments in clear, effective prose.
5. ability to listen actively and to contribute to productive intellectual discussion in class.

### BACHELOR OF ARTS IN AMERICAN STUDIES

The core requirements illustrate how different disciplines approach the study and interpretation of American life and include three courses in each of two main areas: history and institutions; and literature, culture, and the arts. One additional course in comparative race and ethnicity is also required. The required gateway seminar, AMSTUD 160, Perspectives on American Identity, explores the tensions between commonality and difference from a variety of disciplinary perspectives.

Beyond the core requirements of the major, American Studies expects students to define and pursue their own interests in interpreting important dimensions of American life. Accordingly, each student designs a thematic concentration of at least five courses drawn from fields such as history, literature, art, communication, theater, political science, African American studies, feminist studies, economics, anthropology, religious studies, Chicana/o studies, law, sociology, education, Native American studies, music, and film. At least one of the five courses in a student's thematic concentration should be a small group seminar or a colloquium. With program approval, students may conclude the major with a capstone honors research project during their senior year.

Whether defined broadly or narrowly, the thematic focus or concentration should examine its subject from the vantage of multiple disciplines. Examples of concentrations include: race and the law in America; gender in American culture and society; technology in American life and thought; health policy in America; art and culture in 19th-century America; education in America; nature and the environment in American culture; politics and the media; religion in American life; borders and boundaries in American culture; the artist in American society; and civil rights in America.

Completion of the major thus normally requires 13 courses (totaling at least 60 units), all of which must be taken for a letter grade. Not all courses are offered each year; students should consult ExploreCourses for scheduling information for the current academic year.

The course requirements for the American Studies major are:

1. *Gateway Seminar*—American Studies majors are required to take AMSTUD 160, Perspectives on American Identity (5 units), which is also the Writing in the Major (WIM) course for American Studies.
2. *History and Institutions*—Majors are required to complete three courses in American History and Institutions. Specific requirements are:

- AMSTUD 150A. (same as HISTORY 150A) Colonial and Revolutionary America
- AMSTUD 150B. (same as HISTORY 150B) 19th-Century America

The third course may be chosen from one of the following

- AMSTUD 1B. (same as COMM 1B) Media, Culture, and Society
- AMSTUD 2. (same as POLISCI 2) American National Government and Politics
- AMSTUD 25N. (same as SOC 25N) Understanding the Sixties
- AMSTUD 107. (same as HISTORY 107) Introduction to Feminist Studies
- AMSTUD 116. (same as ECON 116) American Economic History

- AMSTUD 137. (same as COMM 137) When the People Speak: Deliberative Democracy and Public Consultation
- AMSTUD 150C. (same as HISTORY 150C) The United States in the 20th Century
- AMSTUD 154. (same as HISTORY 154) American Intellectual and Cultural History
- AMSTUD 156H. Women and Medicine in US History: Women as Patients, Healers and Doctors
- AMSTUD 159. (same as HISTORY 159) Introduction to Asian American History
- AMSTUD 165. (same as EDUC 165) History of Higher Education in the U.S.
- AMSTUD 179. (same as POLISCI 122) Introduction to American Law
- AMSTUD 255D. (same as HISTORY 255D) Racial Identity in the American Imagination
- AMSTUD 268E. (same as HISTORY 268E) U.S. Foreign Policy since 1941
- HISTORY 157. The Constitution
- HISTORY 169. Environmental History of the American West
- HISTORY 251G. Approaches to American Legal History
- IHUM 75. Can the People Rule?

3. *Literature, Culture, and the Arts*—Majors are required to take a minimum of three courses in literature, culture, and the arts, broadly understood. Specific requirements are: at least one course focusing on the period before the Civil War, normally AMSTUD 150, American Literature and Culture to 1855 (same as ENGLISH 123), plus two additional courses, including at least one course outside of literature that emphasizes art, drama, film, music, translation studies, or culture from a different disciplinary or interpretive perspective.

Choices include, but are not limited to:

- AMSTUD 68N. (same as ENGLISH 68N) Mark Twain and American Culture
- AMSTUD 120. (same as COMM 120) Digital Media in Society
- AMSTUD 132. (same as ARTHIST 132) American Art and Culture
- AMSTUD 139B. (same as ENGLISH 139B) American Women Writers, 1850-1920
- AMSTUD 140. Stand Up Comedy and the "Great American Joke" Since 1945
- AMSTUD 142. (same as COMPLIT 142) Literature of the Americas
- AMSTUD 143. (same as ENGLISH 143) Introduction to African-American Literature
- AMSTUD 146. (same as COMPLIT 146) Asian American Culture and Community
- AMSTUD 146C. (same as ENGLISH 146C) Hemingway, Hurston, Faulkner, and Fitzgerald
- AMSTUD 152D. (same as ENGLISH 152D) DuBois and American Culture
- AMSTUD 163S. (same as DRAMA 163S) Postblack Drama in the Age of Obama
- AMSTUD 183C. (same as ENGLISH 183C) Feminism and American Literature
- AMSTUD 253. (same as ARTHIST 253) American Wonders
- IHUM 65. Race and Reunion: Slavery and the Civil War in American Memory
- JAPANGEN 221: Translating Japan, Translating the West

4. *Comparative Race and Ethnicity*—Majors are required to take one course that focuses on the comparative study of race and ethnicity rather than a single racial or ethnic group, generally from the offerings listed by Comparative Studies in Race and Ethnicity (CSRE). Courses that satisfy this requirement include:

- AMSTUD 51N. (same as COMPLIT 51N) Comparative Fictions of Ethnicity
- AMSTUD 114N. (same as AMSTUD 114N) Visions of the 1960s

- AMSTUD 121X. (same as EDUC 121X) Hip Hop, Youth Identities, and the Politics of Language
- AMSTUD 142. (same as COMPLIT 142) Literature of the Americas
- AMSTUD 159. (same as HISTORY 159) Introduction to Asian American History
- AMSTUD 183. (same as CSRE 183) Border Crossings and American Identities
- AMSTUD 214. The American 1960s: Thought, Protest and Culture
- CSRE 199A. Race/Sex/Gender in Cultural Representations
- ENGLISH 56N. Mixed Race in the New Millennium: Crossings of Kin, Faith & Culture
- SOC 149. The Urban Underclass
- SOC 164. Immigration and the Changing United States

5. *Concentration and Capstone Seminar*—Students must design a thematic concentration of at least five courses, with the help of faculty advisers. The courses, taken together, must give the student in-depth knowledge and understanding of a coherent topic in American cultures, history, and institutions. Thematic concentrations should be approved by the end of the registration period of the Autumn Quarter of the junior year, if at all possible. Sample thematic concentrations and courses that allow a student to explore them are available in the American Studies Office in Building 460.

At least one of the courses in the concentration must be designated as the capstone seminar and must require a substantial research paper on a topic related to the thematic concentration. This paper must be filed in the program office prior to degree conferral. The program office has a list of courses that satisfy the capstone requirement, but students are encouraged to propose others that may fit better with their concentrations. An honors project, or an independent study course with a faculty member culminating in a research paper, may also fulfill this requirement with the Director's approval.

Students may choose courses for their thematic concentrations from the following list:

- AMSTUD 101. American Fiction into Film: How Hollywood Scripts and Projects Black and White Relations
- AFRICAAM 75. Black Cinema
- AFRICAAM 105. Introduction to African and African American Studies
- ANTHRO 16. Native Americans in the 21st Century: Encounters, Identity, and Sovereignty in Contemporary America
- ANTHRO 82. Medical Anthropology
- ANTHRO 179. Cultures of Disease: Cancer
- ARTHIST 143A. American Architecture
- ARTHIST 293. Latino American Avant Garde
- ASNAMST 159. Introduction to Contemporary Asian American Poetry
- ASNAMST 161. Asian American Immigration and Health
- CHICANST 164. Immigration and the Changing United States
- CHICANST 167. Chicana and Chicano Representation in Cinema
- CHICANST 168. New Citizenship: Grassroots Movements for Social Justice in the U.S.
- CHICANST 200. Latina/o Literature
- COMM 1A. Media Technologies, People, and Society
- COMM 116. Journalism Law
- COMM 117. Digital Journalism
- COMM 125. Perspectives on American Journalism
- COMM 162. Campaigns, Voting, Media, and Elections
- COMM 177G. Covering the Silicon Valley
- CSRE 16N. African Americans and Social Movements
- CSRE 110. The Environment in Context: Race, Ethnicity, and Environmental Conceptions
- CSRE 112. Colonial Exchanges: Rethinking Race and Gender in Encounters between Europe and the New World

- CSRE 133. Women and Race in the American West, 1849-1950
- CSRE 144/ASNAMST 144. Transforming Self and Systems: Crossing Borders of Race, Ethnicity, Gender, Sexuality, and Class
- CSRE 161. Asian American Immigration and Health
- CSRE 166. New Citizenship: Grassroots Movements for Social Justice in the U.S.
- CSRE 173S. Transnational Multiethnic Lives
- CSRE 203. The Changing Face of America: Civil Rights and Education Strategies for the 21st Century
- DRAMA 155H. A Study of Thornton Wilder's Play *Our Town*
- DRAMA 180Q. Noam Chomsky: The Drama of Resistance
- ECON 153. Economics of the Internet
- ECON 155. Environmental Economics and Policy
- ECON 157. Imperfect Competition
- EDUC 102. Examining Social Structures, Power, and Educational Access
- EDUC 112X. Urban Education
- EDUC 220B. Introduction to the Politics of Education
- ENGLISH 143A. American Indian Mythology, Legend, and Lore
- ENGLISH 139A. Henry James
- ENGLISH 145G. American Fiction since 1945
- ENGLISH 151C. Wastelands
- FEMST 140A. Queer(y)ing the Margins: LGBTQ Issues in the Bay Area
- FEMST 140D. LGBT History in the U.S.
- HISTORY 103E. History of Nuclear Weapons
- HISTORY 130A. The Rise of Scientific Medicine in the United States, 1825-Present
- HISTORY 166B. Immigration Debates in America, Past and Present
- HISTORY 201. Introduction to Public History in the U.S., 19th Century to the Present
- HISTORY 254. Popular Culture and American Nature
- HISTORY 258G. Women and Race in the American West, 1849-1950
- HISTORY 260. California's Minority-Majority Cities
- HISTORY 262G. The Pivotal Decade in U.S. History: 1960s or 1970s?
- HISTORY 263G. History Through a Life: The Allure of American Biography
- HUMBIO 120. Health Care in America: An Introduction to U.S. Health Policy
- HUMBIO 120A. American Health Policy
- HUMBIO 122S. Social Class, Race, Ethnicity, and Health
- HUMBIO 123. Obesity in America: Clinical and Public Health Implications
- HUMBIO 125. Current Controversies in Women's Health
- HUMBIO 166. Food and Society
- HUMBIO 171. The Death Penalty: Human Biology, Law, and Policy
- HUMBIO 172B. Children, Youth, and the Law
- HUMBIO 175. Health Care Through History, Literature, and the Arts
- INTNLREL 140C. The U.S., U.N. Peacekeeping, and Humanitarian War
- INTNLREL 148. Economic Integration of the Americas
- LINGUIST 65. African American Vernacular English
- LINGUIST 156. Language and Gender
- MUSIC 8A. Rock, Sex, and Rebellion
- MUSIC 18A. Jazz History: Ragtime to Bebop, 1900-1940
- MUSIC 18B. Jazz History: Bebop to Present, 1940-Present
- MUSIC 147A. Music Ethnography of the Bay Area
- NATIVEAM 15. Honoring Ishi's Legacy: 100 Years of Resistance and Renewal
- NATIVEAM 16. Native Americans in the 21st Century: Encounters, Identity, and Sovereignty in Contemporary America
- NATIVEAM 120. Native American Writers, 1880-1920
- NATIVEAM 124. Gender in Native American Societies
- POLISCI 110C. America and the World Economy
- POLISCI 110D. War and Peace in American Foreign Policy
- POLISCI 118P. U.S. Relations in Iran
- POLISCI 120B. Campaigns, Voting, Media, and Elections
- POLISCI 120C. American Political Institutions: Congress, the Executive Branch, and the Courts
- POLISCI 123. Politics and Public Policy
- POLISCI 124R. The Federal System: Judicial Politics and Constitutional Law
- POLISCI 124S. Civil Liberties: Judicial Politics and Constitutional Law
- POLISCI 125V. Minority Representation and the Voting Rights Act
- POLISCI 213S. A Post American Century? American Foreign Policy in a Unipolar World
- POLISCI 214R. Challenges in American Foreign Policy
- POLISCI 226T. The Politics of Education
- PUBLPOL 101. Politics and Public Policy
- PUBLPOL 125. Law and Public Policy
- PUBLPOL 135. Regional Politics and Decision Making in Silicon Valley
- PUBLPOL 154. Politics and Policy in California
- PUBLPOL 156. Health Care Policy and Reform
- PUBLPOL 194. Technology Policy
- SOC 118. Social Movements and Collective Action
- SOC 135. Poverty, Inequality, and Social Policy in the United States
- SOC 138. American Indians in Comparative Historical Perspective
- SOC 142. Sociology of Gender
- SOC 145. Race and Ethnic Relations
- SOC 149. The Urban Underclass
- SOC 150. Race and Political Sociology
- SOC 155. The Changing American Family
- SOC 164. Immigration in the U.S.
- STS 101. Science, Technology, and Contemporary Society
- URBANST 160. Environmental Policy and the City in U.S. History
- URBANST 161. U.S. Urban History Since 1920
- URBANST 166. East Palo Alto: Reading Urban Change

## HONORS PROGRAM

To graduate with honors, American Studies majors must complete a senior thesis and have an overall grade point average of 3.5 in the major, or demonstrated academic competence. Students must apply to enter the honors program no later than the end of registration period in Autumn Quarter of their senior year, and must enroll in 10-15 units of AMSTUD 250, Senior Research, during the senior year. These units are in addition to the units required for the major. The application to enter the program must contain a one-page statement of the topic of the senior thesis, and must be signed by at least one faculty member who agrees to be the student's honors adviser. (Students may have two honors advisers.) The thesis must be submitted for evaluation and possible revision to the adviser no later than four weeks before graduation.

Students are encouraged to choose an honors topic and adviser during the junior year. To assist students in this task, American Studies offers a pre-honors seminar (AMSTUD 240A) in which students learn research skills, develop honors topics, and complete honors proposals. Students also may enroll in the American Studies Honors College during September before the senior year. American Studies also provides students the opportunity to work as paid research assistants for faculty members during the summer between their junior and senior year. More information about American Studies honors is available from the program office.



## MINOR IN AMERICAN STUDIES

To earn a minor in American Studies, students must complete at least 28 units of course work in the program. Because students may not count courses for both a major and a minor, the specific courses that are used for an American Studies minor depend on the courses that are used to satisfy the major requirement.

A student must take the following:

1. The gateway seminar, AMSTUD 160. Perspectives on American Identity
2. at least 2 courses from category 2 (History and Institutions)
3. at least 2 courses from category 3 (Literature, Culture and the Arts)
4. at least 1 course from category 4 (Comparative Race and Ethnicity)

Courses used to satisfy these requirements must be taken for a letter grade.

## ANTHROPOLOGY

*Emeriti: (Professors)* Clifford R. Barnett, Harumi Befu, George A. Collier, Jane F. Collier, Carol Delaney, Charles O. Frake, James L. Gibbs, Jr., Renato I. Rosaldo, George D. Spindler, Robert B. Textor

*Chair:* James Ferguson

*Professors:* Lisa Curran, William H. Durham, James Ferguson, Thomas Blom Hansen, Ian Hodder, Richard G. Klein, Tanya Luhmann, Lynn Meskell, Sylvia J. Yanagisako (on leave)

*Associate Professors:* Rebecca Bliege Bird, Paulla Ebron, James A. Fox, Miyako Inoue (on leave), S. Lochlann Jain, James Holland Jones, Matthew Kohrman, Liisa Malkki, John W. Rick, Barbara Voss

*Assistant Professors:* Angela Garcia, Ian G. Robertson, Michael V. Wilcox

*Senior Research Scientist/Lecturers:* Douglas W. Bird

*Courtesy Professors:* H. Samy Alim, Penelope Eckert, Raymond McDermott

*Visiting Professors:* Arek Marciniak

*Visiting Associate Professors:* Ewa Domanska

*Visiting Assistant Professors:* Sharika Thiranagama

*Lecturers:* Kathleen Coll, Carolyn Duffey, Claudia Engel, Matthew Jobin, Cari Kapur, Alexandra Koelle, Alma Kunanbaeva, Stephanie Melillo, Merritt Ruhlen, Dan Salkeld

*Affiliated Faculty:* Carol Boggs, J. Gordon Brotherston, Susan Cashion, Jean-Pierre Dupuy, Marcus W. Feldman, Henry Greely, Li Liu, Ellen Porzig, Robert Sapolsky, Jeffrey T. Schnapp, Bernardo Subercaseaux, Richard White

*Postdoctoral Fellows:* Ayca Alemdaroglu, Melissa Baird, Julia Cassaniti, Brian Codding, Carter Hunt, Jocelyn Marrow, Lindsay Weiss, Brian Wood

*Teaching Affiliates:* Elif Babul, Seahan Bestel, Curtis Murungi, Angel Roque, Robert Samet, Austin Zeiderman

*Department Offices:* Building 50, Main Quadrangle, 450 Serra Mall

*Mail Code:* 94305-2034

*Phone:* (650) 723-3421

*Email:* anthropology@stanford.edu

*Web Site:* <http://anthropology.stanford.edu>

Courses offered by the Department of Anthropology are listed under the subject code ANTHRO on the *Stanford Bulletin's* ExploreCourses web site.

## MISSION OF THE DEPARTMENT OF ANTHROPOLOGY

The courses offered by the Department of Anthropology are designed to: provide undergraduates with instruction in anthropology; provide undergraduate majors in Anthropology with a program of work leading to the bachelor's degree; and prepare

graduate candidates for advanced degrees in Anthropology. Anthropology is devoted to the study of human beings and human societies as they exist across time and space. It is distinct from other social sciences in that it gives central attention to the full time span of human history, and to the full range of human societies and cultures, including those located in historically marginalized parts of the world. It is therefore especially attuned to questions of social, cultural, and biological diversity, to issues of power, identity, and inequality, and to understanding the dynamic processes of social, historical, ecological, and biological change over time. Education in Anthropology provides excellent preparation for living in a multicultural and globally-interconnected world, and helps to equip students for careers in fields including law, medicine, business, public service, research, ecological sustainability, and resource management. Students may pursue degrees in Anthropology at the bachelor's, master's, and doctoral levels.

The Department of Anthropology offers a wide range of approaches to the topics and area studies within the field, including archaeology, ecology, environmental anthropology, evolution, linguistics, medical anthropology, political economy, science and technology studies, and sociocultural anthropology. Methodologies for the study of micro- and macro-social processes are taught through the use of qualitative and quantitative approaches. The department provides students with excellent training in theory and methods to enable them to pursue graduate study in any of the above mentioned subfields of Anthropology.

## LEARNING OUTCOMES

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. an understanding of core knowledge within the Anthropology discipline.
2. the ability to communicate ideas clearly and persuasively in writing.
3. the ability to analyze a problem and draw correct inferences using qualitative and/or quantitative analysis.
4. the ability to evaluate theory and critique research within the Anthropology discipline.

## UNDERGRADUATE PROGRAMS IN ANTHROPOLOGY

In addition to gaining an excellent foundation for graduate research and study, students majoring in Anthropology can pursue careers in government, international business, international development agencies, international education, law, mass media, nonprofit organizations, and public policy.

## GRADUATE PROGRAMS IN ANTHROPOLOGY

Graduate training in Anthropology at Stanford is designed for students who seek the Doctoral (Ph.D.) degree, and for students who seek the Masters of Arts (M.A.) degree only. Entering graduate students need not have majored in Anthropology as undergraduates, although most have backgrounds in behavioral, biological, social, or physical sciences.

## BACHELOR OF ARTS IN ANTHROPOLOGY

Undergraduate training in the department of Anthropology is designed for students who seek the bachelor of arts (B.A.) degree only. Students may declare a major in Anthropology and earn the B.A. degree by following the requirements below. The department also offers a minor in Anthropology. The B.A. degree program usually requires at least five quarters of enrollment. Students interested in majoring in Anthropology are encouraged to declare

by the beginning of their junior year and to work closely with an adviser to develop a coherent program of study. For more complete information about the major see the department web site at <http://anthropology.stanford.edu>.

To declare a major in Anthropology, apply in AxBESS for the B.A. in Anthropology; contact the department's Student Peer Adviser(s) or the Undergraduate Student Services Specialist to prepare the major checklist and planning form submit the required forms to the Undergraduate Student Services Specialist; request a faculty adviser assignment and meet with the assigned faculty adviser for approval of the major checklist and planning form. These forms are available at <http://anthropology.stanford.edu>. Students must apply in AxBESS for the B.A. Major in Anthropology by the time junior status is achieved (85 units).

## DEGREE REQUIREMENTS

The B.A. degree in Anthropology may be earned by fulfilling the following requirements:

1. A faculty adviser appointed in the Department of Anthropology. Undergraduate Anthropology (ANTHRO) majors should plan to meet with their faculty adviser at least once each quarter.
2. A program of 65 units, passed with an overall minimum grade of 'C':
  - a. of the 65 units, 50 units must be in courses with the ANTHRO subject code. 15 may be approved from related areas of study, overseas studies, and/or transfer units and may be unrelated to the chosen emphasis.  
*Note:* Any related, overseas studies, or transfer units must be approved by the faculty adviser and by petition to the Undergraduate Committee.
  - b. of the 65 units, at least 20 units with a minimum grade of 'C' must be in courses with the ANTHRO subject code numbered 100 or above and taught by Anthropology faculty.
  - c. no more than 10 units of directed reading-style course work may be counted towards the 50 units required for the major in the ANTHRO subject code.
  - d. no more than 10 units may be taken for a satisfactory/no credit grade: 5 units in ANTHRO courses, and 5 in related or transfer units.
3. A minimum grade of 'B' in an ANTHRO Writing in the Major (WIM) course from the chosen emphasis. This should be taken within a year of declaring the major or before the end of the junior year.
4. A minimum grade of 'B' in an ANTHRO Theory course from the chosen emphasis. This should be taken within a year of declaring the major or before the end of the junior year.
5. A minimum grade of 'B' in ANTHRO 91 Method and Evidence in Anthropology or in an approved methods course from the chosen emphasis. This should be taken within a year of declaring the major or before the end of the junior year.
6. An approved course of study which includes an emphasis chosen from the list below. Students must complete a minimum of 20 units in their chosen emphasis of which 10 units must be numbered 100 or above.
  - a. Archaeology and Heritage
  - b. Culture and Society
  - c. Ecology, Environment, and Evolution
  - d. Medical Anthropology
7. Competence in a foreign language beyond the first-year level. Such competence is usually demonstrated by completing a 5 unit course at the second-year level with a minimum grade of 'B-'. The requirement may be met by special examination administered through the Language Center, or demonstration of superior placement scores.

*Note:* Students whose programs require non-English language study as part of a geographical or linguistics focus may ask their faculty adviser to approve up to 5 units from language courses toward the degree if such courses are at the

second-year level and above, or are in a second non-English language.

8. At least five quarters of enrollment in the major. Each candidate for the B.A. in Anthropology should declare a major by the first quarter of the third year of study.

Advising is an important component of the Anthropology major. Students are encouraged to work closely with their major adviser throughout their pursuit of the degree. Advising milestones for the major include the following:

1. In the quarter in which the major is declared, students meet with their assigned faculty adviser, create a rigorous course of study based on topical breadth, and obtain adviser approval of an Anthropology emphasis as part of the course of study and obtain the major adviser's signature on the Major Checklist.
2. Undergraduate Anthropology majors should plan to meet with their major faculty adviser at least once each quarter before the Final Study List deadline. Any revisions to the initial checklist must be approved by the faculty adviser.
3. Undergraduate Anthropology majors must submit an updated major checklist and planning form to the Undergraduate Student Services Specialist in the quarter before graduating.

## REQUIRED COURSES—

1. *Writing in the Major courses—*
  - a. Undergraduate majors can fulfill the Writing in the Major course requirement for the B.A. in Anthropology by taking the ANTHRO Theory course designated from a chosen emphasis.
2. *Theory courses—*  
Enroll in one of the following according to the student's chosen emphasis:
  - a. Archaeology and Heritage: ANTHRO 90A. History of Archaeological Thought
  - b. Culture and Society/Medical Anthropology: ANTHRO 90B. Theory in Cultural and Social Anthropology
  - c. Ecology, Environment, and Evolution: ANTHRO 90C. Theory of Ecological and Environmental Anthropology
3. *Methods courses—*  
The following course fulfills the ANTHRO undergraduate major methods course requirement.  
ANTHRO 91. Method and Evidence in Anthropology  
Students choosing the Archaeology and Heritage emphasis may substitute ANTHRO 91A. Archaeological Methods, if given. And students choosing the Ecology, Environment and Evolution emphasis may substitute ANTHRO 91C. Methods and Analysis in Ecological Anthropology, if given.
4. *Department courses—*  
Choose from the following according to the student's chosen emphasis. Students should complete a minimum of 20 units in their chosen emphasis of which 10 units must be numbered 100 or above. Department courses may fulfill the requirements for more than one emphasis; see the undergraduate student services specialist for details.
  - a. For the Archaeology and Heritage emphasis, courses are numbered ANTHRO 100 through ANTHRO 113.
  - b. For the Culture and Society emphasis, courses are numbered ANTHRO 120 through ANTHRO 150.
  - c. For the Ecology, Environment, and Evolution emphasis, courses are numbered ANTHRO 160 through ANTHRO 178.
  - d. For the Medical Anthropology emphasis, courses are numbered ANTHRO 179 through ANTHRO 185.
5. *Research courses—*  
Courses listed are recommended for students writing a research paper in the major:
  - ANTHRO 92. Undergraduate Research Proposal Writing Workshop
  - ANTHRO 93. Prefield Research Seminar
  - ANTHRO 94. Postfield Research Seminar
  - ANTHRO 95A. Research in Anthropology
6. *Senior courses—*ANTHRO 95B. Senior Paper

## SENIOR PAPER

The senior paper program in Anthropology provides majors the opportunity to conduct original research under the guidance of an Anthropology faculty member. All Anthropology majors are encouraged to write a senior paper. Interested Anthropology majors of junior standing may apply to the senior paper program by submitting a senior paper application form, including a research topic/title of the proposed senior paper project, a two page abstract/proposal, and a letter of reference from their faculty adviser to the undergraduate student service specialist on or by February 15th in the junior year. Enrollment in ANTHRO 95A, Research in Anthropology, is recommended during Autumn and Winter quarters of the senior year. Students must enroll in ANTHRO 95B, Senior Paper, in the final quarter of the undergraduate degree program before graduating. The senior paper is submitted in the final quarter before graduation. For more information, see the Undergraduate Student Services Specialist.

## HONORS PROGRAM

The honors program in Anthropology provides eligible Anthropology majors with an opportunity to conduct original ethnographic, field, laboratory, or library-based research under the guidance of an Anthropology faculty member. All Anthropology majors are urged to consider applying to the departmental honors program in Anthropology. Interested Anthropology majors of junior standing may apply for admission to the honors program by submitting an honors application form, including a research topic/title of the proposed honors project, a two page abstract/proposal, a transcript, and a letter of reference from their faculty or honors adviser to the undergraduate student services specialist on or by February 15th in the junior year. Department majors are eligible to apply for honors candidacy with a 3.4 GPA in the department major, a 3.0 GPA in overall course work, and with no more than one incomplete listed on the transcript at the time of application. Students interested in the honors program are encouraged to apply for summer research funding through the Department of Anthropology, Undergraduate Advising and Research, and area studies centers. This process requires planning as the Spring Quarter research deadline falls before the honors application due date. In most case, honors students apply for such funding early in the junior year.

1. *Required Courses*—
  - a. The theory and methods course appropriate to the student's chosen emphasis of study.
  - b. ANTHRO 95B. Senior Paper, is required in the final quarter of the student's B.A. degree program. Senior papers with a minimum letter grade of 'A-' may be awarded departmental honors. Honors students may enroll for a minimum of 5 units and up to a maximum of 10 units.
2. *Optional Courses*—
  - a. ANTHRO 92. Undergraduate Research Proposal Writing Workshop, is recommended during Autumn and Winter quarters of the junior year.
  - b. ANTHRO 93. Prefield Research Seminar
  - c. ANTHRO 94. Postfield Seminar, is given in Autumn Quarter only. Student researchers may choose to enroll in ANTHRO 94 or to attend Summer Honors College in the summer following their junior year.
  - d. ANTHRO 95A. Research in Anthropology, is recommended during Autumn and Winter quarters of the senior year.

## FIELD SCHOOL AND RESEARCH OPPORTUNITIES IN ANTHROPOLOGY

Students majoring in Anthropology are encouraged to develop field research projects under the supervision of a department faculty member. The department offers research grants to support individually-designed and other summer field research in Anthropology. The department research grants may be used to support field research as a supplement to other field research

grants such as the UAR research grants. The department also offers opportunities to participate in faculty-led research projects.

See the department's web site for information about the department's summer research opportunities, including the following: Beagle II Award, Tambopata, and Franz Boas summer scholars programs, the Georgia Sea Islands Cultural Heritage Preservation Project, and Michelle Z. Rosaldo Summer Field Research Grant program. The VPUE-funded departmental grants program supports students' participation in faculty-led research projects such as the Georgia Sea Islands Cultural Preservation Project. Other field school opportunities include the following: Catalhoyuk, El Presidio de San Francisco, Pueblo of Abo, and South Africa Heritage.

*Note:* Required courses for the Franz Boas summer scholars program and the Michelle Z. Rosaldo grant program include:

- ANTHRO 93. Prefield Research Seminar
  - *or* ANTHRO 93B. Prefield Research Seminar for Non-majors
- *and* ANTHRO 94. Postfield Research Seminar.

For more information about research opportunities and deadlines, see the department's web site.

## MINOR IN ANTHROPOLOGY

To declare a minor in Anthropology, apply in Axxess for the B.A. Minor in Anthropology; contact the department's student peer adviser(s) or the undergraduate student services specialist to prepare the minor checklist and the minor planning form; submit the required forms to the undergraduate student services specialist; request a faculty adviser assignment; and meet with the assigned faculty adviser for approval of the minor checklist and planning form. These forms are available at <http://anthropology.stanford.edu>. Students must apply in Axxess for the B.A. Minor in Anthropology by the last day of the quarter at least two quarters before degree conferral.

Requirements for the minor in Anthropology include the following—

1. A faculty adviser appointed in the Department of Anthropology.
2. A program of 30 units, with a minimum grade of 'C':
  - a. Of the 30 units, 10 units may be approved from related areas of study, overseas studies, and transfer units.
 

*Note:* Any related, overseas studies, or transfer units must be approved by the faculty adviser and by petition to the Undergraduate Committee.
  - b. Of the 30 units, a minimum of 15 units must be ANTHRO courses numbered 100 or above.
  - c. No more than 5 units of directed reading-style course work may be counted towards the minor and may only be included among the 10 related units permitted for the minor.
  - d. No more than 5 units may be taken for a satisfactory/no credit grade.
3. A self-designed course of study chosen from an Anthropology emphasis listed below and approved by the faculty adviser:
  - a. Archaeology and Heritage
  - b. Culture and Society
  - c. Ecology, Environment and Evolution
  - d. Medical Anthropology
4. A minimum grade of 'C' in two ANTHRO courses listed at the 100 level or higher and taught by Anthropology faculty.
5. At least two quarters of enrollment in the minor. Each candidate for the B.A. Minor in Anthropology should declare by the last day of the quarter at least two quarters before the quarter of degree conferral.

Advising milestones for the minor include the following—

1. In the quarter in which the minor is declared, the student must meet with his or her assigned adviser, create a rigorous course of study based on topical breadth, and obtain adviser approval for the checklist.

2. Any revisions to the initial checklist must be approved by the faculty adviser.
3. Undergraduate Anthropology minors must submit an updated minor checklist and planning form to the undergraduate student services specialist in the quarter before graduating.

## COTERMINAL BACHELOR'S AND MASTER'S DEGREES IN ANTHROPOLOGY

University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees" section of this bulletin. For University coterminal degree program rules and University application forms, see <http://studentaffairs.stanford.edu/registrar/publications#Coterm>.

The University minimum requirements for the coterminal bachelor's/master's program are 180 units for the bachelor's degree plus 45 (or higher departmental requirement, as determined by each graduate department) unduplicated units for the master's degree. The requirements for the coterminal program with dual undergraduate degrees are 225 units for the two bachelor's degrees, and 45 units for the master's degree. For the 45-unit University minimum for the master's degree, all courses must be at or above the 100 level and 50 percent must be courses designated primarily for graduate students (typically at least at the 200 level). Department requirements may be higher. Units for a given course may not be counted to meet the requirements of more than one degree, that is, no units may be double-counted. No courses taken more than two quarters prior to admission to the coterminal master's program may be used to meet the 45-unit University minimum requirement for the master's degree.

Graduate enrollment at Stanford University for three consecutive quarters of full tuition for at least 45 units is required of all candidates for the coterminal master's degree. M.A. students in Anthropology must take a minimum of 45 units of Anthropology course work beyond the undergraduate degree with an overall minimum grade point average of 3.0. 45 units constitute the University minimum for the M.A. degree, and courses must be at or above the 100 level.

The M.A. program usually requires more than one year of study. However, full-time students entering the program with appropriate background should complete the M.A. degree program within three consecutive calendar quarters after the student's first quarter of master's-level enrollment. The University allows no transfer units into the master's program. To provide a meaningful master's program within one year, advance planning of course work with an adviser is required. Requirements for the coterminal master's program must be completed within three years.

### ADMISSION TO THE COTERMINAL MASTER'S DEGREE PROGRAM

The deadline for graduate applications to the coterminal M.A. degree program in Anthropology is December 13, 2011. Stanford University undergraduate majors are eligible to apply for the coterminal masters degree program if they have a 3.5 GPA in their department major, a 3.0 GPA in overall course work, and have no more than one incomplete listed on the transcript at the time of application. Successful applicants to the M.A. program may enter only in the following Autumn Quarter. Coterminal master's degree applicants are not required to submit their Graduate Record Examination scores. Prospective applicants should see <http://anthropology.stanford.edu> for further information about the application process and the department's requirements for the coterminal master's program.

For University coterminal degree program rules and University application forms, see <http://studentaffairs.stanford.edu/registrar/publications#Coterm>.

*Degree Options*—Students may pursue one of three possible department tracks in the Anthropology M.A. degree program. The tracks are:

- Archaeology

- Culture and Society
  - Ecology and Environment
- The tracks are not declarable in Axess.

## MASTER OF ARTS IN ANTHROPOLOGY

University requirements for the terminal M.A. are described in the "Graduate Degrees" section of this bulletin.

The Department of Anthropology offers the terminal master's degree to the following:

1. Graduate applicants who apply from outside the University for admission to the terminal M.A. program in Anthropology.
2. Stanford graduate students, taking advanced degrees in other departments or schools at Stanford, who are admitted to the terminal M.A. program in Anthropology.
3. Anthropology Ph.D. students at Stanford University who fulfill the M.A. degree requirements on the way to the Ph.D. degree.

Graduate applicants who apply from outside the University and whose ultimate goal is the Ph.D. degree should apply directly to the Ph.D. degree program. Applicants who are offered admission to the terminal M.A. degree program may not transfer to the Ph.D. degree program; they must reapply on the same basis as other Ph.D. applicants in a competition with the Ph.D. applicants.

Graduate students taking an advanced degree in other departments or schools at Stanford and who apply for admission to the M.A. in Anthropology are governed by separate requirements as described in the Department's Guide to the Ph.D. Degree Program.

Anthropology Ph.D. students who decide to take the M.A. in Anthropology on the way to the Ph.D. are also governed by separate requirements described in the Ph.D. Degree Program.

Graduate enrollment at Stanford University for three consecutive quarters of full tuition for at least 45 units is required of all candidates for the terminal master's degree. M.A. students in Anthropology must take a minimum of 45 units of Anthropology course work beyond the undergraduate degree with an overall grade point average of 3.0 or higher. 45 units constitute the University minimum for the M.A. degree, and courses must be at or above the 100 level.

Anthropology Ph.D. students who decide to take the M.A. in Anthropology on the way to the Ph.D. are also governed by separate requirements described in the Department's Guide to the Ph.D. Degree Program.

The M.A. program may require more than one year of study. However, full-time students entering the program with appropriate background should complete the M.A. degree program within three consecutive calendar quarters after the student's first quarter of master's-level enrollment. The University allows no transfer units into the master's program. To provide a meaningful master's program within one year, advance planning of course work with an adviser is required. Requirements for the terminal master's program must be completed within three years.

For further information about the department's master's degree program requirements, see <http://anthropology.stanford.edu>.

### ADMISSION TO THE MASTER'S DEGREE PROGRAM

The deadline for graduate applications to the M.A. degree program in Anthropology is December 13, 2011. Successful applicants to the M.A. program may enter only in the following Autumn Quarter. Master's degree applicants must file a report of their Graduate Record Examination score electronically. Prospective applicants should see <http://anthropology.stanford.edu> for further information about the application process and the department's requirements to the terminal master's program.

No financial support is available to students enrolled for the M.A. degree.

*Degree Options*—Students may pursue one of three possible department tracks in the Anthropology M.A. degree program. The tracks are:

- Archaeology

- Culture and Society
  - Ecology and Environment
- The tracks are not declarable in Axess.

## DEGREE REQUIREMENTS

Requirements for the coterminal and terminal master's degree program include the following:

1. A faculty adviser appointed in the Department of Anthropology.
2. A program of 45 units, taken at the 100 level or higher with a minimum grade of 'B'. *Note:* At least 23 of the 45 units must be taken at the 200/300 level.
  - a. of the 45 units, no more than 15 units may be approved from related areas of study or overseas studies.
  - b. of the 45 units, no more than 10 units of directed reading-style course work may be counted towards the degree.
  - c. of the 45 units, no more than 5 units may be taken for a satisfactory/no credit grade.
3. A minimum grade of 'B' in an ANTHRO theory course from the chosen track.
4. A minimum grade of 'B' in an ANTHRO methods course from the chosen track.
5. A minimum grade of 'B' in four ANTHRO review courses from the chosen track that are listed at the 200 level or higher and taught by Anthropology faculty, and taken as a five unit course.
6. A self-designed course of study chosen from the Anthropology tracks listed below:
  - a. Archaeology
  - b. Culture and Society
  - c. Ecology and Environment
7. Submission of a Graduate Research Paper Proposal approved by the faculty adviser by the end of the first quarter of the master's degree program.
8. Submission of a Master's Degree Program Proposal form approved by the faculty adviser by the end of the first quarter of the master's degree program.
9. Presentation of the master's research project at the department's master's (honors) presentation event in Spring Quarter - optional.
10. Submission of the master's paper reviewed by two faculty members (Advisor and Reader). For the Culture and Society track the thesis can be a field research or library-based research paper. For the Archaeology and the Ecology and Environment tracks, the thesis can also be a laboratory research paper.

### *Required Courses—*

1. *Archaeology Track*—Four departmental review courses which must include ANTHRO 303, Introduction to Archaeology Theory, and one additional theory course. Students must also take ANTHRO 307, Archaeology Methods and Research Design (or comparable, approved 200 level course).
2. *Culture and Society Track*—Four departmental review courses which must include ANTHRO 301, History of Anthropological Theory, Culture and Society and ANTHRO 300, Reading Theory through Ethnography. Students must also take ANTHRO 306, Anthropological Research Methods.
3. *Ecology and Environment Track*—Four departmental review courses which must include ANTHRO 302, History of Anthropological Theory Ecology and Environment (or comparable, approved 200 level course), plus ANTHRO 305, Research Methods in Ecological Anthropology (or comparable, approved 200 level course).

*Recommended Courses*—For all tracks, attendance at the departmental colloquium each quarter is recommended for all master's students. Students can enroll in ANTHRO 444, Anthropology Colloquium. For the Ecology and Environment track, students may also take ANTHRO 312G, Problems in Ecology, Evolution and Environment, for one quarter, in place of attendance at one quarter of the departmental colloquium.

## DOCTOR OF PHILOSOPHY IN ANTHROPOLOGY

University requirements for the Ph.D. are described in the "Graduate Degrees" section of this bulletin.

### ADMISSION

The deadline for graduate application to the Ph.D. degree program is December 13, 2011. Prospective applicants should see <http://anthropology.stanford.edu> for information about application for graduate admission. Successful applicants for the Ph.D. program may enter only in Autumn Quarter. It is department policy not to defer graduate admission. Applicants must file a report of their Graduate Record Examination score electronically, submit a writing sample in English that demonstrates the ability to produce original analytical work at the graduate level, and provide a statement of purpose. In addition to a clear statement of research interests in the statement of purpose, it is especially important for applicants to provide a detailed description of the area of specialization as well as the topical interests for dissertation research. Applicants should also submit three letters of reference and recent, original transcripts.

### FINANCIAL SUPPORT

The department endeavors to provide needed financial support (through fellowships, teaching and research assistantships, and tuition grants) to all students admitted to the Ph.D. program who maintain satisfactory degree progress. Applicants for the Ph.D. program must file a request for financial aid [http://www.stanford.edu/dept/finaid/grad/apply/grad\\_loans/form.htm](http://www.stanford.edu/dept/finaid/grad/apply/grad_loans/form.htm) if they wish to be considered for funding support.

First-year students who have not obtained a higher degree previous to entering the Ph.D. degree program and who have not obtained extramural funding previous to entering the Ph.D. degree program are required to submit one extramural funding application by the first day of finals week in the Autumn Quarter of the first year.

Second-year students are required to perform one or more teaching assistantship quarters. Second-year students who have not secured funding for the second year summer for pre-dissertation field research are required to make at least two pre-dissertation field research or area/language studies funding applications for summer funding support in the second year.

In order to be eligible for department funding for summer field research (dependant on the availability of funding), first-year students must submit the department's Graduate Research Proposal application establishing eligibility for summer funding; second year students must submit the Graduate Report of Degree Progress and make at least two applications for pre-dissertation field research; third-year students must pass the qualifying examinations and receive department approval from the Dissertation Reading Committee for the dissertation proposal.

Third-year students who have not secured fourth-year field research funding are required to make at least three extramural funding applications to support dissertation research by the end of Autumn Quarter of the third year. If receiving department funding, fourth-year students must submit a department application for funding as a predoctoral research affiliate before leaving for field work and must make quarterly reports on their degree progress to their dissertation reading committee. In addition, fourth year students must make a quarterly Report of Degree Progress in order to maintain their eligibility for funding.

Fifth-year students are required to perform one or more quarters of teaching assistantship. Fifth-year students who have not secured extramural funding for the sixth year are required to make at least two dissertation write-up funding applications to secure extramural or intramural funding for dissertation write-up in order to be eligible for consideration of a department teaching affiliateship in the sixth year.

## PROGRAM

The Ph.D. program allows the student to develop a flexible program reflecting special research interests, under the supervision of a faculty committee chosen by the student. Students are encouraged to plan for completion of all work for the Ph.D. in five years. Note: The University required oral examination may be scheduled in the fifth year or beyond depending upon a student's dissertation completion progress. Ph.D. students in Anthropology must complete a minimum of 135 quarter units with a minimum grade point average (GPA) of 3.0 (B). The maximum allowable number of transfer units is 45.

*Degree Options*—Students may pursue three different tracks in the Anthropology Ph.D. degree program. The tracks are not declarable in Axxess; they do not appear on the transcript or the diploma. The three tracks are:

- Archaeology
- Culture and Society
- Ecology and Environment.

## DEGREE REQUIREMENTS

For students who matriculate beginning 2011-12, the requirements for the doctoral degree program include the following:

1. For the first year in the degree program, students must submit a Plan of Study detailing the courses by quarter to be taken in the first year of the degree program. The Plan of Study should be signed by the faculty adviser prior to the Autumn Quarter course enrollment deadline. The Plan of Study should also confirm the department track: Archaeology, Culture and Society, or Ecology and Environment.
2. Within the first two years, pass with a minimum grade of 'B+', six graduate level ANTHRO subject code Department Review Courses appropriate to the student's chosen track.
3. In the first year of the program:
  - a. pass with a minimum grade of 'B+' the theory course(s) appropriate for the chosen track:
    1. *Archaeology track*—ANTHRO 303, Introduction to Archaeological Theory
    2. *Culture and Society track*—ANTHRO 300, Reading Theory Through Ethnography, and ANTHRO 301, History of Anthropological Theory, Culture and Society
    3. *Ecology and Environment track*—ANTHRO 302, History of Anthropological Theory, Ecology and Environment, or comparable, approved course at the ANTHRO 200 level.
  - b. pass with a minimum grade of 'B+' at least one track-designated methods course:
    1. *Archaeology track*—ANTHRO 307, Archaeological Methods and Research Design
    2. *Culture and Society track*—ANTHRO 306, Anthropological Research Methods
    3. *Ecology and Environment track*—within the first year, pass at least one of two required methods courses:
      - a. ANTHRO 304, Data Analysis for Quantitative Research
      - b. ANTHRO 305, Research Methods in Ecological Anthropology
      - c. or comparable, approved courses at the ANTHRO 200 level.
  - c. complete at least 55 units overall (including 45 units of course work) by the end of Summer Quarter in the first year.
  - d. satisfy the department ethics requirement for review of ethics in Anthropology by enrolling in a research methods course or by attending a specific meeting of ANTHRO 306, Anthropological Research Methods for the purpose of ethics review.
  - e. enroll in ANTHRO 310G, Introduction to Graduate Studies in Anthropology, during Autumn Quarter.

- f. *Culture and Society track students only* enroll in ANTHRO 311G, Introduction to Culture and Society Graduate Studies in Anthropology, during Winter and Spring quarters for 1-2 units (no more than 5 units total over two quarters).
  - g. enroll in ANTHRO 444, Anthropology Colloquium, and attend the departmental colloquia series each quarter.
  - h. submit a Graduate Report of Degree Progress and Research Proposal to the adviser and the graduate committee on or by May 15 in Spring Quarter of the first year. Receive approval for the proposal from the adviser and the graduate committee by the beginning of finals week in Spring quarter of the first year.
  - i. submit at least one extramural funding application within the first year.
  - j. complete the appropriate CITI tutorial for non-medical human subjects, and, either submit a non-medical human subjects protocol, based on the pre-dissertation research proposal, to the Institutional Review Board before departing for summer field research in the first year, or confirm approval for Exemption status. Alternately, a Notice of Determination may be confirmed with the Institutional Review Board for a pilot study proposal that does not require protocol submission.
  - k. complete the appropriate CITI tutorial for Responsible Conduct of Research on or by May 15 in Spring Quarter.
4. In the second year:
    - a. as required by the chosen track, pass with a minimum grade of 'B+' ANTHRO 308, Proposal Writing Seminar (offered Spring Quarter). For all tracks, submit the dissertation proposal to the adviser and the graduate committee by the beginning of finals week in Spring quarter. Receive approval for the draft proposal for the purpose of the second year summer pre-dissertation research from the adviser and the graduate committee on or by the first day of Summer Quarter.
    - b. complete at least 40 units of course work in the second year for a total of at least 85 units of course work (95 units overall) by the end of the second year.
    - c. pass with a minimum grade of 'B+' remaining ANTHRO subject code review courses to complete the six course requirement.
    - d. *Ecology and Environment students track only*—pass the second of two required methods courses, if both were not completed in the first year:
      1. ANTHRO 304, Data Analysis for Quantitative Research
      2. ANTHRO 305, Research Methods in Ecological Anthropology
      3. or comparable, approved courses at the ANTHRO 200 level.
    - e. at the beginning of Autumn Quarter attend the teaching assistantship training workshop.
    - f. serve as a teaching assistant for at least one quarter in the second year.
    - g. submit a second-year Graduate Report of Degree Progress on or by May 15 in Spring Quarter of the second year. Receive approval from the adviser and the graduate committee by the beginning of finals week in Spring Quarter.
    - h. by the beginning of finals week in winter quarter, confirm the qualifying examination committee advisor for each examination committee to the department Graduate Committee.
    - i. by the beginning of finals week in winter quarter (for those whose native language is English), either pass a foreign research or field language exam or petition the department's language committee for exemption from a foreign research or field language examination (based on a description of previous field or research language training).

- For those whose native language is not English, demonstrate satisfactory command of English, as evidenced by completion of the first two years of graduate study and a petition to the language committee.
- j. upon completion of the above requirements and the recommendation of the Anthropology faculty, petition the University for candidacy by the beginning of finals week in Spring Quarter.
  - k. Upon completion of the above requirements, and upon recommendation of the Anthropology faculty, request the Master's degree on the way to the Ph.D. degree program by the end of Spring Quarter of the second year, if desired.
5. In the third year, complete the following:
    - a. by the end of the third week of Autumn Quarter, confirm the reader for each of the qualifying examination committees.
    - b. by the beginning of finals week in Autumn Quarter, confirm the schedule dates and times for the qualifying examinations to the graduate committee.
    - c. by the beginning of finals week in Autumn Quarter, submit three dissertation research grant proposals, the grant application, and the approved non-medical human subjects protocol, to the faculty adviser.
    - d. by the beginning of finals week in the Autumn Quarter, confirm the dissertation reading committee by submitting the university dissertation reading committee form to the Graduate Committee.
    - e. by the end of the third week in Winter Quarter, submit the preliminary qualifying examination bibliographies to the respective committees.
    - f. by the beginning of finals week in Winter Quarter, submit the approved qualifying examination bibliographies to the respective committees.
    - g. by the end of the second week in Spring Quarter, complete the qualifying examinations for area and topic (two separate examinations to be scheduled approximately one week apart).
    - h. by the end of the fourth week in Spring Quarter, schedule a meeting with the dissertation reading committee to review the dissertation proposal.
    - i. by the beginning of finals week in Spring Quarter, submit the approved dissertation proposal to the graduate committee.
    - j. before departing for field research, receive approval for the non-medical human subjects protocol from the Institutional Review Board.
  6. In the fourth year, complete the following requirements:
    - a. by the beginning of finals week in a given quarter, submit a quarterly report of dissertation field research to the dissertation reading committee.
    - b. submit a fourth-year Report of Degree Progress to the graduate committee on or by May 15 in the Spring Quarter.
  7. In the fifth year, complete the following requirements:
    - a. during the fifth year and after returning from field work, complete one or more teaching assistant quarters in the department.
    - b. during Autumn, Winter, Spring quarters in the fifth year, students attend a minimum of four of five class meetings of ANTHRO 400, Dissertation Writers Seminar (required of Culture and Society track, recommended for students in both the Archaeology and the Ecology and Environment tracks). Each quarter, chapter drafts of the dissertations must be handed in to the dissertation reading committee for review. Eligibility for department support is based on seminar attendance as well as on San Francisco Bay Area residency (the Bay Area is defined as Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, or Sonoma counties).
    - c. after submission of the penultimate draft of the dissertation and before the quarter preceding the quarter in which the

dissertation is to be submitted for the Ph.D. degree, students may schedule and deliver an oral presentation of the dissertation in the department.

8. In the fifth year or beyond, complete the following requirements:
  - a. submit a penultimate draft of the dissertation by the end of the first week of the quarter preceding the quarter in which the university required oral exam defense of dissertation has been scheduled and the dissertation is to be submitted for conferral of degree.
  - b. at least four weeks prior to a proposed date for the oral examination dissertation defense, submit the oral examination schedule form and a final draft of the dissertation, approved by the dissertation reading committee, to the graduate committee.
  - c. Pass the university required oral examination defense of dissertation, prior to final submittal of the dissertation and in order to graduate.

## REQUIRED COURSES

1. *Archaeology Track*—Required courses include the following:
  - ANTHRO 310G. Introduction to Graduate Studies in Anthropology
  - ANTHRO 311G. Introduction to Culture and Society Studies in Anthropology (recommended)
  - ANTHRO 303. Introduction to Archaeological Theory
  - ANTHRO 307. Archaeological Methods and Research Design
  - ANTHRO 308. Proposal Writing Seminar (recommended)
  - ANTHRO 444. Anthropology Colloquium
2. *Culture and Society Track*—Required courses include the following:
  - ANTHRO 310G. Introduction to Graduate Studies in Anthropology
  - ANTHRO 311G. Introduction to Culture and Society Studies in Anthropology
  - ANTHRO 301. History of Anthropological Theory, Culture and Society
  - ANTHRO 300. Reading Theory through Ethnography
  - ANTHRO 306. Anthropological Research Methods
  - ANTHRO 308. Proposal Writing Seminar
  - ANTHRO 444. Anthropology Colloquium
3. *Ecology and Environment Track*—Required courses include the following:
  - ANTHRO 310G. Introduction to Graduate Studies in Anthropology
  - ANTHRO 302. History of Anthropological Theory in Evolution, Ecology and Environment (or comparable, approved ANTHRO 200 level course)
  - ANTHRO 304. Data Analysis in Quantitative Research (or comparable, approved ANTHRO 200 level course)
  - ANTHRO 305. Research Methods in Ecological Anthropology (or comparable, approved ANTHRO 200 level course)
  - ANTHRO 444. Anthropology Colloquium

## PH.D. MINOR IN ANTHROPOLOGY

Prospective applicants should see <http://anthropology.stanford.edu> for further information about the application process and the department's requirements for the Ph.D. Minor in Anthropology. The requirements for a Ph.D. minor in Anthropology include the following:

1. Complete 30 units of ANTHRO subject code courses at the 300 level with a minimum grade point average of 3.0 (B). Course work for a minor cannot also be used to meet requirements for a master's degree.
2. Enlist a faculty member within the Department of Anthropology who will provide written consent to serve as the adviser for the minor and serve on the student's oral examination and dissertation.

3. In conjunction with the program adviser, determine a coherent course of study related to the Ph.D. degree program.
4. Pass with a minimum grade of 'B+' three ANTHRO theory courses, and one ANTHRO course in a geographical or theoretical area.

## OVERSEAS STUDIES COURSES IN ANTHROPOLOGY

For course descriptions and additional offerings, see the listings in the *Stanford Bulletin's* ExploreCourses web site (<http://explorecourses.stanford.edu>) or the Bing Overseas Studies web site (<http://bosp.stanford.edu>). Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

### AUTUMN QUARTER

#### KYOTO

OSPOSGEN 068. Enduring Kyoto. 2 units, Harumi Befu

#### OXFORD

OSPOXFRD 016. Cultural Studies, Media, Literacy. 4-5 units, Palumbo-Liu

OSPOXFRD 043. Anthropology, Material Culture and the Symbolic and Social Meanings of Space: with reference to museums & collections in Oxford. 4 units, Alison Kahn

### WINTER QUARTER

#### PARIS

OSPPARIS 068. Cultures of Graphic Literature. 3-5 units, Lochlann Jain

OSPPARIS 069. Science, Technology, and Culture of Medicine. 3-5 units, Lochlann Jain

### SPRING QUARTER

#### FLORENCE

OSPFLOR 070. Investigating In/exclusion: Introduction to Anthropology through the Study of Embodiment and Consumption in Italy. 5 units, Matthew Kohrman

#### OXFORD

OSPOXFRD 043. Anthropology, Material Culture, and the Meanings of Space. 4 units, Alison Kahn

## APPLIED PHYSICS

*Emeriti: (Professors)* Malcolm R. Beasley, Arthur Bienenstock, Steven Chu, Alexander L. Fetter, Theodore H. Geballe, Stephen E. Harris, Walter A. Harrison, Peter A. Sturrock; *(Professors, Research)* Calvin F. Quate, Helmut Wiedemann, Herman Winick; *(Courtesy)* Gordon S. Kino

*Chair:* Hideo Mabuchi

*Professors:* Steven M. Block, Philip H. Bucksbaum, Robert L. Byer, Sebastian Doniach, Martin M. Fejer, Daniel S. Fisher, Harold Y. Hwang, Aharon Kapitulnik, Mark A. Kasevich, Hideo Mabuchi, Kathryn A. Moler, Vahé Petrosian, Stephen R. Quake, Zhi-Xun Shen, Yuri Suzuki (effective Winter Quarter), Yoshihisa Yamamoto

*Associate Professors:* Ian R. Fisher, David A. Reis, Mark J. Schnitzer

*Assistant Professors:* Surya Ganguli (effective Winter Quarter), Benjamin L. Lev

*Professor (Research):* Michel J-F. Dignonnet

*Lecturer:* Tobias Beetz

*Visiting Professor:* Alexander Palevski

*Courtesy Professors:* Bruce M. Clemens, James S. Harris, Lambertus Hesselink, David A. B. Miller, W. E. Moerner, Douglas D. Osheroff, Shoucheng Zhang

*Consulting Professors:* Thomas M. Baer, Raymond G. Beausoleil, Richard G. Brewer, John D. Fox, Bernardo A. Huberman, Richard M. Martin, Stuart S. P. Parkin, Daniel Rugar

*Department Office:* 348 Via Pueblo Mall - Applied Physics Room 116-118

*Mail Code:* 94305-4090

*Phone:* (650) 723-4027

*Web Site:* <http://appliedphysics.stanford.edu>

Courses offered by the Department of Applied Physics are listed under the subject code APPPHYS on the *Stanford Bulletin's* ExploreCourses web site.

The Department of Applied Physics offers qualified students with backgrounds in physics or engineering the opportunity to do graduate course work and research in the physics relevant to technical applications and natural phenomena. These areas include accelerator physics, biophysics, condensed matter physics, nanostructured materials, quantum electronics and photonics, quantum optics and quantum information, space science and astrophysics, synchrotron radiation and applications. Student research is supervised by the faculty members listed above and also by various members of other departments such as Biology, Chemistry, Electrical Engineering, Materials Science and Engineering, Physics, the SLAC National Accelerator Laboratory, and faculty of the Medical School who are engaged in related research fields. Research activities are carried out in laboratories including the Geballe Laboratory for Advanced Materials, the Edward L. Ginzton Laboratory, the Hansen Experimental Physics Laboratory, the SLAC National Accelerator Laboratory, the Center for Probing the Nanoscale, and the Stanford Institute for Materials and Energy Science.

The number of graduate students admitted to Applied Physics is limited. Applications should be received by January 3, 2012. Graduate students normally enter the department only in Autumn Quarter.

## GRADUATE PROGRAMS IN APPLIED PHYSICS

Admission requirements for graduate work in Applied Physics include a bachelor's degree in Physics or an equivalent engineering degree. Students entering the program from an engineering curriculum should expect to spend at least an additional quarter of study acquiring the background to meet the requirements for advanced degrees in Applied Physics.

## MASTER OF SCIENCE IN APPLIED PHYSICS

The University's basic requirements for the master's degree are discussed in the "Graduate Degrees" section of this bulletin. The minimum requirements for the degree are 45 units, of which at least 39 units must be graduate-level courses in applied physics, engineering, mathematics, and physics. The required program consists of the following:

1. Courses in Physics and Mathematics to overcome deficiencies, if any, in undergraduate preparation.
2. Basic graduate courses (letter grade required):
  - a. *Advanced Mechanics*—one quarter, 3 units: PHYSICS 210, or approved substitute 211
  - b. *Electrodynamics*—two quarters, 6 units: PHYSICS 220, 221
  - c. *Quantum Mechanics*—two quarters, 6 units: PHYSICS 230, 231, or approved substitutes 232, 330, 331, 332, 370
3. 30 units of additional advanced courses in science and/or engineering. 15 of the 30 units may be any combination of advanced courses, Directed Study (APPPHYS 290), and 1-unit seminar courses, to complete the requirement of 45 units. Examples of suitable courses include BIO 217; EE 222, 223, 231, 232, 248, 268, 346; PHYSICS 372, 373. At least 15 of these 30 units must be taken for a letter grade.



4. A final overall grade point average (GPA) of 3.0 (B) is required for courses used to fulfill degree requirements.

There are no department or University examinations, and a thesis is not required. If a student is admitted to the M.S. program only, but later wishes to change to the Ph.D. program, the student must apply to the department's admissions committee.

## DOCTOR OF PHILOSOPHY IN APPLIED PHYSICS

The University's basic requirements for the Ph.D. including residency, dissertation, and examinations are discussed in the "Graduate Degrees" section of this bulletin. The program leading to a Ph.D. in Applied Physics consists of course work, research, qualifying for Ph.D. candidacy, a research progress report, a University oral examination, and a dissertation as follows:

1. Course Work:
  - a. Courses in Physics and Mathematics to overcome deficiencies, if any, in undergraduate preparation.
  - b. Basic graduate courses\* (letter grades required):
    1. *Advanced Mechanics*—one quarter: PHYSICS 210, or approved substitute 211
    1. *Statistical Physics*—one quarter: PHYSICS 212
    2. *Electrodynamics*—two quarters: PHYSICS 220, 221
    3. *Quantum Mechanics*—two quarters: PHYSICS 230, 231, or approved substitutes 232, 330, 331, 332, 370
    4. *Laboratory*—one quarter: APPPHYS 207, 208, 232, 304, 305; BIOE 370; EE 234, 410; MATSCI 171, 172, 173; PHYSICS 301.
  - c. 18 units of additional advanced courses in science and/or engineering, not including Directed Study (APPPHYS 290), Dissertation Research (APPPHYS 390), and 1-unit seminar courses. Examples of suitable courses include BIO 217; EE 222, 223, 231, 232, 248, 268, 346; PHYSICS 372, 373. Only 3 units at the 300 or above level may be taken on a satisfactory/no credit basis.
  - d. 96 units of additional courses to meet the minimum residency requirement of 135. Directed study and research units as well as 1-unit seminar courses can be included.
  - e. A final average overall grade point average (GPA) of 3.0 (B) is required for courses used to fulfill degree requirements.
  - f. Students are normally expected to complete the specified course requirements by the end of their third year of graduate study.
2. *Research*: may be conducted in a science/engineering field under the supervision of a member of the Applied Physics faculty or appropriate faculty from other departments.
3. *Ph.D. Candidacy*: satisfactory progress in academic and research work, together with passing the Ph.D. candidacy qualifying examination, qualifies the student to apply for Ph.D. candidacy, and must be completed before the third year of graduate registration. The examination consists of a seminar on a suitable subject delivered by the student before the faculty academic adviser (or an approved substitute) and two other members of the faculty selected by the department.
4. *Research Progress Report*: normally before the end of the Winter Quarter of the fourth year of enrollment in graduate study at Stanford, the student arranges to give an oral research progress report of approximately 45 minutes, of which a minimum of 15 minutes should be devoted to questions from the Ph.D. reading committee.
5. *University Ph.D. Oral Examination*: consists of a public seminar in defense of the dissertation, followed by private questioning of the candidate by the University examining committee.
6. *Dissertation*: must be approved and signed by the Ph.D. reading committee.

\* Requirements for item '1b' may be totally or partly satisfied with equivalent courses taken elsewhere, pending the approval of the graduate study committee.

## ARCHAEOLOGY

*Director*: Lynn Meskell (Anthropology)

*Professors*: Ian Hodder (Anthropology), Richard Klein (Anthropology), Mark Lewis (History, Asian Languages), Li Liu (East Asian Languages and Cultures), Mike Moldowan (Geological and Environmental Sciences), Gail Mahood (Geological and Environmental Sciences), Ian Morris (Classics, History), Amos Nur (Geophysics), Michael Shanks (Classics), Peter Vitousek (Biology)

*Associate Professors*: Rebecca Bird (Anthropology), Jody Maxmin (Art and Art History, Classics), John Rick (Anthropology), Jennifer Trimble (Classics), Barb Voss (Anthropology)

*Assistant Professors*: Giovanna Ceserani (Classics), Ian Robertson (Anthropology), Michael Wilcox (Anthropology)

*Visiting Professors*: Arek Marcinkak, Magnus Bernardson

*Post Doctoral Fellows*: Melissa Baird, Lindsay Weiss

*Associated Staff*: Laura Jones (Campus Archaeologist), Lisa Newble (Collections Manager), Tom Seligman (Cantor Arts Center)

*Fellow*: Bill Rathje (on leave)

*Program Offices*: Building 500

*Mail Code*: 94305-2170

*Program Phone*: (650) 723-5731

*Web Site*: <http://archaeology.stanford.edu>

Courses offered by the Archaeology Program are listed under the subject code ARCHLGY on the *Stanford Bulletin's* ExploreCourses web site.

Archaeology is the study of the past through its material remains that survive into the present. Archaeology is a discipline that offers direct access to the experiences of a wide range of people in numerous cultures across the globe. Increasingly, archaeology bridges past and present societies through the study of the human heritage and its role in contemporary societies. Stanford's Archaeology Program provides students with an interdisciplinary approach to the material remains of past societies, drawing in equal parts on the humanities, social sciences, and natural sciences.

The Archaeology curriculum draws on faculty from a wide range of University departments and schools. To complete the requirements for the major, students must take courses from the offerings of the program and from the listings of other University departments. The program culminates in a B.A. in Archaeology.

### MISSION OF THE UNDERGRADUATE PROGRAM IN ARCHAEOLOGY

The mission of the undergraduate program in Archaeology is to provide students with a broad and rigorous introduction to the analysis of the material culture of past societies, drawing on the questions and methods of the humanities, social sciences, and natural sciences. Students in the major learn to relate these analyses to the practice of archaeology in the contemporary world. The program seeks to help each student achieve a high level of understanding through concentrated study of a particular research area. Courses in the major complete a comprehensive curriculum that draws on faculty from a wide range of University departments and programs. Archaeology majors are well prepared for advanced training in professional schools such as education, law, and journalism and, depending upon their choice of upper-division course, graduate programs in the humanities, social sciences, and natural sciences.

### LEARNING OUTCOMES

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. an understanding of the material culture of past societies, drawing on the questions and methods of the humanities, social sciences, and natural sciences.
2. an ability to relate this analysis and understanding to the practice of archaeology in the contemporary world.
3. a high level of understanding in a particular research area.

## BACHELOR OF ARTS IN ARCHAEOLOGY

To declare a major in Archaeology, students should contact the student services specialist at (650) 721-1361, who provides an application form, answers initial questions, and helps the student choose a faculty adviser and area of concentration. All majors must complete 65 units, which must form a coherent program of study and be approved by the student's faculty adviser and the program director.

Students who plan to pursue graduate work in Archaeology should be aware of the admission requirements of the particular departments to which they intend to apply. These vary greatly. Early planning is advisable to guarantee completion of major and graduate school requirements.

## REQUIREMENTS

The B.A. in Archaeology requires a minimum of 65 units in the major, divided among five components:

1. *Core Courses (20 units)*—
  - a. Gateway: ARCHLGY 1, Introduction to Prehistoric Archaeology (5 units)
  - b. Intermediate: ARCHLGY 102, Archaeological Methods and Research Design (5 units)
  - c. Intermediate: ARCHLGY 103, History of Archaeological Thought (5 units; Writing in the Major)
  - d. Capstone: ARCHLGY 107A, Archaeology as a Profession (5 units)

ARCHLGY 1 is recommended as a first course, and many upper-level courses in Archaeology require this course as a prerequisite. Students should normally take the capstone course in their final year of course work in the major.
2. *Analytical Methods and Computing (at least 3-5 units)*—
 

Quantitative skills and computing ability are indispensable to archaeologists. It is recommended that students take ANTHRO 98B, General Methods in Archaeology. Other courses that may be used to satisfy this requirement are ANTHRO 98B, PSYCH 10/STATS 60, and ECON 102A.
3. *Archaeological Skills (at least 10 units)*—
 

Archaeological skills include archaeological formation processes, botanical analysis, cartography, ceramic analysis, dating methods, faunal analysis, geographic information systems, geology, geophysics, genetics, osteology, remote sensing, soil chemistry, and statistics. With the approval of the instructor and Archaeology director, undergraduates may fulfill part of this requirement from graduate-level courses (typically courses with catalog numbers of 200 or higher).

  - ARCHLGY 106. Museums and Collections, 5 units
  - ANTHRO 175. Human Osteology, 5 units
  - ANTHRO 98B. Digital Methods in Archaeology, 5 units
  - ANTHRO 116. Quantitative Analysis in Archaeological and Anthropological Research
  - BIO 8N. Human Evolution, 5 units
  - CLASSART 114. Ceramics: Art and Science, 5 units
  - EESS 164. Fundamentals of Geographic Information Science, 5 units
  - EESS 161. Statistical Methods for Earth and Environmental Sciences, 5 units
  - GES 1A. Fundamentals of Geology, 5 units
  - GES 49N. Field Trip to Death Valley and Owens Valley, 5 units
  - GES 102. Earth Materials, 5 units
4. *Theory (at least 10 units)*—
 

Topics include archaeological, art-historical, sociocultural, historical, and material culture theory. With the approval of the instructor, undergraduates may fulfill part of this

requirement from graduate-level courses (typically courses with catalog numbers of 200 or higher).

- ARCHLGY 70. Global Heritage, Conservation and Environment, 5 units
  - ARCHLGY 120. Social Zooarchaeology, 5 units
  - ARCHLGY 123. Politics, Heritage & Archaeology, 5 units
  - ANTHRO 125. Language and the Environment, 5 units
  - ANTHRO 90B. Theory of Social and Cultural Anthropology, 5 units
  - ANTHRO 103. The Archaeology of Modern Urbanism, 5 units
  - CLASSART 113. Ten Things: An Archaeology of Design, 5 units
5. *Area of Concentration (at least 20 units)*—
 

In consultation with their faculty advisors, students choose an area of concentration in archaeological research. Concentrations can be defined in terms of time and space such as small-scale societies or the archaeology of complex societies, or in terms of research problems such as new world archaeology or Mediterranean archaeology. An area of concentration should provide both breadth and depth in a specific research area. Courses should be chosen from the list below. Courses other than those on this list can be used to fulfill this requirement with the prior approval of the student's faculty adviser and the program director. With the approval of the instructor, undergraduates may fulfill part of this requirement from graduate-level courses, typically courses numbered 200 or higher. However, each course may only count toward one component of the program. Students are encouraged to design their own area of concentration, with the prior approval of the student's faculty adviser and the program director.

    - a. *Small Scale Societies*—
      - ANTHRO 16. Native Americans in the 21st Century, 5 units
    - b. *Archaeology of Complex Societies*—
      - ARCHLGY 111. Emergence of Chinese Civilizations from Caves to Palaces, 5 units
      - ANTHRO 100C. Chavin de Huantar Research Seminar, 5 units
      - ANTHRO 102. The Maya, 5 units
      - ANTHRO 106. Incas and Their Ancestors, 5 units
      - ARTHIST 203. Greek Art In and Out of Context, 5 units
      - CLASSART 21Q. Eight Great Archaeological Sites in Europe, 5 units
      - CLASSART 101. Archaic Greek Art, 5 units
      - CLASSGEN 123. Urban Sustainability: Long Term Archaeological Perspectives, 5 units
      - CLASSHIST 135A. Ancient War, 5 units
    - c. *Mediterranean Archaeology*—
      - ARTHIST 203. Greek Art In and Out of Context, 5 units
      - ARTHIST 204A. Appropriations of Greek Art, 5 units
      - CLASSART 101. Archaic Greek Art, 5 units
      - CLASSART 112. Ancient Urbanism
    - d. *New World Archaeology*—
      - ANTHRO 200C. Chavin de Huantar Research Seminar, 5 units
      - ANTHRO 16. Native Americans in the 21st Century, 5 units
      - ANTHRO 101. Aztecs and their Ancestors
      - ANTHRO 205. Ancient Cities in the New World
    - e. *Heritage*—
      - ARCHLGY 64. Cultural Heritage and Human Rights
      - ARCHLGY 120. Social Zooarchaeology
      - ARCHLGY 123. Politics, Heritage & Archaeology
      - ARCHLGY 132. The Anthropology of Heritage: Concepts, Contexts and Critique
      - ANTHRO 16. Native Americans in the 21st Century

- f. *Urbanism and Cities*—
- ANTHRO 103. Archaeology of Modern Urbanism
  - ANTHRO 205. Ancient Cities in the New World
  - CLASSART 21Q. Eight Great Archaeological Sites
  - CLASSGEN 123. Urban Sustainability
6. *Archaeological Fieldwork*—Students may meet this requirement in two ways:
- a. Taking part in a month-long field project directed by a Stanford faculty member, and taking a directed reading during the returning academic year for credit. In 2010, field projects were underway in Peru, New Mexico, England, Jordan, and Turkey.
  - b. Completing a field school offered by another institution. Such field schools must be approved in advance by the student's undergraduate adviser and by the director of the Archaeology Center.
7. *Collateral Language Requirement*—All Archaeology majors must demonstrate competence in a foreign language beyond the first-year level. Students can meet this requirement by completing a course beyond the first-year level with a grade of 'B' or better, and are encouraged to choose a language that has relevance to their archaeological region or topic of interest. Students may petition to take an introductory-level course in a second language to fulfill this requirement by demonstrating the connection between the language(s) and their research interest(s).
8. Students may count up to 15 units of research and independent study, (including but not limited to ARCHLGY 190, 195 and 199) toward the Archaeology major.

## HONORS PROGRAM

The honors program in Archaeology gives qualified majors the chance to work closely with faculty on an individual research project culminating in an honors thesis. Students may begin honors research from a number of starting points, including topics introduced in the core or upper-division courses, independent interests, research on artifacts in Stanford's collections, or fieldwork experiences.

Interested Archaeology majors of junior standing may apply for admission by submitting an honors application form, including a 4-5 page statement of the project, a transcript, and a letter of recommendation from the faculty member supervising the honors thesis to the student services specialist, no later than the end of the fourth week of the Spring Quarter. Archaeology majors are eligible to apply for honors candidacy. The thesis is due in early May of the senior year and is read by the candidates adviser and a second reader appointed by the undergraduate committee.

## COGNATE COURSES

Students are advised to meet with their adviser about degree requirements and the applicability of these courses to a major or minor program.

- ARCHLGY 12. Peopling the Globe  
 ANTHRO 1. Introduction to Cultural and Social Anthropology  
 ANTHRO 3. Introduction to Prehistoric Archaeology  
 ANTHRO 21N. Anthropology of Globalization  
 ANTHRO 30Q. The Big Shift  
 ANTHRO 90B. Theory in Social and Cultural Anthropology  
 ANTHRO 90C. Introduction to Theory in Ecological and Environmental Anthropology  
 ANTHRO 98E. Excavation at Catalhoyuk, Turkey  
 ANTHRO 100C. Chavin de Huantar Research Seminar  
 ANTHRO 103. Archaeology of Modern Urbanism  
 ANTHRO 116. Quantitative Analysis in Archaeological and Anthropological Research  
 ANTHRO 135H. CSRE House Seminar: Race, Gender, and Class at Stanford  
 ARTHIST 101. Archaic Greek Art (same as CLASSART 101)  
 ARTHIST 203. Greek Art in and out of Context (same as CLASSART 109)

- ARTHIST 204A. Appropriations of Greek Art (same as CLASSART 110)  
 CLASSART 21Q. Eight Great Archaeological Sites in Europe  
 CLASSART 112. Ancient Urbanism  
 CLASSART 113. Ten Things: Science, Technology, and Design (same as STS 112)  
 CLASSART 114. Ceramics: Art and Science  
 CLASSGEN 123. Urban Sustainability: Long-Term Archaeological Perspectives  
 ECON 102A. Introduction to Statistical Methods (Postcalculus) for Social Scientists  
 EESS 160. Statistical Methods for Earth and Environmental Sciences: General Introduction  
 EESS 164. Fundamentals of Geographic Information Science (GIS) (same as EARTHSYS 144)  
 EE 140. The Earth From Space: Introduction to Remote Sensing (same as GEOPHYS 140)  
 GES 1. Dynamic Earth: Fundamentals of Earth Science  
 GES 49N. Field Trip to Death Valley and Owens Valley  
 GES 102. Earth Materials  
 HUMBIO 2N. Culture, Evolution, and Society  
 STATS 60. Introduction to Statistical Methods: Precalculus (same as PSYCH 10)  
 URBANST 115. Urban Sustainability: Long-Term Archaeological Perspectives

## MINOR IN ARCHAEOLOGY

A minor in Archaeology provides an introduction to the study of the material cultures of past societies. It can complement many majors, including but not limited to Anthropology, Applied Physics, Art and Art History, Classics, Earth Systems, Geological and Environmental Sciences, History, and Religious Studies.

Students must complete the declaration process, including the planning form submission and Axxess registration, by the last day of the quarter, two quarters prior to degree conferral; for example, by the last day of Autumn Quarter if Spring graduation is the intended quarter of graduation.

To minor in Archaeology, the student must complete at least 27 units of relevant course work, including:

1. *Core Program (10 units)*—
  - a. Gateway Course: ARCHLGY 1. Introduction to Prehistoric Archaeology (5 units)
  - b. Capstone Course: ARCHLGY 103. History of Archaeological Thought (5 units)
 ARCHLGY 1 is recommended as a first course, and many of the upper-level courses in Archaeology require this course as a prerequisite. Students should normally take the capstone course in their final year of course work in the minor.
2. *Archaeological Skills (2-5 units)*—
 Archaeological skills include dating methods, faunal analysis, botanical analysis, ceramic analysis, geology, geophysics, soil chemistry, remote sensing, osteology, genetics, statistics, cartography, and geographic information systems. The course(s) must be chosen from the list of courses under Archaeological Skills (requirement 3) in the "Bachelor of Arts in Archaeology" section of this bulletin.
3. *Theory (5 units)*—
 Topics include archaeological, art historical, sociocultural, historical, and material culture theory. The course(s) must be chosen from the list of courses under Theory (requirement 4) in the "Bachelor of Arts in Archaeology" section of this bulletin.
4. *Area of Concentration (10 units)*—
 In consultation with their faculty advisers, students choose an area of concentration in archaeological research. Concentrations can be defined in terms of time and space such as small-scale societies or the archaeology of complex societies, or in terms of research problems such as new world archaeology or Mediterranean archaeology. An area of concentration should provide both breadth and depth in a specific research area.

Courses must be chosen from the lists of courses under Area of Concentration (requirement 5) in the "Bachelor of Arts in Archaeology" section of this bulletin. Students are encouraged to design their own area of concentration, with the prior approval of both the student's faculty adviser and the program director.

## OVERSEAS STUDIES COURSES IN ARCHAEOLOGY

For course descriptions and additional offerings, see the listings in the *Stanford Bulletin's* ExploreCourses web site (<http://explorecourses.stanford.edu>) or the Bing Overseas Studies web site (<http://bosp.stanford.edu>). Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

### AUTUMN QUARTER

#### AUSTRALIA

OSPAUSTL 40. Australian Studies. 3 units, Bill Casey, Ian Lilley, GER:DB:SocSci, EC:GlobalCom

### WINTER QUARTER

#### CAPETOWN

OSPCPTWN 65. Western Cape Sites of Memory. 3-5 units, Grant Parker, GER:EC:GlobalCom

### SPRING QUARTER

#### CAPETOWN

OSPCPTWN 36. The Archaeology of Southern African Hunter Gatherers. 5 units, John Parkington

## ART AND ART HISTORY

*Emeriti: (Professors)* Keith Boyle, Kristina Branch, Wanda M. Corn, Elliot Eisner, David Hannah, Matthew S. Kahn, Suzanne Lewis, Frank Lobdell, Dwight C. Miller, Michael Sullivan, Paul V. Turner

*Chair:* Nancy Troy

*Area Director for Art History:* Nancy Troy

*Area Director for Film and Media Studies:* Kristine Samuelson

*Area Director for Art Practice:* Joel Leivick

*Director of Undergraduate Studies in Art History:* Jody Maxmin

*Director of Undergraduate Studies in Art Practice:* Xiaozhe Xie

*Director of Undergraduate Studies in Film and Media Studies:* Jean Ma

*Director of Graduate Studies in Art History:* Pamela M. Lee

*Director of Graduate Studies in Art Practice:* Paul DeMarinis

*Director of Graduate Studies in Documentary Film:* Jan Krawitz

*Professors:* Enrique Chagoya (Painting/Drawing/Printmaking), Paul DeMarinis (Electronic Media), Jan Krawitz (Documentary Film), Pamela M. Lee (Contemporary Art), Michael Marrinan (18th- and 19th-century European Art), Kristine Samuelson (Documentary Film), Melinda Takeuchi (Japanese Art), Richard Vinograd (Chinese Art), Bryan Wolf (American Art), Xiaozhe Xie (Painting/Drawing)

*Associate Professors:* Scott Bukatman (Film Studies, on leave), Jody Maxmin (Ancient Art), Bissera Pentcheva (Medieval Art, on leave), Gail Wight (Electronic Media)

*Assistant Professors:* Terry Berlier (Sculpture, on leave), Morten Steen Hansen (Renaissance Art, on leave), Pavle Levi (Film Studies), Jean Ma (Film Studies), Barbaro Martinez-Ruiz (African Art), Jamie Meltzer (Documentary Film, on leave)

*Professor (Teaching):* Joel Leivick (Photography)

*Lecturers:* Kevin Bean (Drawing/Painting), Thomas Beischer (Architectural History), Elizabeth Consavari (Renaissance Art), Robert Dawson (Photography), John Edmark (Design), Lukas Felzmann (Photography), Valerie Gonzalez (Islamic Art), David Laderman (Film Studies), Adam Tobin (Screenwriting)

*Affiliated Professor:* John H. Merryman (Law, emeritus)

*Department Offices:* Room 101, Cummings Art Building

*Mail Code:* 94305-2018

*Phone:* (650) 723-3404

*Web Site:* <http://art.stanford.edu>

Courses offered by the Department of Art & Art History are listed on the *Stanford Bulletin's* ExploreCourses web site under the subject codes ARTHIST (Art History), ARTSTUDI (Art Practice), FILMSTUD (Film Studies), and FILMPROD (Film Practice).

## MISSION OF THE DEPARTMENT OF ART AND ART HISTORY

The department offers courses of study in: (1) the history of art, (2) the practice of art (studio), and (3) film and media studies, leading to the following degrees: B.A. degree in Art History; B.A. degree in Art Practice; B.A. degree in Film and Media Studies; M.F.A. degree in Art Practice; M.F.A. degree in Design; M.F.A. degree in Documentary Film and Video; Ph.D. degree in Art History.

The undergraduate program is designed to help students think critically about the visual arts and visual culture. Courses focus on the meaning of images and media, and their historical development, roles in society, and relationships to disciplines such as literature, music, and philosophy. Work performed in the classroom, studio, and screening room is designed to develop a student's powers of perception, capacity for visual analysis, and knowledge of technical processes.

### LEARNING OUTCOMES

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. knowledge and awareness of art terminology and concepts.
2. ability to develop effective and nuanced lines of interpretation.
3. improved critical thinking skills using primary and secondary source materials.
4. improvement in analytical writing skills and close reading skills.
5. ability to form and validate their own and others' opinions through knowledge of artistic movements and sociohistorical events.

## IRIS AND B. GERALD CANTOR CENTER FOR VISUAL ARTS

The Iris and B. Gerald Cantor Center for Visual Arts at Stanford University is a major resource for the department. The center offers a 22,000-object collection on view in rotating installations in 18 galleries, the Rodin Sculpture Garden, and special exhibitions, educational programs, and events. Through collaborations with the teaching program, student internships, and student activities, the Center provides a rich resource for Stanford students.

### ART HISTORY

## UNDERGRADUATE PROGRAMS IN ART HISTORY

The discipline of Art History teaches students how to analyze and interpret works of fine art (paintings, drawings, prints, and sculpture), photography and moving image media (film, video, television, and digital art), material culture (ritual objects, fashion, advertisements, and the decorative, applied, and industrial arts), and the built environment (architecture, urbanism, and design). The department takes it as axiomatic that the skills of visual literacy and analysis are not innate but may be acquired through training and practice. Objects of study are drawn from the cultures of Africa, Asia, the Americas, from the Middle East; from

Western, Central, and Eastern Europe; and from antiquity to the present.

Art History is a historical discipline that seeks to reintegrate the work of art into the original context of its making and reception, foregrounding its significant status as both historical document and act of social communication. At the same time, Art History seeks to understand the ways in which the work of art transcends the historical moment of its production, taking on different meanings in later historical periods, including the present. As part of their visual training, students of Art History become proficient in cultural analysis and historical interpretation. Art History thus envisions itself as uniquely well positioned to train students from a variety of disciplines in the light of the dramatic visual turn that has gripped the humanities and the sciences over the course of the last decade, with more and more disciplines becoming vitally interested in visual forms and modes of communication.

## GRADUATE PROGRAMS IN ART HISTORY

The doctoral program in Art History at Stanford is relatively small, and affords the graduate student the opportunity to work intensively with individual members of the faculty. The Doctor of Philosophy degree is taken in a particular field, supported by a background in the general history of art. Doctoral candidates also undertake collateral studies in other graduate departments or in one of the University's interdisciplinary programs.

## BACHELOR OF ARTS IN ART HISTORY

### SUGGESTED PREPARATION FOR THE MAJOR

Students considering a major in art history should take ARTHIST 1, Introduction to the Visual Arts (WIM course), during their freshman or sophomore year.

### FIELDS OF STUDY OR DEGREE OPTIONS

Students who wish to major in Art History declare the Art History major on Axess. Concentrations within the major are approved by the faculty adviser and are not declared on Axess. Sample concentrations include:

1. Topical concentrations: art and gender; art, politics, race, and ethnicity; art, science, and technology; urban studies
2. Genre concentrations: architecture; painting; sculpture; film studies; prints and media; decorative arts and material culture
3. Historical and national concentrations: ancient and medieval; Renaissance and early modern; modern and contemporary; America; Africa; Asia; the Americas
4. Interdisciplinary concentrations: art and literature; art and history; art and religion; art and economics; art and medicine (with adviser consent a maximum of two concentration courses may be taken outside the department).

### DEGREE REQUIREMENTS

All undergraduate majors complete a minimum of 61 units (14 courses of 4-5 units each). Students are required to complete two foundation courses (including the WIM course: ARTHIST 1, Introduction to the Visual Arts), five Art History distribution courses, five concentration courses, one studio course, and the junior seminar. Courses must be taken for a letter grade. To declare the major, students must meet with the undergraduate coordinator. At that time the student selects a faculty adviser. Majors are required to attend an orientation session presented by the professional staff of the Art and Architecture Library, which introduces the tools of research and reference available on campus or through the Internet. This requirement should be completed no later than the quarter following the major declaration.

*Required Courses—*

1. Foundation Courses (10 units):
  - a. ARTHIST 1. Introduction to the Visual Arts (WIM course)

- b. One other course from ARTHIST 2, ARTHIST 3, FILMSTUD 4
2. Distribution Courses (20 units): In order that students acquire a broad overview of different historical periods and different geographic regions, majors must take five Art History lecture courses, one from each of the following five categories:
    - a. Ancient and medieval: ARTHIST 101, 102, 105, 106, 106A, 107, 108, 108A, 108B
    - b. Renaissance and early modern: ARTHIST 111, 114, 117, 118, 120, 121, 122, 124, 126, 132
    - c. Modern, contemporary, and the U.S.: ARTHIST 132, 142, 143, 145, 147, 155, 158A, 173, 176, 182
    - d. Asia, Africa, and the Americas: ARTHIST 182, 184, 185, 185B, 186, 187, 188A, 190, 194, 196
    - e. Film studies: FILMSTUD 100A, 100B, 100C, 101, 102, 115, 116, 132, 137, 150, 167.
  3. Area of Concentration (22 units): The department encourages students to pursue their interests by designing an area of concentration tailored to their own intellectual concerns. This area of concentration provides the student with an in-depth understanding of a coherent topic in Art History and consists of five Art History courses: two must be seminars or colloquia; and four of the five courses must be in a single field or concentration constructed by the student in consultation with their faculty adviser. Students must submit an area of concentration form, signed by their faculty adviser, during Winter Quarter of their junior year.
  4. Capstone Seminar (5 units): ARTHIST 296, Junior Seminar: Methods and Historiography of Art History. This course is designed to introduce majors to methods and theories underlying the practice of Art History. The seminar is offered annually, typically during Autumn Quarter.
  5. Studio Course (4 units): Majors are required to complete at least one introductory Studio Art course. Courses may not be offered every year and are subject to change.

### HONORS PROGRAM

The purpose of the honors thesis is to extend and deepen work done in an Art History class; the topic should have focus and clear parameters. Typically an honors thesis is not an exploration of a new area that the student has never studied before. The minimum requirement for admission to the honors program is an overall GPA of 3.7, and at least 3.7 in Art History courses. Students must complete at least five Art History courses at Stanford by the end of their junior year; four must be completed by the end of winter quarter. Students interested in the honors program should consult their potential adviser by the beginning of junior year. Thesis advisers must be in residence during Autumn Quarter of the student's senior year, and it is highly recommended that they are in residence during the rest of senior year. Students wishing to write an honors thesis must announce their intention by submitting an intent form signed by their thesis adviser (who need not be the student's academic adviser) by February 1 of their junior year.

Candidates for the honors program must submit to the Art History faculty a five-page thesis proposal, including bibliography and illustrations, and one completed paper that demonstrates the student's ability to conceptualize and write about issues. The complete proposal must be submitted to the department's undergraduate coordinator no later than the third week of Spring Quarter of the candidate's junior year so it can be read, discussed, and voted upon at the faculty's regular meeting in early May. A candidate is accepted into the honors program by a simple majority.

Once admitted to the honors program, students work with their thesis advisers to define the scope of study, establish a research and writing timetable, and enlist one other faculty member to serve on the thesis reading committee. The summer between junior and senior years is usually devoted to refining the topic and pursuing any off-campus research. Students may apply for UAR research

grants to help finance trips or expenses related to preparing the research for their honors thesis.

During their senior year, students must register for 10 units of ARTHIST 297, Honors Thesis Writing, 5 units of which may count towards the student's concentration in Art History. Students are required to register for two to five units each quarter during their senior year, for a total of ten units. To aid the process of research and writing, students preparing an honors thesis are paired with a graduate student mentor. Students must contact the graduate student mentor in their junior year as soon as they begin to think about writing an honors thesis. Through regular meetings, mentors guide students through the proposal process and the research and writing year.

Students and thesis advisers should plan their work so that a complete, final manuscript is in the hands of each member of the student's reading committee by the beginning of the seventh week of the student's final quarter at Stanford (one year from proposal to final manuscript). The thesis adviser assigns a letter grade; both faculty readers must approve the thesis for honors before the student is qualified to graduate with honors.

*Required Course—*

- ARTHIST 297. Honors Thesis Writing

### MINOR IN ART HISTORY

A student declaring a minor in Art History must complete 25 units of course work in one of the following four tracks: Open, Modern, Asian, or Architecture. Upon declaring the minor, students are assigned an adviser with whom they plan their course of study and electives. A proposed course of study must be approved by the adviser and placed in the student's departmental file. Only one class may be taken for credit outside of the Stanford campus; this includes courses taken in the Overseas Studies Program. Minors are required to attend an orientation session presented by the professional staff of the Art and Architecture Library, which introduces the tools of research and reference available on campus or through the Internet. This requirement should be completed no later than the quarter following the minor declaration.

*Requirements—*A student with a minor in Art History must complete six Art History courses for a total of 25 units.

1. *Open Track*—ARTHIST 1 (WIM) plus five Art History lecture courses, colloquia, or seminars in any field.
2. *Modern Track*—ARTHIST 1 (WIM) plus five Art History lecture courses, colloquia, or seminars in any aspect of 19th- to 20th-century art.
3. *Asian Track*—ARTHIST 2 plus five Art History lecture courses, colloquia, or seminars in Asian Art (ARTHIST 1 may be one of the five courses).
4. *Architecture Track*—ARTHIST 3 plus five Art History lecture courses, colloquia, or seminars in architectural history (ARTHIST 1 may be one of the five courses).

### MASTER OF ARTS IN ART HISTORY

University requirements for the M.A. are described in the "Graduate Degrees" section of this bulletin.

#### ADMISSION

The department offers M.A. and Ph.D. degrees, although the M.A. is only granted as a step toward fulfilling requirements for the Ph.D. The department does not admit students who wish to work only toward the M.A. degree. Please see the Ph.D. section for admissions information.

#### DEGREE REQUIREMENTS

1. *Units*—completing a total of at least 45 units of graduate work at Stanford in the history of art in courses at the 200 level and above, including a seminar in art historiography/visual theory.
2. *Languages*—reading knowledge of two foreign languages, preferably German and French or Italian. Students in Chinese and Japanese art are ordinarily expected to demonstrate

reading competence in modern and classical Chinese or Japanese, depending on the student's area of focus. Final determination is made in consultation with the student's primary adviser.

3. *Papers*—submission of one paper from among those written during the year.
4. *Area Coverage*—demonstration to the faculty, by course work and/or examination, that the student has adequate knowledge of the major areas of the history of art.

### DOCTOR OF PHILOSOPHY IN ART HISTORY

University requirements for the Ph.D. are described in the "Graduate Degrees" section of this bulletin. An expanded explanation of department requirements is given in the Art History Graduate Student Handbook.

#### ADMISSION

In addition to University requirements, the department requires a research paper of approximately 15-20 pages demonstrating the student's capacity to pursue independent investigation of an art historical problem as part of the application. All applicants must have been awarded a B.A., B.F.A., or B.S. from an accredited university.

#### DEGREE REQUIREMENTS

To be eligible for the doctoral degree, the student must complete a minimum of three years of full-time graduate work in Art History, at least two years of which must be in residence at Stanford. Doctoral students must complete a minimum of 135 units. Of these 135, the student must complete at least 100 units of graduate course work at the 200 level or above, including all required courses, with a minimum of 62 units in Art History lecture courses and seminars.

1. *Collateral Studies*—The student is required to take at least three courses in supporting fields of study (such as anthropology, classics, history, literature, or philosophy), determined in consultation with the department advisers. These courses are intended to strengthen the student's interdisciplinary study of art history.
2. *Graduate Student Teaching*—As a required part of their training, graduate students in Art History, regardless of their source of funding, must participate in the department's teaching program. At least one, one-quarter assignment in ARTHIST 1, 2, 3, or FILMSTUD 4 is required (with concurrent registration in ARTHIST 610, Seminar in Teaching Praxis for ARTHIST 1 only). Students are required to serve as a teaching assistant for a minimum of four quarters. Further opportunities for teaching may be available.
3. *Admission to Candidacy*—A graduate student's progress is formally reviewed at the end of Spring Quarter of the second year. The applicant for candidacy must put together a candidacy file showing that he/she has completed the requirements governing the M.A. program in the History of Art (see above), and at least an additional 18-24 units by the end of Winter Quarter of the second year. The graduate student does not become a formal candidate for the Ph.D. degree until he/she has fully satisfied these requirements and has been accepted as a candidate by the department.
4. *Area Core Examination (ACE)*—All graduate students conceptualize an area core and bibliography in consultation with their primary adviser and two other Stanford faculty members, one of whom is drawn from a field other than Art History, or, if in Art History, has expertise outside of the student's main area of interdisciplinary concentration. Students are required to pass an area core examination, in either written or oral form, during Winter Quarter of the third year of study. To prepare for the exam, students may enroll in the 5-unit reading course (ARTHIST 620).
5. *Dissertation and Oral Defense Requirements*—

- a. Reading Committee—After passing the Area Core Examination (ACE), each student is responsible for the formation of a dissertation reading committee consisting of a principal adviser and three readers. Normally, at least two of the three readers are drawn from the department and one may come from outside the department.
- b. Dissertation Proposal—By the beginning of Autumn Quarter in the fourth year, students should have identified a dissertation subject and written a proposal in consultation with their principal adviser. To prepare the proposal, students may take one 5-unit independent study course (ARTHIST 640) and apply for a funded Summer Quarter to research and write the proposal. The proposal is submitted for approval by the Art History faculty at the beginning of the fourth year for comments. In the event that a proposal is not approved, the faculty establishes conditions for its resubmission and reconsideration at a later date.
- c. Dissertation—A member of the Art History faculty acts as the student's dissertation adviser and as chair of the reading committee. The final draft of the dissertation must be in all the readers' hands at least four weeks before the date of the oral defense. The dissertation must be completed within five years from the date of the student's admission to candidacy for the Ph.D. degree. A candidate taking more than five years must apply for an extension of candidacy.
- d. Oral Defense Examinations—Each student arranges an oral examination with the four members of the reading committee and a chair chosen from outside the department. The oral examination consists mainly of a defense of the dissertation but may range, at the committee's discretion, over a wider field. The student is required to discuss research methods and findings at some length and to answer all questions and criticisms put by members of the examining committee. At the end of the defense, the committee votes to pass or fail the student on the defense. The committee also makes recommendations for changes in the dissertation manuscript before it is submitted to the University as the final requirement for the granting of the Ph.D. degree in the History of Art. After incorporating the changes, the manuscript is given a final review and approval by the student's principal adviser.

## PH.D. IN ART HISTORY AND HUMANITIES

The department participated in the Graduate Program in Humanities leading to a Ph.D. degree in Art History and Humanities. At this time, the option is available only to students already enrolled in the Graduate Program in Humanities; no new students are being accepted. The University remains committed to a broad-based graduate education in the humanities; the courses, colloquium, and symposium continue to be offered, and the Division of Literatures, Cultures, and Languages provides advising for students already enrolled who may contact Denise Winters at 650-724-1333 for further information. Courses are listed under the subject code HUMNTIES and may be viewed on the *Stanford Bulletin's* ExploreCourses web site.

## PH.D. MINOR IN ART HISTORY

For a minor in Art History, a candidate is required to complete 24 units of graduate-level Art History courses (200 level or above) in consultation with a department adviser.

## ART PRACTICE (STUDIO)

### UNDERGRADUATE PROGRAMS IN ART PRACTICE (STUDIO)

The Art Practice program offers production-based courses founded on the concepts, skills and cultural viewpoints that characterize contemporary art practice. The goal is to educate students, both majors and minors, in the craft, culture, and theory

of current fine art practices to prepare them for successful careers as artists. The art practice program is designed to develop in-depth skills in more than one area of the visual arts. It emphasizes the expressive potential of an integration of media, often via a cross-disciplinary, interactive path. Through collaboration and connections with scientists, engineers, and humanities scholars, the program addresses a breadth of topical and artistic concerns central to a vital undergraduate education.

## GRADUATE PROGRAM IN ART PRACTICE (STUDIO)

The program provides a demanding course of study designed to challenge advanced students. Participants are chosen for the program on the basis of work that indicates high artistic individuality, achievement, and promise. Candidates should embody the intellectual curiosity and broad interests appropriate to, and best served by, work and study within the University context.

## BACHELOR OF ARTS IN ART PRACTICE (STUDIO)

### DEGREE REQUIREMENTS

All undergraduate majors complete a minimum of 65 units including six lower level courses, six upper level courses, and four art history courses, including the WIM course ARTHIST 1, Introduction to the Visual Arts. All courses must be taken for a letter grade. University units earned by placement tests or advanced placement work in secondary school are not counted within the 65 units. The studio requirements are divided into lower level (introductory, 100 level) and upper level (advanced, 200 level) course work. At the lower level, students focus on a range of subject matter from historical motifs (figure, still life, landscape) to contemporary ideas in art. Upper level courses are designed to stretch the student's understanding of materials, techniques, site, and social relevance. Experimental and challenging in nature, these courses cross area boundaries. Independent study supervised by a member of the permanent faculty is also available to the advanced student.

Students are encouraged to move through the requirements for the major in the sequence outlined. Students are exposed to a range of practices early in their development in order to have a good basis of comparison if they choose to focus on a particular medium. This sequence of courses also broadens the students' skills and enables them to combine materials and methods. In all courses, students are expected to pass mid-term and final reviews and critiques of their work.

To declare the major, students must meet with the undergraduate coordinator. At that time the student selects a faculty adviser. Art Practice majors are required to meet with both their adviser and the undergraduate coordinator during the first two weeks of each quarter to have course work approved and make certain they are meeting degree requirements. Majors are required to attend an orientation session presented by the professional staff of the Art and Architecture Library, which introduces the tools of research and reference available on campus or through the Internet. This requirement should be completed no later than the quarter following the major declaration.

#### Required Courses—

1. Six lower level courses (24 units): Six courses from ARTSTUDI 130, 131, 136, 138, 140, 141, 145, 148, 148A, 151, 153, 154, 155, 160, 161, 167, 170, 173, 177, 178, 179, 180.
2. Six upper level courses (24 units):
  - a. ARTSTUDI 230. Interdisciplinary Art Survey: Concepts and Strategies. Focus is on direct experiences of multidisciplinary art and art practices.
  - b. ARTSTUDI 249. Advanced Undergraduate Seminar. Emphasis is on investigation of visual concepts interpreted by a single medium, by cross-practices, or by collaboration

among students working in a variety of materials. This seminar gives the student an opportunity to be exposed to the work of other majors in a critique-based forum directed by a visiting artist or critic.

- c. Four other courses from ARTSTUDI 239, 241, 245, 246, 248, 249, 252, 260, 262, 263, 265A, 268, 269, 270, 271, 272, 276, 277, 275, 277A, 279A, 284, 285.
3. Four Art History courses (17 units): ARTHIST 1 (WIM course) and three other art history courses. At least one course must be in the modern art series, ARTHIST 140-159. Students may substitute one Art History course with a Film Studies course.  
Courses may not be offered every year and are subject to change.

*Transfer Credit Evaluation*—Upon declaring an Art Practice major, a student transferring from another school must have his or her work evaluated by a Department of Art and Art History adviser. A maximum of 13 transfer units are applied toward the 65 total units required for the major. A student wishing to have more than 13 units applied toward the major must submit a petition to the adviser and then have his or her work reviewed by a studio committee.

### OVERSEAS STUDY OR STUDY ABROAD

A minimum of 52 of the 65 units required for the Art Practice major and a minimum of 32 of the 36 units required for the Art Practice minor must be taken at the Stanford campus. A student must meet with his or her adviser and undergraduate coordinator before planning an overseas campus program.

### MINOR IN ART PRACTICE (STUDIO)

A student declaring a minor in Art Practice must complete 36 units of Art Practice and Art History course work. All minors are required to attend an orientation session presented by the professional staff of the Art and Architecture Library, which introduces the tools of research and reference available on campus or through the internet. Minors are required to meet with both their adviser and the undergraduate coordinator during the first two weeks of each quarter to have course work approved and to make certain they are meeting degree requirements.

*Requirements*—A student with a minor in Art Practice must complete nine courses for a total of 36 units.

1. Three lower level courses (12 units) selected from ARTSTUDI 130, 131, 136, 138, 140, 141, 145, 148, 148A, 151, 153, 154, 155, 160, 161, 167, 170, 173, 177, 178, 179, 180.
2. Three upper level courses (11 units):
  - a. ARTSTUDI 249: Advanced Undergraduate Seminar. Emphasis is on investigation of visual concepts interpreted by a single medium, by cross-practices, or by collaboration among students working in a variety of materials. This seminar gives the student an opportunity to be exposed to the work of other majors in a critique-based forum directed by a visiting artist or critic. Minors should enroll for three units.
  - b. Two other courses from ARTSTUDI 239, 241, 245, 246, 248, 249, 252, 260, 262, 263, 265A, 268, 269, 270, 271, 272, 276, 277, 275, 277A, 279A, 284, 285.
3. Three Art History Courses (13 units): ARTHIST 1 (WIM) and two other art history courses. At least one of the courses must be in the modern art series, ARTHIST 140-159.  
Courses may not be offered every year and are subject to change.

### MASTER OF FINE ARTS IN ART PRACTICE (STUDIO)

University requirements for the M.F.A. are described in the "Graduate Degrees" section of this bulletin.

## THE GRADUATE PROGRAM IN PAINTING, SCULPTURE, NEW GENRES, AND PHOTOGRAPHY

### ADMISSION

The applicant must have a B.A., B.F.A., or B.S. from an accredited school. It is expected that the applicant will have a strong background in art practice, either an undergraduate degree or at least three years of independent studio practice. Applications and portfolios for the Art Practice program must be received by January 10, 2012. Students accepted to the program are admitted for the beginning of the following Autumn Quarter. No applicants for mid-year entrance are considered.

*Portfolio Specifications*—See the department web site at <http://art.stanford.edu/graduate/admission/> for portfolio requirements.

### FIELDS OF STUDY OR DEGREE OPTIONS

Fields of study for the M.F.A. degree are offered in Painting, Sculpture, New Genres, and Photography. These fields of study are not declared on Axess; they are not printed on the transcript or the diploma.

### DEGREE REQUIREMENTS

1. *Residency*—Completing a minimum of two years (six quarters) of graduate work in residence at Stanford.
2. *Units*—The student must complete 48 units of study. Students must discuss their programs of study with their academic adviser and the department's student services administrator to ensure that an appropriate program of study is chosen.
  - a. *Seminar Requirement*—Six quarters (36 units) of ARTSTUDI 342, Master's Project, which includes two weekly seminars (the Object Seminar and the Concept Seminar) and Studio Practice, which is an individual tutorial with a selected member of the faculty.
  - b. *Elective Requirement*—Three courses of academic electives (12 units) are required in the first year. These courses can be chosen from a large variety of disciplines in consultation with the Director of Graduate Studies.
3. *Faculty Reviews*—The student is expected to pass three faculty reviews:
  - a. at the end of the first quarter; any student judged to be making inadequate progress is placed on probation and requires an additional review at the end of the second quarter
  - b. at the end of the third quarter
  - c. at the time of the M.F.A. exhibition.
 The purpose of these reviews is to evaluate development and to assess the progress of the student.
4. *Thesis*—During the fifth quarter in the program, students must write a thesis paper addressing the development of their work over the two-year period at Stanford. Participation in the M.F.A. exhibition at the end of the year is required.
5. *Graduate Student Teaching*—Regardless of their source of funding, students are required to assist with the department's teaching program for a minimum of eight hours per week over the period of six quarters; the particulars of this assignment are at the department's convenience.  
The studio faculty reserves the right to make use of graduate paintings, sculptures, and photographs in exhibitions serving the interests of the graduate program.  
Graduate students must remain in residence at Stanford for the duration of the program.

### MASTER OF FINE ARTS IN DESIGN

University requirements for the M.F.A. are described in the "Graduate Degrees" section of this bulletin.

### THE GRADUATE PROGRAM IN DESIGN

Working jointly, the departments of Art & Art History and Mechanical Engineering offer graduate degrees in product and



visual design. A large physical environment, the Design Yard, provides professional studio space and well-equipped shops. Flexible programs may include graduate courses in fields such as engineering design, biotechnology, marketing, microcomputers, or the studio and art history curriculum. The program centers on a master's project and may also include work in advanced art and design. The program is structured to balance independent concentration with the use of the University and community, and interaction with the students and faculty of the graduate Design program. Cross-disciplinary interaction is encouraged by a four-person graduate Design faculty.

### ADMISSION

1. The applicant must have a B.A., B.F.A., or B.S. from an accredited school. It is expected that the applicant will have a strong background in studio art, either an undergraduate degree or at least three years of independent studio practice.
2. Applications and portfolios for the design program must be received by January 10, 2012. Students accepted to the program are admitted for the beginning of the following Autumn Quarter. No applicants for mid-year entrance are considered.
3. Portfolio Specifications:
  - a. A portfolio or book containing 12-24 photographs, originals, or printouts of creative work, appropriately labeled and identified.
  - b. A DVD showing works in action. Total run time should not exceed five minutes, and the disc should be playable in any standard DVD player. CD-ROMs are not accepted.

### FIELDS OF STUDY OR DEGREE OPTIONS

Fields of study for the M.F.A. degree are offered in Product or Visual Design.

These fields of study are not declared on Axxess; they are not printed on the transcript or the diploma.

### DEGREE REQUIREMENTS

1. *Residency*—The student must complete a minimum of two years (six quarters) of graduate work in residence at Stanford.
2. *Units*—The student must complete 57 units of course work chosen in consultation with an adviser in the department. At least 18 of the 57 units must be in ARTSTUDI 360A,B,C, Master's Project: Design and ME 316A,B,C, Product Design: MS Project (12 units in the ARTSTUDI series and 6 units in the ME series). Typically, students working for the M.F.A. degree are encouraged to take full advantage of both sides of the Joint Program in Design, as well as courses that tap the broader resources of the university.
3. *Required Courses (6 courses, 19-22 units)*—
  1. ARTSTUDI 160. Design I: Fundamental Visual Language
  2. ARTSTUDI 260. Design II: The Bridge
  3. ME 203. Design and Manufacturing
  4. ME 312. Advanced Product Design: Formgiving
  5. ME 313. Human Values and Innovation in Design
  6. Any one course sponsored by the d.school
4. *One course from the following (4 units)*—
  1. ARTSTUDI 269. Professional Design Exploration
  2. ARTSTUDI 268. Design Synthesis
  3. ARTSTUDI 269. Advanced Creative Studies
5. *Two courses from the following (6-8 units)*—
  1. ARTSTUDI 161. Catalyst for Design
  2. ARTSTUDI 166. Design in Motion
  3. ARTSTUDI 167. Introduction to Animation
  4. ARTSTUDI 180. Color
  5. ARTSTUDI 263. Paper
  6. ME 120. History and Philosophy of Design
  7. ME 216A. Advanced Product Design: Needfinding
6. *Thesis Requirements (6 courses, 18 units)*—
  1. ARTSTUDI 360A,B,C (9 units)
  2. ME 316A,B,C (9 units)
7. *Electives (2 courses, 6 units)*—Any two courses at student's discretion.

## FILM AND MEDIA STUDIES

### UNDERGRADUATE PROGRAMS IN FILM AND MEDIA STUDIES

The Bachelor of Arts in Film and Media Studies provides an introduction to film aesthetics, national cinematic traditions, modes of production in narrative, documentary, and experimental films, the incorporation of moving image media by contemporary artists, and the proliferation of new forms of digital media. The program is designed to develop the critical vocabulary and intellectual framework for understanding the role of cinema and related media within broad cultural and historical concepts.

### GRADUATE PROGRAMS IN DOCUMENTARY FILM AND VIDEO

The Master of Fine Arts program in documentary production provides a historical, theoretical, and critical framework within which students master the conceptual and practical skills for producing nonfiction film and video. The M.F.A. is a terminal degree program with a two-year, full-time curriculum representing a synthesis of film praxis and film and media history, theory, and criticism. Courses provide an intellectual and theoretical framework within which students' creative work is developed. Students proceed through the program as a cohort. The program does not permit leaves of absence.

The M.F.A. degree is designed to prepare graduate students for professional careers in film, video, and digital media. Graduates are qualified to teach at the university level. The philosophy of the program is predicated on a paradigm of independent media that values artistic expression, social awareness, and an articulated perspective. Students become conversant with the documentary tradition as well as with alternative media and new directions in documentary. Training in documentary production is combined with the development of research skills in film criticism and analysis. Electives in film studies, art history, and studio art provide an intellectual and theoretical framework within which creative work is realized. The parallel focus on production and studies prepares students for an academic position that may require teaching both film studies and production.

### BACHELOR OF ARTS IN FILM AND MEDIA STUDIES

#### SUGGESTED PREPARATION FOR THE MAJOR

Students considering a major in film and media studies should take FILMSTUD 4, Introduction to Film Study, and are encouraged to take ARTHIST 1, Introduction to the Visual Arts, during their freshman or sophomore year. These courses anchor the major through exposure to film language, genre, and visual and narrative structures. Majors are required to take one course in the fundamentals of film and video production.

*Suggested or Recommended Courses (all of which will meet major requirements) --*

- ARTHIST 1. Introduction to the Visual Arts (WIM course for Art History)
- FILMSTUD 4. Introduction to Film Study
- FILMSTUD 101. Cinematic Analysis (WIM course for Film & Media Studies)

#### FIELDS OF STUDY OR DEGREE OPTION

Advanced undergraduate courses are offered in five fields of study. These fields are declared on Axxess:

- Film History
- Film and Culture
- Film, Media, and Technology
- Writing, Criticism, and Practice
- Aesthetics and Performance

Working with a faculty adviser, students choose five courses in their field from course offerings in Art and Art History and one course from another department in the University.

## DEGREE REQUIREMENTS

All undergraduate majors complete a minimum of 65 units (16 courses of 3-5 units each), or 15 courses plus an honors thesis. FILMSTUD 101, Cinematic Analysis (WIM course) is required for all majors. All courses for the major must be taken for a letter grade. To declare the major, students must meet with the undergraduate coordinator. At that time the student selects a faculty adviser. Majors are required to attend an orientation session presented by the professional staff of the Art and Architecture Library, which introduces the tools of research and reference available on campus or through the Internet. This requirement should be completed no later than the quarter following the major declaration.

### *Required Courses—*

1. ARTHIST 1. Introduction to the Visual Arts (preferred) or an Art History elective
2. FILMSTUD 4. Introduction to Film Study
3. FILMSTUD 6. Introduction to Digital Media or FILMSTUD 7. Introduction to Television Studies
4. FILMSTUD 100A, B, C. History of World Cinema I, II, III
5. FILMSTUD 101. Fundamentals of Cinematic Analysis (WIM course)
6. FILMSTUD 102. Theories of the Moving Image
7. FILMPROD 114. Introduction to Film and Video Production
8. *Concentration*—Five courses, four of which must be in a single film and media studies concentration developed by the student in consultation with an adviser. Concentration areas are: film history; film and culture; aesthetics and performance; film, media, and technology; and writing, criticism, and practice. The remaining course must be related, situating the student's concentration in a broader context.
9. *Capstone Experience*—FILMSTUD 290. Senior Seminar: Movies and Methods, offered once a year. The Senior Seminar represents the culminating intellectual experience for Film Studies majors choosing not to write an honors thesis. Honors thesis writers may also take the senior seminar. Seniors who may not be in residence in the quarter that the senior seminar is offered may enroll in their junior year. Movies and Methods provides majors with an opportunity to synthesize their previous work in Film Studies and work in an advanced setting with a faculty member.

## HONORS PROGRAM

Students who want to write an honors thesis should consult with a potential adviser by the beginning of junior year. The adviser must be a faculty member in residence during the student's senior year who can oversee the student's progress throughout the project.

The minimum requirements for admission to the honors program in the department are an overall GPA of 3.7 and at least 3.7 in Film and Media Studies courses. Students must complete at least five Film and Media Studies courses at Stanford by the end of their junior year; four must be completed by the end of Winter Quarter. Students wishing to write an honors thesis must announce their intention by submitting a form signed by the thesis adviser, who need not be the student's academic adviser, by February 1 of their junior year.

Candidates for the honors program must submit to the Film and Media Studies faculty a 3-5 page thesis proposal outlining the themes of the thesis, a bibliography, a tentative schedule for research and writing, and one completed paper that demonstrates the student's ability to conceptualize and write about ideas. This complete proposal must be submitted to the department's undergraduate coordinator no later than the third week of Spring Quarter of the candidate's junior year so that it can be read, discussed, and voted upon at the faculty's regular meeting in early

May. A candidate is accepted into the honors program by a simple majority.

Once admitted to the honors program, students work with their thesis advisers to research, organize, and write the thesis, and to enlist one other faculty member to serve on the thesis reading committee.

To aid the process of research and writing, students preparing an honors thesis are paired with a graduate student mentor. Students should contact the graduate student mentor in their junior year as soon as they begin to think about writing an honors thesis. Honors thesis writers must register for 10 units of FILMSTUD 297, Honors Thesis Writing, while working on the thesis. Students are required to register for two to five units each quarter during their senior year, for a total of ten units. Students may apply for UAR research grants to help finance trips or expenses related to preparing the research for their honors thesis.

Students and thesis advisers should plan the work schedule so that a final manuscript is in the hands of each member of the thesis reading committee by the beginning of the seventh week of the student's final quarter at Stanford (one year from proposal to final manuscript). The thesis adviser assigns a letter grade; both faculty readers must approve the thesis for honors before the student is qualified to graduate with honors.

### *Required Courses—*

- FILMSTUD 297. Honors Thesis Writing

## MINOR IN FILM AND MEDIA STUDIES

A minor in Film Studies requires four core courses and three elective courses for a total of seven courses. Courses must focus on film and use the method of film study towards completion of the minor; courses that use film to illustrate a cultural topic are not eligible. Film Production and Studio Art courses may not be used towards the requirements.

Upon declaring the minor, students are assigned an adviser with whom they plan their course of study and electives. A proposed course of study must be approved by the adviser and placed in the student's departmental file. Only one class may be taken for credit outside the Stanford campus, including Stanford Overseas Studies programs. Minors are required to attend an orientation session presented by the professional staff of the Art Library, which introduces the many tools of research and reference available on campus or through the Internet. This requirement should be completed no later than the quarter following the minor declaration.

*Requirements*—The minor in Film Studies requires seven courses for a minimum of 29 units.

### *Required Courses for the Minor—*

- FILMSTUD 4. Introduction to Film Study
- FILMSTUD 102. Theories of the Moving Image
- One course from FILMSTUD 100A,B,C. History of World Cinema I, II, III
- One course in a national cinema or an additional course in film history

*Optional Courses for the Minor*—Three elective courses, which may include one film production course. An elective can be chosen from courses in other departments only if approved by the Film Studies coordinator and core faculty for their stress on methods of film analysis. These may include courses in national cinemas, film genres, experimental and documentary film, or film theory.

## MASTER OF FINE ARTS IN DOCUMENTARY FILM AND VIDEO

University requirements for the M.F.A. are described in the "Graduate Degrees" section of this bulletin.

## ADMISSION

The program requires residency for two consecutive years. The admissions committee seeks applicants who have some work experience beyond their undergraduate years and can articulate

why they want to learn documentary film and video production. The committee looks for evidence of the likelihood of success in a rigorous academic program that emphasizes creative work. The conceptual and technical skills required for documentary work are sufficiently different from fictional narrative to make the Stanford program inappropriate for students interested in narrative filmmaking. Each year, eight students are admitted to the program. Applications and portfolios must be received by January 10, 2012. Students accepted into the program at this time must enroll in Autumn Quarter of 2012. The program does not allow for deferred admission or a mid-year enrollment.

**Portfolio**—The department requires a DVD (NTSC only) copy of film or video work for which the applicant has had creative control. The sample work must be well labeled and accompanied by a brief synopsis, running time of the clips, the circumstances of production, and the applicant's role. Total running time for the work sample should not exceed 15 minutes and may consist of more than one project. Work on which the applicant had only a production assistant role is not appropriate for submission. Student work, however, is appropriate for consideration. Applicants who have had only minimal film or video production experience should submit an example of their best creative work in any medium.

## FIELDS OF STUDY OR DEGREE OPTIONS

Fields of study for the M.F.A. degree are offered in Documentary Film.

## DEGREE REQUIREMENTS

- Residency**—Completing two years (six quarters) of graduate work in residence at Stanford.
- Units**—A minimum of 80 units is required for the M.F.A. degree. In the production core, students are required to conceptualize and visualize their ideas in a series of writing and producing courses that focus on documentary story structure. These courses are taken in tandem with project-based production courses that provide training in the technical and conceptual aspects of cinematography, sound recording, and editing. Discussion of form and content is a signature component of the writing and production courses. The production core is complemented by a series of required film studies courses in documentary plus elective courses in the history, aesthetics, ideology, and theory of all genres of moving image media. Core film production courses are offered S/NC only. All other courses must be taken for a letter grade.
- M.F.A. Thesis Project**—In the second year of the program, each student produces a 20-minute film or video documentary that constitutes the thesis project. In FILMPROD 405, students choose a topic, research and develop their project, and write a proposal for submission. A project may not begin production until the final proposal has been approved. Most of the production and post-production occurs in FILMPROD 406A and 406B in Winter and Spring quarters.
- Required Courses**—
  - Core Production courses (eight courses, 32 units)**—Core courses must be taken in sequence.
    - FILMPROD 400. Film/Video Writing and Directing
    - FILMPROD 401. Nonfiction Film Production
    - FILMPROD 402. Digital Video
    - FILMPROD 403. Advanced Documentary Directing
    - FILMPROD 404. Advanced Film and Video Production
    - FILMPROD 405. Producing Practicum
    - FILMPROD 406A,B. Documentary MFA Thesis Seminar I and II
  - Core Film Studies courses (six courses, 25 units)**—
    - FILMSTUD 302. Theories of the Moving Image
    - FILMSTUD 315. Documentary Issues and Traditions
    - FILMSTUD 316. International Documentary
    - FILMSTUD 410A,B. Documentary Perspectives I and II

- Electives (seven courses, 28 units)**—To be chosen in consultation with the student's adviser.
  - Art History—one course, 4 units
  - Studio Art and/or Communications—two courses, 8 units
  - Film Studies—three courses, 12 units
  - Choice Elective—one course, 4 units

## ART HISTORY AND FILM STUDIES COURSE CATALOG NUMBERING SYSTEM

The first digit of the ARTHIST and FILMSTUD course number indicates its general level of sophistication.

001-099	Introductory
100-199	Undergraduate level lectures
200-299	Undergraduate seminars/individual work
300-399	Graduate level lectures
400-599	Graduate seminars/individual work

The course numbers below indicate the area of Art History and Film Studies addressed.

Art History	
001-099	Introductory
100-104	Ancient
105-109	Medieval
110-119	Renaissance
120-139	Early Modern
140-159	Modern
160-179	Contemporary
180-189	Asia
190-195	Africa and the Americas
200-299	Seminars and Colloquia
410-499	Historical Studies
500-599	Critical Studies
600-699	Graduate Research
Film Studies	
004-103	Introductory
111-118	Genre
130-139	National Cinemas
140-149	Aesthetics
150-159	Other
220-299	Seminars
400-660	Graduate Seminars

## OVERSEAS STUDIES COURSES IN ART AND ART HISTORY

For course descriptions and additional offerings, see the listings in the *Stanford Bulletin's* ExploreCourses web site (<http://explorecourses.stanford.edu>) or the Bing Overseas Studies web site (<http://bosp.stanford.edu>). Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

## AUTUMN QUARTER

### BERLIN

- OSPBER 17. Split Images: a Century of Cinema. 4 units, Kramer, GER:DB:Hum, EC:GlobalCom
- OSPBER 60. Cityscape as History: Architecture and Urban Design in Berlin. 5 units, Matthias Pabsch, GER:DB:Hum

### FLORENCE

- OSPFLOR 34. The Woman in Florentine Art. 4 units, Timothy Verdon, GER:DB:Hum, EC:Gender
- OSPFLOR 41. The Contemporary Art Scene in Tuscany: Theory and Practice. 3-5 units, Filippo Rossi
- OSPFLOR 55. Academy of Fine Arts: Studio Art. 1-3 units, Ermelinda Campani

- OSPFLOR 115Y. The Duomo and Palazzo della Signoria: Symbols of a Civilization. 4 units, Timothy Verdon, GER:DB:Hum
- OSPFLOR 134F. Modernist Italian Cinema. 5 units, Ermelinda Campani, GER:DB:Hum

#### MADRID

- OSPMADR 46. Drawing with Four Spanish Masters: Goya, Velázquez, Picasso and Dalí. 3 units, Oscar Sánchez Fuster

#### OXFORD

- OSPOXFRD 221Y. Art and Society in Britain. 5 units, Geoffrey Tyack, GER:DB:Hum

#### PARIS

- OSPPARIS 42. EAP: Drawing with Live Model. 2 units, Staff
- OSPPARIS 43. EAP: Painting and Use of Color. 2 units, Staff
- OSPPARIS 44. EAP: Graphic Art. 2 units, Staff
- OSPPARIS 107Y. The Age of Cathedrals: Religious Art and Architecture in Medieval France. 4 units, Colette Deremble, Jean Paul Deremble, GER:DB:Hum

#### WINTER QUARTER

##### FLORENCE

- OSPFLOR 48. Sharing Beauty: Florence and the Western Museum Tradition. 4 units, Filippo Rossi, Timothy Verdon, GER:DB:Hum
- OSPFLOR 49. The Cinema Goes to War: Fascism and World War II As Represented in Italian and European Cinema. 5 units, Ermelinda Campani, GER:DB:Hum
- OSPFLOR 55. Academy of Fine Arts: Studio Art. 1-5 units, Ermelinda Campani
- OSPFLOR 111Y. From Giotto to Michelangelo: Introduction to the Renaissance in Florence. 4 units, Timothy Verdon, GER:DB:Hum

##### MADRID

- OSPMADR 45. Women in Art: Case Study in the Madrid Museums. 4 units, Julia Doménech López, GER:DB:Hum, EC:Gender

##### PARIS

- OSPPARIS 42. EAP: Drawing with Live Model. 2 units, Staff
- OSPPARIS 43. EAP: Painting and Use of Color. 2 units, Staff
- OSPPARIS 44. EAP: Graphic Art. 2 units, Staff
- OSPPARIS 54. The Artist's World: The Workshop, Patronage and Public in 19th and 20th Century France. 4 units, Estelle Halevi, GER:DB:Hum

#### SPRING QUARTER

##### FLORENCE

- OSPFLOR 54. High Renaissance and Maniera. 5 units, Timothy Verdon, GER:DB:Hum
- OSPFLOR 55. Academy of Fine Arts: Studio Art. 1-5 units, Ermelinda Campani
- OSPFLOR 58. Space as History: Urban Change and Social Vision: Florence 1059-2008. 4 units, Filippo Rossi, Timothy Verdon, GER:DB:Hum
- OSPFLOR 67. Women in Italian Cinema: Maternity, Sexuality and the Image. 4 units, Ermelinda Campani, GER:DB:Hum, EC:Gender
- OSPFLOR 71. Becoming an Artist in Florence: The Contemporary Artistic Craftmanship in Tuscany and the New Tendencies in the Visual Future. 3-5 units, Filippo Rossi

##### PARIS

- OSPPARIS 42. EAP: Drawing with Live Model. 2-2 units, Staff

- OSPPARIS 43. EAP: Painting and Use of Color. 2-2 units, Staff
- OSPPARIS 44. EAP: Graphic Art. 2-2 units, Staff
- OSPPARIS 60. Representation of Women in Christian Art: Boldness and Virtue. 4 units, Brigitte Gallini, GER: DB:Hum, EC:Gender
- OSPPARIS 92. Building Paris: Its History, Architecture, and Urban Design. 4 units, Estelle Halevi, GER:DB:Hum

## ASTRONOMY

*Emeriti: (Professors)* Von R. Eshleman, Peter A. Sturrock, G. Leonard Tyler, Robert V. Wagoner

*Committee in Charge:* Vahé Petrosian (*Director*), Roger W. Romani, Sarah Church

*Professors:* Roger Blandford (Physics, SLAC), Blas Cabrera (Physics), Steven Kahn (Physics, SLAC), Peter Michelson (Physics, SLAC), Vahé Petrosian (Physics, Applied Physics), Roger W. Romani (Physics)

*Associate Professors:* Steve Allen (Physics, SLAC), Tom Abel (Physics, SLAC), Sarah Church (Physics)

*Assistant Professors:* Stefan Funk (Physics, SLAC), Chau-Lin Kuo (Physics, SLAC), Risa Wechsler (Physics, SLAC)

*Professor (Research):* Philip H. Scherrer (Physics)

*Program Offices:* Varian, Room 316

*Mail Code:* 94305-4060

*Phone:* (650) 723-1439

*Web Site:* <http://www.stanford.edu/dept/astro>

Astronomy courses are offered primarily through the Physics department, with subject code PHYSICS on the *Stanford Bulletin's* ExploreCourses web site.

Although Stanford University does not have a degree program in astronomy or astrophysics, teaching and research in various branches of these disciplines are ongoing activities in the departments of Applied Physics, Electrical Engineering, and Physics.

For the convenience of students interested in astronomy, astrophysics, and cosmology, a course program for undergraduate and graduate study is listed in the "Astronomy Cognate Courses" section of this bulletin. The list provides introductory courses for the student who wishes to be informed about the fields of astronomy without the need for prerequisites beyond high school algebra and physics. Courses in astronomy numbered below 100 are designed to serve this group of students. Astronomy courses numbered 100-199 serve the student interested in an initial scientific study of astronomy. The courses numbered 200 and above are for graduate students and advanced undergraduates, subject to prior approval by the course instructor.

## UNDERGRADUATE PROGRAMS IN ASTRONOMY

The University does not offer a separate undergraduate major in Astronomy. Students who intend to pursue graduate study in astronomy or space science are encouraged to major in physics, following the advanced sequence if possible, or in electrical engineering if the student has a strongly developed interest in radioscience. The course descriptions for these basic studies are listed under the appropriate department sections of this bulletin. Students desiring guidance in developing an astronomy-oriented course of study should contact the chair of the Astronomy Program Committee. The following courses are suitable for undergraduates and are recommended to students considering advanced study in astronomy or astrophysics: PHYSICS 100, Introduction to Observational and Laboratory Astronomy; PHYSICS 160, Introduction to Stellar and Galactic Astrophysics; PHYSICS 161, Introduction to Extragalactic Astrophysics and Cosmology; GES 222, Planetary Systems: Dynamics and Origins. Students planning study in astronomy beyond the B.S. are urged to take PHYSICS

260 and 262, Introduction to Astrophysics and to Gravitation, and to consider an undergraduate thesis (PHYSICS 169) or honors thesis in an astrophysics related area. The above-mentioned courses are required for physics majors who choose the curriculum with a concentration in astrophysics (see the "Physics" section of this bulletin). The student observatory, located in the hills to the west of the campus and equipped with a 24-inch and other small reflecting telescopes, is used for instruction of the observation-oriented courses.

### MINOR IN ASTRONOMY

The minor program in Astronomy is described in the "Physics" section of this bulletin. The non-technical minor, intended for students whose major does not require the PHYSICS 40 series, requires 10 units of Physics courses (PHYSICS 21, 23, 25/26) and 9-10 units of Astronomy courses (3-4 units of PHYSICS 50 or 100, and 6 units of PHYSICS 15, 16, 17, 18N). The technical minor for other students consists of 14 units of PHYSICS 70, 100 (or greater), 160, 161, EE 106, and GES 122 in addition to the 40 or 60 series.

To be accepted to the minor program, students need to obtain an adviser selected from the faculty in the Astronomy Course Program. The minor declaration deadline is three quarters before graduation (that is, beginning Autumn Quarter if the student is graduating at the end of Spring Quarter). All courses for the minor must be taken at Stanford University, and a letter grade of 'C-' or better must be received for all units applied toward the minor.

### GRADUATE PROGRAMS IN ASTRONOMY

Graduate programs in astronomy and astrophysics and related topics are carried out primarily in the Department of Physics but also the departments of Applied Physics and Electrical Engineering. Students should consult the course listings, degree requirements, and research programs of these departments for more detailed information. Graduate research opportunities are available in many areas of theoretical and observational astronomy, including research projects using the Hobby Eberly telescope, a 10-meter-class telescope located at McDonald Observatory in Texas. Other observational and experimental opportunities are in ground-based observations of CMB and space-based gamma-ray observations with Fermi and in the future, X-ray observations with NuSTAR. For further information on graduate research opportunities, see the "Center for Space Science and Astrophysics" section of this bulletin and the Kavli Institute of Particle Astrophysics and Cosmology at <http://kipac.stanford.edu>.

Students planning to conduct research in astronomy and astrophysics are required to take PHYSICS 360, Physics of Astrophysics, and at least one of the following: PHYSICS 361, Stellar and Galactic Astrophysics; 362, Extragalactic Astrophysics and Cosmology; or 363, Solar and Solar-Terrestrial Physics. Students lacking a background in astrophysics, gravitation, and plasma physics should take PHYSICS 260 and 262, Introduction to Astrophysics and to Gravitation, and PHYSICS 312, Basic Plasma Physics. Students with special interests in gravitation should take PHYSICS 364, Advanced Gravitation.

Students interested in research programs in space physics involving spacecraft studies of the planets, their satellites, and their near-space environments should see the "Center for Space Science and Astrophysics" section of this bulletin.

## ATHLETICS, PHYSICAL EDUCATION, AND RECREATION

*Emeriti:* (Professor) Wesley K. Ruff; (Associate Director) Robert C. Young; (Assistant Director) Shirley Schoof; (Athletic Director) Ted Leland

*Athletic Director:* Bob Bowlsby

*Deputy Athletic Directors:* Patrick Dunkley, Ray Purpur

*Senior Associate Athletic Director, Intercollegiate Services/Senior Woman Administrator:* Beth Goode

*Senior Associate Athletic Director, External Relations:* Chris Hutchins

*Senior Associate Athletic Director, Intercollegiate Sports:* Earl Koberlein

*Senior Associate Athletic Director, Physical Education, Recreation, and Wellness:* Eric Stein

*Senior Associate Athletic Director, CFO:* Brian Talbott

*Associate Athletic Director for Business Strategy:* Kevin Blue

*Associate Director of Development, Development:* Joe Karlgaard

*Associate Directors of Development for Major Gifts:* Scott Alexander, Darcie Bransford

*Senior Assistant Athletic Director, Media Relations:* Jim Young

*Assistant Athletic Director, Compliance Services:* Megan Boone

*Assistant Athletic Director, Marketing:* Marie Vasquez

*Assistant Athletic Director, Capital Planning:* David Schinski

*Sport Directors:* Basketball, men: Johnny Dawkins; Basketball,

women: Tara VanDerveer; Crew, men: Craig Amerkhanian;

Crew, women: Yasmin Farooq; Cross Country: Jason Dunn;

Diving: Richard Schavone; Field Hockey: Tara Danielson;

Football: David Shaw; Golf, men: Conrad Ray; Gymnastics,

men: Thom Glielmi; Gymnastics, women: Kristen Smyth;

Lacrosse: Amy Bokker; Lightweight Crew, women: Al Acosta;

Sailing: John Vandemoer; Soccer, men: Bret Simon; Softball:

John Rittman; Squash, women: Mark Talbott; Swimming, men:

Skip Kenney; Tennis, men: John Whitlinger; Tennis, women:

Lele Forood; Track and Field, women: Edrick Floreal;

Volleyball, men: John Kosty; Volleyball, women: John

Dunning; Water Polo, men: John Vargas; Water Polo, women:

John Tanner; Wrestling: Jason Borrelli

*Department Offices:* Arrillaga Family Sports Center

*Mail Code:* 94305-6150

*Phone:* (650) 723-4591

*Web Site:* <http://cardinalrec.stanford.edu>

*Athletics Web Site:* <http://gostanford.com>

Courses offered by the Department of Athletics, Physical Education, and Recreation are listed under the subject code ATHLETIC on the *Stanford Bulletin's* ExploreCourses web site.

From the founding of the University, Stanford's leaders have believed physical activity is valuable for its own sake and complementary to the educational purpose of the University. The mission of the Department of Athletics, Physical Education, and Recreation is to offer the widest possible range of quality programs for athletic participation and physical fitness at all levels of skill and interest. Within the limitations of its resources, the department provides a broad range of instructional, recreational, and intramural competitive programs for all who wish to participate. The intrinsic value to the participant is the primary criterion by which the worth of the programs should be judged.

The goals of the department's programs are to promote understanding of the value and role of physical activity as an important dimension of the human condition, to develop performance skills in sport, to develop the habit of participation, and to provide leadership opportunities in aquatics, sports, and other physical activities. To this end, the program encompasses a diversity of learning and participating opportunities from informal recreation through organized intramural competition, basic instructional classes, and theoretical study to, and including, intercollegiate athletic competition.

### PROGRAMS IN ATHLETICS, PHYSICAL EDUCATION, AND RECREATION

No degrees are offered in Physical Education.

### INTERCOLLEGIATE ATHLETICS

In keeping with American university tradition, Stanford offers a broad intercollegiate athletic program. The objectives are to

provide the opportunity to compete at the highest possible level without jeopardizing the integrity of the individual or the institution; to adhere strictly to all University, association, and conference rules governing athletic participation; and to encourage effectively the achievement of academic goals by student athletes at the same rate as other University students. As a member of the National Collegiate Athletic Association (NCAA), Stanford fields both men's and women's varsity teams. Those for men are baseball, basketball, crew, cross country, fencing, football, golf, gymnastics, sailing, soccer, swimming and diving, tennis, track and field, volleyball, water polo, and wrestling. Those for women are basketball, crew, cross country, fencing, field hockey, golf, gymnastics, lacrosse, sailing, soccer, softball, squash, swimming and diving, synchronized swimming, tennis, track and field, volleyball, and water polo.

Both men's and women's teams are affiliated with the Pacific Ten Conference, one of the premier athletic conferences in the nation. Additional or alternative intercollegiate athletic competition is available for all teams.

### CLUB SPORTS

The Stanford Club Sports program provides competition in sports not included in the intercollegiate varsity program and instruction in classes or activities not included in the Physical Education program. It also develops student leadership in organizing, administering, and funding activities. The club program is actively supervised by the Coordinator of Club Sports, but the emphasis is on student interest and leadership to initiate, organize, and conduct the respective clubs. Those students in clubs that meet the criteria for inclusion in the formal curriculum may apply for units of credit.

### INTRAMURAL SPORTS (IM)

Students interested in participating in intramural sports should visit the intramural web site: <http://www.stanford.edu/group/intramurals> for more information. They may visit the IM Office in Ford/Burnham. The program includes formal competition in fifteen team and individual sports, using both league and single elimination tournament play structure. Individuals are encouraged to check the web site at the beginning of each quarter to obtain registration and league information. Registration occurs on the second Monday and Tuesday of each quarter, with mandatory captain meetings held that Thursday evening. Intramural leagues are offered in Autumn, Winter, Spring, and Summer quarters.

### RECREATION

The department provides facility use for faculty, staff, and students (and, for some activities, their immediate families) to participate in aquatics, conditioning, and sports for general recreation. Specific recreation hours for all the facilities are posted throughout the year at the respective facilities and at <http://suwellness.stanford.edu>.

The golf course and driving range are available for faculty, staff, and student use on a fee basis; information is available from the Golf Pro Shop.

Recreational classes are offered in areas such as rock climbing, indoor cycling, and golf.

### FACILITIES

Athletic facilities are located throughout the campus. On the west side of campus are the Golf Course, the Golf Driving Range, the Red Barn Stables, Roble Field and Pool, the Sand Hill Intramural Fields, and the West Campus Tennis Courts. Centrally located is the Tresidder Fitness Center. On the east side of campus are the Arrillaga Center for Sports and Recreation, the Arrillaga Family Racquetball Center, the Arrillaga Family Sports Center, Avery Aquatic Center, Burnham Pavilion, Cobb Track and Angell Field, the Ford Center for Sports and Recreation, the Manzanita Basketball Court and Field, Maples Pavilion, Taube South Tennis Courts, and Taube Tennis Stadium.

Off-campus facilities include the Morrison Boathouse, a sailing and rowing facility.

## CURRICULUM AND SERVICES

The diverse instructional program strives to accommodate the sports interests of all undergraduates and graduate students. Only intercollegiate varsity men's and women's teams are limited to undergraduates. Skill groupings and limited class sizes enable the beginning student or the advanced performer to achieve success within the limits of individual motivation and potential. Skill level in, and knowledge about, a specific activity as well as available space are the only limitations to enrollment. Physically disabled students are encouraged to contact Eric Stein ([elstein@stanford.edu](mailto:elstein@stanford.edu)) for enrollment advice.

*Academic Credit*—Activity classes carry 1 unit of credit for satisfactory completion of work. Although there is no limitation on the number of activity classes in which a student may enroll, no more than 8 units of these activity classes (and/or other University activity classes) may be applied toward undergraduate graduation requirements (see the "Undergraduate Degrees" section of this bulletin).

*Auditing*—No auditing is allowed in activity classes. Faculty and staff may take an activity class as space is available with instructor consent after student enrollment is completed.

*Class Fees*—Fees are charged for enrollment in all physical education activity classes and club sports. Class fees are posted directly to the student's university account.

*Class Sign-ups*—Students sign up for classes on Axess. For classes with limited enrollment, students must attend the first class meeting or contact the instructor to guarantee their space in class.

*Deadline for Adding a Class*—Students who have never appeared in a class may not enroll in that class after the fourth class meeting has passed. Students may add the class after the fourth meeting if they have been in regular attendance, but must add the class to their study list by the study list deadline, Friday of the third week of the quarter.

*Equipment*—Information on equipment and recommended class attire is available from the department or instructor.

*Lockers*—Lockers are available for rent to faculty/staff and students at the Arrillaga Family Sports Center, Ford Center and Roble Gym. The fee for faculty/staff is \$30 per quarter or \$70 per year. The fee for students is \$20 per quarter or \$50 per year.

# BIOLOGY

*Emeriti Professors:* Bruce S. Baker, Winslow R. Briggs, Allan M. Campbell, David Epel, Donald Kennedy, Peter Ray, Joan Roughgarden, Robert Schimke, Norman K. Wessells, Dow O. Woodward, Charles Yanofsky

*Emeriti Professor (Teaching):* R. Paul Levine

*Chair:* Robert D. Simoni

*Professors:* Barbara A. Block, Steven M. Block, Larry B. Crowder, Martha S. Cyert, Gretchen C. Daily, Mark W. Denny, Rodolfo Dirzo, Paul R. Ehrlich, Marcus W. Feldman, Russell D. Fernald, Christopher B. Field, Wolf Frommer, Judith Frydman, William F. Gilly, Deborah M. Gordon, Elizabeth A. Hadly, Philip C. Hanawalt, H. Craig Heller, Patricia P. Jones, Richard G. Klein, Ron R. Kopito, Sharon R. Long, Liqun Luo, Susan K. McConnell, Fiorenza Micheli, Harold A. Mooney, W. James Nelson, Stephen R. Palumbi, Dmitri Petrov, Robert M. Sapolsky, Carla J. Shatz, Michael A. Simon, Robert D. Simoni, George N. Somero, Tim P. Stearns, Stuart H. Thompson, Shripad Tuljapurkar, Peter Vitousek, Virginia Walbot, Ward B. Watt

*Professor (Teaching):* Carol L. Boggs

*Associate Professors:* Dominique Bergmann, Or Gozani, Mary Beth Mudgett, Noah A. Rosenberg, Mark J. Schnitzer, Kang Shen

*Assistant Professors:* Hunter B. Fraser, Tadashi Fukami, Christopher Lowe, Ashby Morrison, Jan M. Skotheim

*Courtesy Professors:* Joseph Berry, Daniel Fisher, Arthur R. Grossman, Alfred Spormann, Irving Weissman, Wing Wong

*Courtesy Associate Professors:* Kathryn Barton, Zhiyong Wang

*Courtesy Assistant Professors:* David Ehrhardt, Martin Jonikas, Jonathan Payne, Sue Rhee

*Lecturers:* Daria Hekmat-Scafe, Waheeda Khalfan, Shyamala D. Malladi, Patricia Seawell, Andrew Todhunter, James Watanabe

*Consulting Professors:* Cathy Laurie, Marc Tessier-Lavigne

*Librarian:* Michael Newman

*Main Department Office and Phone:* Gilbert Building, Room 109 – (650) 723-2413

*Student Services Office and Phone:* Gilbert Building, Room 108 – (650) 723-1826 (graduate students); (650)723-5060 (undergraduates)

*Mail Code:* 94305-5020

*Web Site:* <http://biology.stanford.edu>

Courses offered by the Department of Biology are listed under the subject code BIO on the *Stanford Bulletin's* ExploreCourses web site.

The department provides:

- a major program leading to the B.S. degree
- a minor program
- a coterminal program leading to the M.S. degree
- a doctoral program leading to the Ph.D. degree, *and*
- courses designed for the non-major.

## MISSION OF THE UNDERGRADUATE PROGRAM IN BIOLOGY

The mission of the undergraduate program in Biology is to provide students with in-depth knowledge in the discipline, from molecular biology to ecology. Students in the program learn to think and analyze information critically, to draw connections among the different areas of biology, and to communicate their ideas effectively to the scientific community. The major exposes students to the scientific process through a set of core courses and electives from a range of subdisciplines. The Biology major serves as preparation for professional careers, including medicine, dentistry, veterinary sciences, teaching, consulting, research, and field studies.

## LEARNING OUTCOMES

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. the ability to use discipline-specific tools and content knowledge to analyze and interpret scientific data, to evaluate the significance of the data, and to articulate conclusions supportable by the data.
2. the ability, independently and collaboratively, to formulate testable scientific hypotheses and to design approaches to obtain data to test the respective hypotheses.
3. the ability to communicate content understanding and research outcomes effectively using various media.

## MISSION OF THE GRADUATE PROGRAM IN BIOLOGY

For graduate-level students, the department offers resources and experience learning from and working with world-renowned faculty involved in research on ecology, neurobiology, population biology, plant and animal physiology, biochemistry, immunology, cell and developmental biology, genetics, and molecular biology.

The M.S. degree program offers general or specialized study to individuals seeking biologically oriented course work, and to undergraduate science majors wishing to increase or update their science background or obtain advanced research experience.

The training for a Ph.D. in Biology is focused on learning skills required to be a successful research scientist and teacher, including how to ask important questions and then devise and carry out experiments to answer these questions. Students work closely with an established adviser and meet regularly with a committee of faculty members to ensure that they understand the importance of diverse perspectives on experimental questions and approaches. Students learn how to evaluate critically pertinent original literature in order to stay abreast of scientific progress in their areas of interest. They also learn how to make professional presentations, write manuscripts for publication, and become effective teachers.

## FACILITIES

The facilities and personnel of the Department of Biology are housed in the Gilbert Biological Sciences Building, Herrin Laboratories, Herrin Hall, Jasper Ridge Biological Preserve, James H. Clark Center, Lorry I. Lokey Laboratory Building, Jerry Yang and Akiko Yamazaki Environment & Energy Building (Y2E2), and the Carnegie Institution of Washington (all on the main campus); and Hopkins Marine Station in Pacific Grove on Monterey Bay.

Jasper Ridge Biological Preserve (JRBP) is located near Stanford University's campus in the eastern foothills of the Santa Cruz Mountains. The preserve encompasses geologic, topographic, and biotic diversity within its 1,189 acres and provides a natural laboratory for researchers from around the world, educational experiences for students and docent-led visitors, and refuge for native plants and animals. See <http://jrpb.stanford.edu>.

Hopkins Marine Station, located 90 miles from the main University campus in Pacific Grove, was founded in 1892 as the first marine laboratory on the west coast of North America. For more information, including courses taught at Hopkins Marine Station with the subject code BIOHOPK, see the "Biology, Hopkins Marine Station" section of this bulletin.

The department's large collections of plants (Dudley Herbarium), fish, reptiles, and amphibians, as well as smaller collections of birds, mammals, and invertebrates, are housed at the California Academy of Sciences in San Francisco, where they, and extensive collections of the academy, are available to those interested in the systematics of these groups. Entomological collections, restricted to those being used in particular research

projects, are housed in the Herrin Laboratories. No general collections are maintained except for teaching purposes.

The Falconer Biology Library in Herrin Hall (<http://library.stanford.edu/depts/falconer>) contains over 1,200 current subscriptions and an extensive collection of monographs and reference works. A specialized library is maintained at Hopkins Marine Station.

## BACHELOR OF SCIENCE IN BIOLOGY

The undergraduate major in Biology can serve as a stepping-stone for a wide variety of career opportunities. For students planning to attend medical, dental, or veterinary school, or graduate school in biological and applied sciences, the biology major provides a strong foundation in the basic life sciences. This foundation of knowledge, plus laboratory experience, also prepares students well for research and technical positions in universities, government, and industry.

While a major in Biology provides an excellent background for these technical careers, it can also serve as a valuable and satisfying focus of a liberal arts education for those not planning careers in science-related fields. An understanding of basic biological principles is of increasing importance in today's world. A knowledgeable and concerned citizenry is the best guarantee that these issues will be resolved most effectively. Finally, an understanding of the processes of life can heighten our perception and appreciation of the world around us, in terms of its beauty, variety, and uniqueness.

### ADVISING

Members of the Biology faculty are available for advising on such academic matters as choice of courses, research, suggested readings, and career plans. The student services office maintains a current list of faculty advisers, advising availability, and research interests.

The student services office staff and BioBridge, the department's peer advising group, are prepared to answer questions on administrative matters, such as requirements for the major, approved out-of-department electives, transfer course evaluations, and petition procedures. This office also distributes the department's *Bachelor of Science Handbook*, which delineates policies and requirements, as well as other department forms and informational handouts.

Each undergraduate interested in the Biology major is required to select a department faculty adviser as part of the major declaration process.

### REQUIREMENTS

Candidates for the general Biology B.S. degree must complete the following, which range from 90-105 total units:

*Core Courses* (must be taken for a letter grade when available):

<i>Subject and Catalog Number</i>	<i>Units</i>
BIO 41	5
BIO 42	5
BIO or BIOHOPK 43	5
BIO 44X	5
BIO or BIOHOPK 44Y*	5

\* BIO 44Y not required if completing honors program. Failure to complete honors program results in student being required to complete BIO 44Y.

*Required Foundational Breadth Courses*—two courses may be taken credit/no credit:

<i>Subject and Catalog Number</i>	<i>Units</i>
CHEM 31A,B, or 31X	4-8
CHEM 33, 35, 36, 130*, 131	18
CHEM 135 or 171	3
PHYSICS 21, 22, 23, 24 or 41, 43, 45 or 28, 29	8-12
MATH 19, 20, 21 or 41, 42 or 51**	5-10

One additional Foundational Breadth Course from this list:

BIOHOPK 174H***	3
BIO/STATS 141***	4-5

CS 106A or 106X	3-5
MATH 51** or beyond	5
STATS 60/PSYCH 10	5

\* May be substituted with MATH 100 or beyond if student is interested in the fields of ecology and evolutionary biology.

\*\* May be counted either toward the math requirement or foundational breadth, but not both.

\*\*\* If taken to fulfill the foundational breadth requirement, these courses do not count toward the 24 elective unit requirement.

*Electives*—24 units required, distributed as follows:

- Biology (BIO) or Hopkins Marine Station (BIOHOPK) courses numbered 100 or above.
- Approved out-of-department electives (list also available in the student services office).
- No more than 6 units from any combination of these courses: BIO 196A,B,C, 197WA, 197WB, 198, 198X, 199, 199W, 199X, 290, 290X, 291; BIOHOPK 198H, 199H, or 290H may be applied toward the total number of elective units. No more than 6 units applied toward the elective unit requirement may be taken CR/NC.
- One course from at least three of the four central menu areas listed below. The purpose of the central menu is to expose students to a wide range of topics studied within the field of biology and is intended to give students a breadth of knowledge. Please note—this requirement is only for the general major. Students pursuing a specialized field of study should consult the specific degree requirements listed in the "Fields of Study" section below.

Central Menu Areas:

1. *Molecular (Area 1)*
  - BIO 104. Advanced Molecular Biology
  - BIO 113. Fundamentals of Molecular Evolution<sup>3</sup>
  - BIO 118. Genetic Analysis of Biological Processes<sup>1</sup>
  - BIO 160A. Developmental Biology I<sup>1</sup>
  - BIO 160B. Developmental Biology II<sup>1</sup>
  - BIO 188. Biochemistry I
  - BIO 189. Biochemistry II
  - BIO 230. Molecular and Cellular Immunology<sup>1</sup>
  - CBIO 101. Cancer Biology<sup>1</sup>
  - CEE 274A. Environmental Microbiology I
2. *Cell/Developmental (Area 2)*
  - BIO 118. Genetic Analysis of Biological Processes<sup>1</sup>
  - BIO 129A. Cellular Dynamics I: Cell Motility and Adhesion
  - BIO 129B. Cellular Dynamics II: Building a Cell
  - BIO 137. Plant Genetics<sup>1</sup>
  - BIO 154. Molecular and Cellular Neurobiology<sup>2</sup>
  - BIO 158. Developmental Neurobiology<sup>2</sup>
  - BIO 160A. Developmental Biology I<sup>1</sup>
  - BIO 160B. Developmental Biology II<sup>1</sup>
  - BIO 171. Principles of Cell Cycle Control
  - BIO 230. Molecular and Cellular Immunology<sup>1</sup>
  - CBIO 101. Cancer Biology<sup>1</sup>
  - CEE 274A. Environmental Microbiology I
3. *Organismal (Area 3)*
  - BIO 112. Human Physiology
  - BIO 153. Cellular Neuroscience
  - BIO 154. Molecular and Cellular Neurobiology<sup>2</sup>
  - BIO 158. Developmental Neurobiology<sup>2</sup>
  - BIO 163. Neural Systems and Behavior
  - BIO 172. Molecular Basis of Body Plan Evolution
  - BIOHOPK 161H. Invertebrate Zoology
  - BIOHOPK 162H. Comparative Animal Physiology
  - BIOHOPK 167H. Nerve, Muscle, and Synapse
  - BIOHOPK 169H. Neurobiology and Behavior
  - BIOHOPK 171H. Ecological and Evolutionary Physiology
  - MI 185. Topics in Microbiology
4. *Ecology and Evolution (Area 4)*
  - BIO 101. Ecology
  - BIO 113. Fundamentals of Molecular Evolution



- BIO 121. Biogeography
- BIO 136. Evolutionary Paleobiology
- BIO 143. Evolution
- BIO 144. Conservation Biology
- BIO 145. Behavioral Ecology
- BIO 182. Modeling Cultural Evolution
- BIOHOPK 163H. Oceanic Biology
- BIOHOPK 185H. Ecology and Conservation of Kelp Forest Communities
- BIOHOPK 172H. Marine Ecology
- CEE 274A. Environmental Microbiology I

1. May be used to satisfy either area I or area II requirement.
2. May be used to satisfy either area II or area III requirement.
3. May be used to satisfy either area I or area IV requirement.
4. May be used to satisfy either area III or area IV requirement.
5. May be used to satisfy area I, area II, or area IV requirement.

*Writing In The Major*—one of the following:

<i>Subject and Catalog Number</i>	<i>Units</i>
BIO 145*	4
BIO 196A*	3
BIO 197WA*	3
BIO 197WB*	3
BIO 199W*	3
BIOHOPK 44Y	5
BIOHOPK 184H*	16

\* May also count toward the elective requirement.

Students intending to pursue research careers in biology, especially in ecology, population genetics, or theoretical biology, should be aware that MATH 19, 20, 21, or MATH 41, 42 are minimum mathematics requirements for the B.S. degree in Biology. Substantial additional training in mathematics, including differential equations, linear algebra, and probability theory, is often highly advisable. Students should consult the Biology faculty to discuss individual needs.

Additionally, even though only two or three quarters of physics are required, students should be aware that many graduate and professional schools (for example, Medicine) require a year of general physics with lab. Biology majors are therefore advised to take the year-long physics sequence PHYSICS 21, 22, 23, 24, 25, 26 if they plan to attend graduate or medical school.

For students considering study at Hopkins Marine Station or an overseas program, the department recommends fulfilling as many University General Education Requirements as possible in the first two years at Stanford.

### HOPKINS MARINE STATION

For more information on Hopkins Marine Station, see the “Hopkins Marine Station” section of this bulletin. Students can go to Hopkins as early as Spring Quarter in the sophomore year, and can also go in the junior and/or senior year to take elective courses. Full descriptions of Hopkins Marine Station courses may be viewed on the *Stanford Bulletin's* Explore Courses web site. The following Hopkins Marine Station courses may be used toward the Biology degree requirements:

*Core*—

- BIOHOPK 43. Plant Biology, Evolution, and Ecology (equivalent to BIO 43)
- BIOHOPK 44Y. Core Experimental Laboratory (equivalent to BIO 44Y)

*Electives*—

- BIOHOPK 161H. Invertebrate Zoology (central menu area 3)
- BIOHOPK 162H. Comparative Animal Physiology (central menu area 3)
- BIOHOPK 163H. Oceanic Biology (central menu area 4)
- BIOHOPK 166H. Molecular Ecology
- BIOHOPK 167H. Nerve, Muscle, and Synapse (central menu area 3)
- BIOHOPK 171H. Ecological and Evolutionary Physiology (central menu area 3)
- BIOHOPK 172H. Marine Ecology (central menu area 4)

- BIOHOPK 173H. Marine Conservation Biology
- BIOHOPK 174H. Experimental Design and Probability
- BIOHOPK 182H. Stanford at Sea (6 units maximum)
- BIOHOPK 184H. Holistic Biology: Monterey Bay and the Sea of Cortez (6 units maximum)
- BIOHOPK 185H. Ecology and Conservation of Kelp Forest Ecology
- BIOHOPK 187H. Sensory Ecology
- BIOHOPK 264H. Population Genetics
- BIOHOPK 274. Hopkins Microbiology Course (6 units maximum)
- BIOHOPK 275H. Synthesis in Biology
- BIOHOPK 277H. Biomechanics, Ecological Physiology, and Genetics of Intertidal Communities

*Research and/or Teaching (maximum 6 units combined)*—

- BIOHOPK 198H. Directed Instruction or Teaching
- BIOHOPK 199H. Undergraduate Research
- BIOHOPK 290H. Teaching of Biological Science
- BIOHOPK 300H. Research

See Biology degree requirements above for further information. Many of the Hopkins Marine Station courses may be used to fulfill department major requirements.

### TYPICAL SCHEDULE FOR A FOUR-YEAR PROGRAM

#### FIRST YEAR

<i>Subject and Catalog Number</i>	<i>Qtr. and Units</i>		
	A	W	S
CHEM 31X*, 33, 35, 36. Chemical Principles and Organic Chemistry	4	4	7
MATH 19, 20, 21. Calculus and Analytic Geometry	3	3	4
Freshman requirements, seminars, or GERs	8	8	6
<b>Totals</b>	<b>15</b>	<b>15</b>	<b>17</b>

\* This schedule varies slightly if the student takes CHEM 31A,B.

#### SECOND YEAR

BIO 41. Genetics, Biochemistry, and Molecular Biology	5		
BIO 42. Cell Biology and Animal Physiology		5	
BIO or BIOHOPK 43. Plant Biology, Evolution, and Ecology			5
BIO 44X. Core Molecular Biology Laboratory		5	
BIO or BIOHOPK 44Y. Core Plant Biology & Eco Evo Laboratory			5
CHEM 130, 131. Organic Chemistry	4	3	
General Education Requirements	6	5	8
<b>Totals</b>	<b>15</b>	<b>17</b>	<b>18</b>

#### THIRD YEAR

CHEM 135 (or 171). Physical Chemistry	3		
PHYSICS 21, 22, 23, 24. Introductory Physics	4	4	
General Education Requirements and/or electives	8	11	15
<b>Totals</b>	<b>15</b>	<b>15</b>	<b>15</b>

#### FOURTH YEAR

General Education requirements and/or electives	15	15	15
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### FIELDS OF STUDY

In addition to the undergraduate major program described above, the department offers these six fields of study for students wishing to concentrate their studies in particular areas of biology:

1. Biochemistry and Biophysics
2. Ecology and Evolution
3. Marine Biology
4. Microbes and Immunity
5. Molecular and Cellular Biology
6. Neurobiology

These fields of study are declared on Axxess at the time of the major declaration; they appear on the transcript but not on the diploma. Candidates for the B.S. degree in Biology with a field of study are required to complete the departmental honors program as well as the set of requirements outlined below.

**BIOCHEMISTRY AND BIOPHYSICS**

Candidates for the Biochemistry and Biophysics field of study must complete the following, which range from 101-110 total units:

**CORE COURSES (MUST BE TAKEN FOR A LETTER GRADE WHEN AVAILABLE):**

<i>Subject and Catalog Number</i>	<i>Units</i>
BIO 41	5
BIO 42	5
BIO or BIOHOPK 43	5
BIO 44X, 44Y or BIOHOPK 44Y	5

**REQUIRED FOUNDATIONAL BREADTH COURSES (TWO COURSES MAY BE TAKEN CREDIT/NO CREDIT):**

CHEM 31A,B or 31X	4-8
CHEM 33, 35, 36, 130	15
CHEM 135 or 171	3
PHYSICS 41, 43, 45	12
MATH 51, 52	10
STATS 60 or BIO 141	4-5

**REQUIRED BIOLOGY COURSES (MUST BE TAKEN FOR A LETTER GRADE):**

BIO 104	3
BIO 118	5
BIO 129A or 129B	4
BIO 188	3

**APPROVED BIOCHEMISTRY AND BIOPHYSICS COURSES (THREE OF THE FOLLOWING; MUST BE TAKEN FOR A LETTER GRADE):**

APPPHYS 136/BIOC 236	3
APPPHYS 192/292	3
BIO 132/232/APPPHYS/BIOPHYS/MCP 232	4
BIO 152/MCP 222	3
BIO 154/254/NBIO 254	4
BIO 189/289/CHEM 183/CHEMENG 183/283	3
BIO 214/BIOC 224	2-5
BIO 217	4
BIOE/RAD 220	3
BIOMEDIN 210	3
BIOMEDIN/BIOE/GENE 214/CS 274	3-4
BIOPHYS/SBIO 228	3
BIOPHYS/SBIO 241	3-5
CHEM 184	4
CHEM 185	3
EE 268	3
MCP 256	4
PHYSICS 105	4

*Electives*—7 units required. Electives must be 100-level or above and chosen from the offerings in the Department of Biology, Hopkins Marine Station, or from the list of approved out-of-department electives. Up to 6 units of teaching and research are allowed. Only one course can be taken credit/no credit.

**WRITING IN THE MAJOR (ONE OF THE FOLLOWING):**

BIO 145*	4
BIO 196A*	3
BIO 197WA*	3
BIO 197WB*	3
BIO 199W*	3
BIOHOPK 44Y	5
BIOHOPK 184H*	16

\* These courses can also be used to count toward the elective requirement.

*Research Requirement*—Admission to the departmental honors program; 10 units of BIO 199, 199X, or BIOHOPK 199H from the same lab; poster or oral presentation; and honors thesis. Only research units from BIO or BIOHOPK are permitted.

**ECOLOGY AND EVOLUTION**

Candidates for the Ecology and Evolution field of study must complete the following, which range from 99-116 total units:

**CORE COURSES (MUST BE TAKEN FOR A LETTER GRADE WHEN AVAILABLE):**

<i>Subject and Catalog Number</i>	<i>Units</i>
BIO 41	5
BIO 42	5
BIO or BIOHOPK 43	5
BIO 101* or BIOHOPK 172H*	3 or 5
BIO 44X or 44Y or BIOHOPK 44Y	5

\* This course cannot also be used to count toward the elective requirement.

**REQUIRED FOUNDATIONAL BREADTH COURSES (TWO COURSES MAY BE TAKEN CREDIT/NO CREDIT):**

CHEM 31A,B or 31X	4-8
CHEM 33, 35, 36	11
PHYSICS 21, 22, 23, 24 or 41, 43, 45 or 28, 29	8-12
MATH 19, 20, 21 or 41, 42 or 51	5-10

**REQUIRED EVOLUTIONARY BIOLOGY COURSE (ONE OF THE FOLLOWING; MUST BE TAKEN FOR A LETTER GRADE):**

BIO 113	4
BIO 136	4
BIO 143	3
BIOHOPK 166H	5

**REQUIRED QUANTITATIVE METHODS COURSE (ONE OF THE FOLLOWING; MUST BE TAKEN FOR A LETTER GRADE):**

BIO 141	4-5
BIOHOPK 174H	3
CS 106A or 106X	3-5
STATS 60 or beyond	5

*Electives*—30 units required. Only one course can be taken credit/no credit. Electives must be from this approved list: BIO 101, 102, 117, 118, 121, 122, 125, 139, 144, 145, 146, 147, 175, 183, 184, 186, 215, 216; BIOHOPK 161H, 162H\*\*\*, 163H, 166H, 171H, 172H, 173H\*, 174H, 182H\*\*\*, 185H\*\*\*; CHEM 130, 131; EARTHSYS 144/EESS 164; EESS 134, 158; GES 123, 240; OSPAUSTL 10\*\*, 20\*\*, 30\*\*.

\* Only 1 unit can count.

\*\* Only 2 units can count.

\*\*\*Only 6 units can count.

**WRITING IN THE MAJOR (ONE OF THE FOLLOWING):**

BIO 145*	4
BIO 196A	3
BIO 197WA	3
BIO 197WB	3
BIO 199W	3
BIOHOPK 44Y	5
BIOHOPK 184H	16

\* This course can also be used to count toward the elective requirement.

*Research Requirement*—Admission to the departmental honors program; 10 units of BIO 199, 199X, or BIOHOPK 199H from the same lab; poster or oral presentation; and honors thesis. Only research units from BIO or BIOHOPK are permitted.

**MARINE BIOLOGY**

Candidates for the Marine Biology field of study must complete the following, which range from 92-140 total units:

**CORE COURSES (MUST BE TAKEN FOR A LETTER GRADE WHEN AVAILABLE):**

<i>Subject and Catalog Number</i>	<i>Units</i>
BIO 41	5
BIO 42	5
BIO or BIOHOPK 43	5
BIO 44X or BIO 44Y or BIOHOPK 44Y	5

**REQUIRED FOUNDATIONAL BREADTH COURSES (TWO COURSES MAY BE TAKEN CREDIT/NO CREDIT):**

CHEM 31A,B or 31X	4-8
CHEM 33, 35, 36, 130, 131	18
PHYSICS 21, 22, 23, 24 or 41, 43, 45 or 28, 29	8-12
MATH 19, 20, 21 or 41, 42 or 51	5-10

STATS 60 or BIO 141 or BIOHOPK 174H 3-5

**REQUIRED BIOLOGY COURSES (MUST BE TAKEN FOR A LETTER GRADE):**

BIO 101 3  
 BIO 118 5  
 BIO 143 3

**APPROVED COURSES (FOUR OF THE FOLLOWING; MUST BE TAKEN FOR A LETTER GRADE):**

BIO/EARTHYSYS 116 4  
 BIOHOPK 161H 5  
 BIOHOPK 162H 5-8  
 BIOHOPK 163H 4  
 BIOHOPK 166H 5  
 BIOHOPK 167H 5  
 BIOHOPK 171H 4  
 BIOHOPK 172H 5  
 BIOHOPK 173H (must be take for 3 units) 3  
 BIOHOPK 182H 16  
 BIOHOPK 184H 16  
 BIOHOPK 185H 10-12  
 OSPAUSTL 010\*, 020\*, 030\* 9

\* These three courses as a whole count as one of the four required courses in this section.

**WRITING IN THE MAJOR (ONE OF THE FOLLOWING):**

BIO 145 4  
 BIO 196A 3  
 BIO 197WA 3  
 BIO 197WB 3  
 BIO 199W 3  
 BIOHOPK 44Y 5  
 BIOHOPK 184H\* 16

\* This course can also be used to count toward the approved courses requirement.

*Research Requirement*—Admission to the departmental honors program; 10 units of BIO 199, 199X, or BIOHOPK 199H from the same lab; poster or oral presentation; and honors thesis on a marine biology topic; one Hopkins Marine Station faculty member must be a reader on the thesis. Only research units from BIO or BIOHOPK are permitted.

**MICROBES AND IMMUNITY**

Candidates for the Microbes and Immunity field of study must complete the following, which range from 89-116 total units:

**CORE COURSES (MUST BE TAKEN FOR A LETTER GRADE WHEN AVAILABLE):**

<i>Subject and Catalog Number</i>	<i>Units</i>
BIO 41	5
BIO 42	5
BIO or BIOHOPK 43	5
BIO 44X or BIO 44Y or BIOHOPK 44Y	5

**REQUIRED FOUNDATIONAL BREADTH COURSES (TWO COURSES MAY BE TAKEN CREDIT/NO CREDIT):**

CHEM 31A,B or 31X 4-8  
 CHEM 33, 35, 36, 130, 131 18  
 PHYSICS 21, 22, 23, 24 or 41, 43, 45 or 28, 29 8-12  
 MATH 19, 20, 21 or 41, 42 or 51 5-10  
 BIO 141\* or BIOHOPK 174H\* 3-5

\* This course cannot also be used to count toward the elective requirement.

**REQUIRED COURSES IN MICROBIOLOGY, IMMUNOLOGY, MOLECULAR EVOLUTION (FOUR OF THE FOLLOWING; MUST BE TAKEN FOR A LETTER GRADE):**

BIO 113 4  
 BIO 177 3  
 BIO 230 4  
 BIOHOPK 274 9-12  
 CEE 177 4  
 CEE 274A 3  
 CEE 274B 3  
 CEE 274D 3  
 IMMUNOL 185 3  
 IMMUNOL 202 3  
 MI 104 3

MI 211 3

**REQUIRED COURSE IN READING SCIENTIFIC LITERATURE (ONE OF THE FOLLOWING; MUST BE TAKEN FOR A LETTER GRADE):**

BIO 178 3  
 MI 185 3

*Electives*—12 units required. Electives must be 100-level or above and selected from the offerings in the Department of Biology, Hopkins Marine Station, or from the list of approved out-of-department electives. Up to 6 units of teaching and research are allowed. Only one course can be taken credit/no credit.

**WRITING IN THE MAJOR (ONE OF THE FOLLOWING):**

BIO 145\* 4  
 BIO 196A\* 3  
 BIO 197WA\* 3  
 BIO 197WB\* 3  
 BIO 199W\* 3  
 BIOHOPK 44Y 5  
 BIOHOPK 184H\* 16

\* This course can also be used to count toward the elective requirement.

*Research Requirement*—Admission to the departmental honors program; 10 units of BIO 199, 199X, or BIOHOPK 199H from the same lab; poster or oral presentation; and honors thesis. Only research units from BIO or BIOHOPK are permitted.

**MOLECULAR AND CELL BIOLOGY**

Candidates for the Molecular and Cell Biology field of study must complete the following, which range from 99-113 total units:

**CORE COURSES (MUST BE TAKEN FOR A LETTER GRADE WHEN AVAILABLE):**

<i>Subject and Catalog Number</i>	<i>Units</i>
BIO 41	5
BIO 42	5
BIO or BIOHOPK 43	5
BIO 44X or BIO 44Y or BIOHOPK 44Y	5

**REQUIRED FOUNDATIONAL BREADTH COURSES (TWO COURSES MAY BE TAKEN CREDIT/NO CREDIT):**

CHEM 31A,B or 31X 4-8  
 CHEM 33, 35, 36, 130, 131 18  
 CHEM 135 or 171 3  
 PHYSICS 21, 22, 23, 24 or 41, 43, 45 or 28, 29 8-12  
 MATH 19, 20, 21 or 41, 42 or 51 10  
 STATS 60 or BIO 141\* 4-5

\* This course cannot also be used to count toward the elective requirement.

**REQUIRED BIOLOGY COURSES (MUST BE TAKEN FOR A LETTER GRADE):**

BIO 104 3  
 BIO 118 5  
 BIO 129A, 129B 8  
 or BIO 160A, 160B 8

*Electives*—15 units required. Electives must be 100-level or above and selected from the offerings in the Department of Biology, Hopkins Marine Station, or from the list of approved out-of-department electives. Up to 6 units of teaching and research are allowed. Only one course can be taken credit/no credit.

**WRITING IN THE MAJOR (ONE OF THE FOLLOWING):**

BIO 145\* 4  
 BIO 196A\* 3  
 BIO 197WA\* 3  
 BIO 197WB\* 3  
 BIO 199W\* 3  
 BIOHOPK 44Y 5  
 BIOHOPK 184H\* 16

\* This course can also be used to count toward the elective requirement.

*Research Requirement*—Admission to the departmental honors program; 10 units of BIO 199, 199X, or BIOHOPK 199H from the same lab; poster or oral presentation; and honors thesis. Only research units from BIO or BIOHOPK are permitted.

**NEUROBIOLOGY**

Candidates for the Neurobiology field of study must complete the following, which range from 100-115 total units:

**CORE COURSES (MUST BE TAKEN FOR A LETTER GRADE WHEN AVAILABLE):**

<i>Subject and Catalog Number</i>	<i>Units</i>
BIO 41	5
BIO 42	5
BIO or BIOHOPK 43	5
BIO 44X or BIO 44Y or BIOHOPK 44Y	5

**REQUIRED FOUNDATIONAL BREADTH COURSES (TWO COURSES MAY BE TAKEN CREDIT/NO CREDIT):**

CHEM 31A,B or 31X	4-8
CHEM 33, 35, 36, 130, 131	18
PHYSICS 21, 22, 23, 24 or 41, 43, 45 or 28, 29	8-12
MATH 19, 20, 21 or 41, 42 or 51	10
STATS 60 or BIO 141*	4-5

\* This course cannot also be used to count toward the elective requirement.

**REQUIRED BIOLOGY COURSES (MUST BE TAKEN FOR A LETTER GRADE):**

BIO 118 or 104	5
BIO 129A or 129B or 160A or 160B	4
BIO 150 or 163	4-5
BIO 154	4
BIO 158	4

*Electives*—15 units required. Electives must be at the 100-level or above and selected from the offerings in the Department of Biology, Hopkins Marine Station, or from the list of approved out-of-department electives. Up to 6 units of teaching and/or research are allowed. Only one course can be taken credit/no credit.

**WRITING IN THE MAJOR (ONE OF THE FOLLOWING):**

BIO 145*	4
BIO 196A*	3
BIO 197WA*	3
BIO 197WB*	3
BIO 199W*	3
BIOHOPK 44Y	5
BIOHOPK 184H*	16

\* These courses can also be used to count toward the elective requirement.

*Research Requirement*—Admission to the departmental honors program; 10 units of BIO 199, 199X, or BIOHOPK 199H from the same lab; poster or oral presentation; and honors thesis. Only research units from BIO or BIOHOPK are permitted.

**HONORS**

To graduate with departmental honors, a student must conduct an independent research project typically over the course of at least one year; projects are started no later than Autumn or Winter quarter of the junior year. Research must be done in a Biology Department lab or a lab in another department for which the student has obtained prior approval. Administrative steps include:

1. Submit an honors proposal to the department's student services office two quarters prior to graduation. For instance, students graduating Spring Quarter must submit petitions no later than mid-Autumn Quarter.
2. Complete at least 10 units of an approved research project in BIO 199, 199X, or BIOHOPK 199H from the same lab. Only research units from BIO or BIOHOPK are permitted.
3. Obtain at least a 3.0 (B) grade point average (GPA) in all Biology major requirements taken at Stanford (foundational breadth, core, and elective courses). Grades earned from teaching (BIO or BIOHOPK 290 and BIO 291) and research (BIOHOPK 199H; BIO 199, 199X) are not computed into this GPA.
4. If graduating in June, participate in the Biology Honors Symposium by presenting a poster or giving an oral presentation. The symposium is typically at the end of May. If graduating Autumn, Winter, or Summer Quarter, produce a poster to be displayed at the symposium.

5. Complete and submit, by the published deadline within the quarter graduation is expected, two signed and bound copies of an honors thesis approved by at least two readers (one of whom must be from the faculty of the Department of Biology and both must be Academic Council members). In addition, students must submit an electronic copy of the honors thesis abstract which include student name, thesis title, research sponsor, and sponsor's department.

Further information on the honors program is available in the student services office in Gilbert 108, as well as on the web at <http://biohonors.stanford.edu>.

**MINOR IN BIOLOGY**

Students interested in the minor in Biology must declare the minor and submit their course plan online via Axess no later than two quarters prior to the student's intended quarter of degree conferral. The Biology minor requires a minimum of six courses meeting the following criteria:

1. All courses must be taken for a letter grade.
2. All courses must be worth or approved for 3 or more units.
3. All courses, other than the Biology Core (41, 42, 43), must be at or above the 100-level. Stanford Introductory Seminars may not be used to fulfill the minor requirements.
4. Courses used to fulfill the minor may not be used to fulfill any other department degree requirements (minor or major).
5. At least one course from the Biology Core (41, 42 or 43) must be taken.
6. The Biology Core Laboratory courses (BIO 44X and BIO/BIOHOPK 44Y) do not count towards the minor.
7. Courses must be chosen from the offerings of the Department of Biology or the Hopkins Marine Station, or from the list of approved out-of-department electives.
8. Elective credit for research (BIO 199 or BIOHOPK 199H) is limited to a maximum of 3 units. BIO 199X is not allowable.

**MASTER OF SCIENCE IN BIOLOGY**

For information on the University's basic requirements for the M.S. degree, see the "Graduate Degrees" section of this bulletin. Students considering this degree option should meet with staff in the student services office prior to applying.

The M.S. degree program offers general or specialized study to individuals seeking biologically oriented course work, and to undergraduate science majors wishing to increase or update their science background or obtain advanced research experience. Students who have majored in related fields are eligible to apply, but course work equivalent to the preparation of a Stanford B.S. in Biology is strongly recommended. This includes course work in biology, chemistry, physics, and mathematics. The M.S. program does not have an M.S. with thesis option.

**ADMISSIONS**

The department only accepts M.S. program applications from matriculated Stanford students:

1. undergraduates wishing to pursue a coterminal MS degree.
  2. graduate students from other Stanford programs wishing to pursue an MS degree.
  3. current Biology PhD students wishing to leave the PhD program with an MS degree.
- Undergraduates must apply in mid-January to start the program in Spring, Autumn, or the following Winter quarter. Graduate students may apply by the third week of any academic quarter.

*Required application materials*—

1. Application for Admission, Preliminary Program Proposal, and Course Transfer Form
2. A statement of purpose which explains why the student wishes to enter the program and what the student plans to accomplish while in the program. The statement should also supply information about the student's science capabilities if his or her undergraduate academic record does not accurately reflect them.

3. Unofficial Stanford transcript
4. Two letters of recommendation, preferably from Biology faculty members in this department. If two such letters are not available, letters from faculty familiar with the student's ability to succeed in a graduate science curriculum are acceptable.
5. Application fee: an application fee is charged to all students regardless of outcome; application fee is applied directly to students' accounts.

## GENERAL REQUIREMENTS

The M.S. program consists of Department of Biology and/or Hopkins Marine Station course work, approved out-of-department electives, and foundational breadth courses totaling at least 45 units at or above the 100-level, distributed as follows:

1. A minimum of 23 of the 45 units must be courses designated primarily for graduate students (200-level or higher).
2. A minimum of 36 units must be chosen from the offerings in the Department of Biology (BIO), Hopkins Marine Station (BIOHOPK), the list of approved out-of-department electives, research and teaching, and/or foundational breadth courses.
  - a. a maximum of 18 of the 36 units may be a combination of Biology research, directed reading, and/or teaching (BIO 198, 198X, 290, 290X, 291, 300, 300X; BIOHOPK 198H, 290H, or 300H).
  - b. a maximum of 9 units may be foundational breadth courses in chemistry, mathematics, statistics, computer science, and/or physics beyond the level required for the undergraduate degree in Biology and at least at the 100-level.
3. No more than 9 units may be other Stanford course work relevant to a student's professional development. Students are required to petition for courses that fall into this category using the General Petition form.

Each candidate designs a coherent program of study in consultation with her or his department adviser. Although there are no specific courses required, program proposals must adhere to department parameters.

In addition to the unit requirements outlined above, students must adhere to the following:

1. A program proposal, signed by the student's adviser and approved by the chair of the M.S. committee, must be filed by the third week of the first quarter of enrollment.
2. Students may take only 6 units CR/NC.
3. Students must maintain a GPA of 3.0 or higher.
4. Students must receive a grade of 'B-' or better in all courses taken for the degree.

Students not meeting these minimum requirements are subject to departmental academic review and/or dismissal.

The department's *Master of Science Handbook* has additional information about the program, University policy, and the department.

## DOCTOR OF PHILOSOPHY IN BIOLOGY

For information on the University's basic requirements for the Ph.D. degree, see the "Graduate Degrees" section of this bulletin. The training for a Ph.D. in Biology is focused on learning skills required for being a successful research scientist and teacher, including how to ask important questions and then devise and carry out experiments to answer these questions. Students work closely with an established adviser and meet regularly with a committee of faculty members to ensure that they understand the importance of diverse perspectives on experimental questions and approaches. Students learn how to evaluate critically pertinent original literature in order to stay abreast of scientific progress in their areas of interest. They also learn how to make professional presentations, write manuscripts for publication, and become effective teachers.

## ADMISSIONS

*Preparation for Graduate Study*—Students seeking entrance to graduate study in Biology ordinarily should have the equivalent of

an undergraduate major in Biology at Stanford. However, students from other disciplines, particularly the physical sciences, are also encouraged to apply. Such students are advised at the time of initial registration on how they should complete background training during the first year of graduate study. In addition to the usual basic undergraduate courses in biology, it is recommended that preparation for graduate work include courses in chemistry through organic chemistry, general physics, and mathematics through calculus.

*Application, Admission, and Financial Aid*—Prospective graduate students must apply via Stanford's online graduate application.

The department's program is divided into three separate areas of concentration:

- ecology/evolution/population studies
- integrative/organismal
- molecular/cellular/developmental/genetic/plant

Included in these concentrations is the option to conduct research at Hopkins Marine Station. These concentrations are recorded in the department as part of the admissions process and for tracking degree progress for admitted students; they do not appear on official university records.

Applicants are required to take the Graduate Record Examination (GRE) general test. The GRE subject test is not required. Applicants should plan on taking the GRE at least one month prior to the application deadline to ensure that official scores are available when applications are evaluated.

Admission to the Ph.D. program is competitive, and in recent years it has been possible to offer admission to approximately 10 percent of the applicants.

Applicants who are eligible should apply for nationally competitive predoctoral fellowships, especially those offered by the National Science Foundation.

Admitted students are typically offered financial support in the form of Stanford Graduate Fellowships, research assistantships, NIH traineeships, or Biology fellowships.

## GENERAL REQUIREMENTS

The following requirements must be completed by all students:

1. *First year advising.* Each entering student meets with the first-year advising committee within the first two weeks of Autumn Quarter and again no later than May 15. The committee reviews the student's previous academic work and current goals and advises the student on a program of Stanford courses, some of which may be required and others recommended. Completion of the core curriculum listed below under "Track Specific Requirements" is required of all students.
2. *Ethics.* Students must take a course on the ethical conduct of research: BIO 312 for ecology/evolution/population studies; MED 255 for integrative/organismal and molecular/cellular/developmental/genetic/plant.
3. *Teaching.* Teaching experience and training are part of the graduate curriculum. Each student assists in teaching one course in the department's core lecture (41, 42, or 43) or lab (44X, 44Y) series, and a second course that can be either a core course or other Biology or Hopkins Marine Station course. A third quarter of teaching is required for ecology, evolution, and population studies students.
4. *Seminars.* Graduate seminars devoted to current literature and research in particular fields of biology are an important means of attaining professional perspective and competence. Seminars are presented under individual course listings or are announced by the various research groups. Topics of current biological interest are presented by speakers from Stanford and other institutions. During the first year of study, graduate students are required to attend seminars and make one formal seminar presentation which must be evaluated by a minimum of two Academic Council faculty members.

5. *Fellowship application.* All eligible first and second year students must apply for a National Science Foundation fellowship.
  6. *Adviser/lab selection.* By April, each first-year student is required to have selected a lab in which to perform dissertation research and to have been accepted by the faculty member in charge.
  7. *Qualifying exam and advancement to candidacy.* During the second year, students are required to write a dissertation proposal which is evaluated by a committee of three faculty (the dissertation advising committee) in an oral presentation. Track-specific deadlines are listed below. All students must advance to candidacy by the end of their second year. This is contingent upon satisfactory completion of course work, all first and second year requirements, and the dissertation proposal. If a student does not meet the requirements for advancing to candidacy by the end of the second year, the student is subject to dismissal from the PhD program. PLEASE NOTE: there is a university requirement for all students for the minimum number of courses allowed: "Prior to candidacy, at least 3 units of work must be taken with each of four Stanford faculty members." This means that by the end of second year, each student must complete at least four 3-unit classes from at least four different faculty members. Advancement to candidacy depends on satisfactory completion of the dissertation proposal, completion of all first and second year requirements, as well as completion of four 3-unit courses taken from four different faculty.
  8. *Advising meetings.* Students must meet regularly with their advising committees. For more details, see the Biology PhD Handbook.
  9. *Publishable manuscript.* Each student must complete one publishable manuscript (paper) for which s/he is the major contributor.
  10. *Residency requirement.* A minimum of 135 units of graduate registration is required of each candidate at the time of graduation.
  11. *Doctoral dissertation.* A completed draft of the dissertation must be turned in to the student's oral examination at least one month before the oral exam is scheduled to take place. The dissertation must be presented to an oral examination committee comprised of at least five faculty members. In addition, the final written dissertation must be approved by the student's reading committee (a minimum of three approved faculty), and submitted to the Registrar's Office. Upon completion of this final requirement, a student is eligible for conferral of the degree.
- b. *lab rotations:*\* First-year students are required to complete rotations in at least two different laboratories. The first rotation must be in a lab in the Department of Biology.
- \* Written petitions for exemptions to core curriculum and lab rotation requirements are considered by the advising committee and the chair of the graduate studies committee. Approval is contingent upon special circumstances and is not routinely granted.
2. *Second year:* Each student must pass a two-part qualifying exam.
    - a. *dissertation proposal:* During Autumn quarter of the second year, the student must prepare a written dissertation proposal that outlines the student's projected dissertation research, including an expert assessment of the current literature; deadline is November 1. An oral examination is held after submission of the written proposal to the dissertation advising committee; deadline is November 15. The student's adviser is a silent member of the examination committee; the other members of the dissertation advising committee can provide feedback. Advancement to candidacy is contingent upon completion of the dissertation proposal and oral exam.

#### *Integrative/Organismal—*

1. *First year:*
  - a. *core curriculum:* Students are required to take BIO 306. Current Topics in Integrative and Organismal Biology. Students specializing in integrative biology may also be asked to take appropriate graduate-level courses as advised by committee.
  - b. *first-year paper:* Students must submit a paper that is evaluated by a minimum of two Academic Council faculty members by May 1. This paper should be a step toward the development of a dissertation proposal and may consist of an analysis of new data or a literature review and synthesis.
2. *Second year:* Each student must pass a two-part qualifying exam.
  - a. *dissertation proposal:* During Spring Quarter of the second year, the student must prepare a written dissertation proposal that outlines the student's projected dissertation research, including an expert assessment of the current literature. An oral examination is held after submission of the written proposal to the dissertation advising committee comprised of three faculty members. The written proposal is due by May 15, and the oral defense must take place no later than June 15. Advancement to candidacy depends on completion of the dissertation proposal and oral exam.

#### *Ecology, Evolution, and Population Studies—*

1. *First year:*
  - a. *core curriculum:* Students are required to take BIO 302, 303, 304: Current Topics and Concepts in Population Biology, Ecology, and Evolution.
  - b. *first-year paper:* The paper should be read, commented upon, and agreed to as satisfactory by two EcoEvo faculty by May 15. This can be satisfied in a number of ways which all involve new writing, undertaken since entering the Stanford program. These may include:
    1. a new draft research manuscript (a previously published paper is not acceptable).
    1. some other piece of new writing, such as a review paper from a course, or an initial literature review of a potential thesis topic. In this case the paper should ordinarily be not less than 10 double-spaced pages in usual sized font, and not more than 10 single spaced pages, plus references. It should be written in the style of a standard scientific paper.
2. *Second year:* Each student must pass a two-part qualifying exam.
  - a. *dissertation proposal:* The student should form her/his thesis committee well before the anticipated date of dissertation proposal defense, and should consult committee members in a timely manner to make sure their

### **TRACK SPECIFIC REQUIREMENTS**

In addition to the general requirements listed above, students must also complete requirements within their concentration.

#### *Molecular, Cellular, Developmental, Genetic, and Plant—*

1. *First year:*
  - a. *core curriculum:*\* Students are required to take the following courses for a letter grade:
    - BIO 203. Advanced Genetics
    - BIO 214/BIOC 224/MCP 221. Advanced Cell Biology
    - BIO 301. Frontiers in Biology
 (satisfies first-year talk requirement; must be taken Autumn and Winter quarters)
 

And one of the following for a letter grade :

    - BIOC/BIOPHYS/SBIO 241. Biological Macromolecules
    - CSB 210. Signal Transduction Pathways and Networks
    - MCP 256. How Cells Work: Energetics, Compartments, and Coupling in Cell Biology
 And three additional courses in the student's area of interest, or as advised by committee. These courses must be offered for at least three units and must be taken for a letter grade.

expectations are clearly understood, and to allow time to produce a professionally effective written proposal. In general, the student should prepare a written document and spoken presentation sufficient to support a 30 minute presentation of the goals of the thesis, typically including preliminary data, models, etc. as appropriate which are relevant to at least the first goal, and should be prepared thereafter to discuss questions raised by the committee in professional scientific depth. An oral examination is held after submission of the written proposal to the dissertation advising committee comprised of three faculty members. The written proposal is due by May 15, and the oral defense must take place no later than June 15. Advancement to candidacy depends on completion of the dissertation proposal and oral exam.

## OVERSEAS STUDIES COURSES IN BIOLOGY

For course descriptions and additional offerings, see the listings in the *Stanford Bulletin's* ExploreCourses web site or the Bing Overseas Studies web site. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

### AUTUMN QUARTER

#### AUSTRALIA

OSPAUSTL 10. Coral Reef Ecosystems. 3 units (2 allowable for the Biology major), Kevin Arrigo, Sophie Dove, Selina Ward, GER:DB:EngrAppSci

OSPAUSTL 20. Coastal Resource Management. 3 units (2 allowable for the Biology major), Ron Johnstone, GER:DB:EngrAppSci

OSPAUSTL 30. Coastal Forest Ecosystems. 3 units (2 allowable for the Biology major), Norman Duke, John Hall, GER:DB:EngrAppSci

### SPRING QUARTER

#### SANTIAGO

OSPSANTG 85. Marine Ecology of Chile and the South Pacific. 5 units, Alvaro Palma, GER:DB:NatSci

## BIOLOGY COURSE NUMBERING SYSTEM

The department uses the following course numbering system:

000-099	Introductory and Core
100-199	Undergraduate
200-299	Advanced Undergraduate, Coterminial and PhD
300+	PhD

## BIOLOGY, HOPKINS MARINE STATION

*Emeritus: (Professor)* David Epel

*Director:* Stephen R. Palumbi

*Associate Director:* George N. Somero

*Professors:* Barbara A. Block, Larry Crowder, Mark W. Denny, William F. Gilly, Fiorenza Micheli, Stephen R. Palumbi, George N. Somero, Stuart H. Thompson

*Assistant Professor:* Christopher J. Lowe

*Lecturer:* James Watanabe

*Station Offices:* 120 Oceanview Blvd., Pacific Grove, CA 93950

*Phone:* (831) 655-6200

*Email:* information@marine.stanford.edu

*Web Site:* <http://hopkins.stanford.edu>

Courses offered by Hopkins Marine Station have the subject code BIOHOPK, and are listed in the "Biology, Hopkins Marine Station [BIOHOPK] Courses" section of this bulletin.

The Hopkins Marine Station, located 90 miles from the main University campus in Pacific Grove, was founded in 1892 as the first marine laboratory on the west coast of North America. The modern laboratory facilities on the 11-acre campus on Cabrillo Point house nine faculty, all members of the Department of Biology. The Miller Library has a collection of literature in marine science. The Hopkins faculty offers undergraduate and graduate courses in biology which focus on the marine realm and involve topics including oceanography, environmental and comparative physiology, molecular evolution, biomechanics, cellular biology, conservation biology, and neurobiology and behavior. Most courses have laboratory sections that exploit the potential of working with readily available marine plants and animals. Small class sizes encourage close student-faculty interactions. Undergraduates have opportunities to carry out research projects with Hopkins faculty during the academic year or summer months. Courses are offered in Winter, Spring, and Summer quarters.

Courses at Hopkins Marine Station can satisfy many requirements, from the Natural Sciences GER to major and minor requirements in departments housed in the Schools of Engineering, Humanities and Sciences, and Earth Sciences. Students are encouraged to check with their department's student services office to see which courses at Hopkins may be used to fulfill major or minor requirements.

### SUMMER PROGRAM AT HOPKINS MARINE STATION

The summer program is open to advanced undergraduate, graduate students, and postdoctoral students, and to teachers whose biological backgrounds, teaching, or research activities can benefit from a summer's study of marine life. Applications, deadlines, and further information are available at <http://hopkins.stanford.edu>.

## BIOPHYSICS

*Emeritus:* Harden M. McConnell (Chemistry)

*Director:* Vijay Pande (Chemistry)

*Professors:* Russ Altman (Genetics, Medical Informatics), Steve Block (Applied Physics, Biology), Steven Boxer (Chemistry), Axel Brunger (Molecular and Cellular Physiology), Gilbert Chu (Oncology), Mark Davis (Microbiology and Immunology), Sebastian Doniach (Physics, Applied Physics), James Ferrell (Chemical and Systems Biology), Daniel Fisher (Applied Physics), K. Christopher Garcia (Molecular and Cellular Physiology, Structural Biology), Gary Glover (Radiology), Philip C. Hanawalt (Biology), Daniel Herschlag (Biochemistry), Keith O. Hodgson (Chemistry), Theodore Jardetzky (Structural Biology), Chaitan Khosla (Chemical Engineering, Chemistry), Brian Kobilka (Molecular and Cellular Physiology), Eric Kool (Chemistry), Ron Kopito (Biology), Roger D. Kornberg (Structural Biology), Michael Levitt (Structural Biology), Richard Lewis (Molecular and Cellular Physiology), Uel J. McMahan (Neurobiology), Tobias Meyer (Chemical and Systems Biology), W. E. Moerner (Chemistry), Norbert Pelc (Bioengineering, Radiology), Joseph D. Puglisi (Structural Biology), Stephen Quake (Bioengineering), Stephen J. Smith (Molecular and Cellular Physiology), Edward I. Solomon (Chemistry), James A. Spudich (Biochemistry, Developmental Biology), William I. Weis (Structural Biology, Molecular and Cellular Physiology), Richard N. Zare (Chemistry)

*Associate Professors:* Annelise Barron (Bioengineering), Judith Frydman (Biology), Pehr Harbury (Biochemistry), Craig Levin (Radiology), Vijay Pande (Chemistry), Julie Theriot (Biochemistry)

*Assistant Professors:* Zev Bryant (Bioengineering), Lynette Cegelski (Chemistry), Jennifer Cochran (Bioengineering), Bianxiao Cui (Chemistry), Rhiju Das (Biochemistry), Alexander Dunn (Chemical Engineering), Miriam Goodman (Molecular and Cellular Physiology), KC Huang (Bioengineering), Merritt Maduke (Molecular and Cellular

Physiology), Jianghong Rao (Radiology), Ingmar Riedel-Kruse (Bioengineering), Mark Schnitzer (Biology, Applied Physics), Jan Skotheim (Biology), Andrew Spakowitz (Chemical Engineering)

*Program Offices:* Fairchild Building D118

*Mail Code:* 94305-5126

*Phone:* (650) 723-7576

*Email:* biophysics@med.stanford.edu

*Web Site:* <http://med.stanford.edu/biophysics>

Courses offered by the Biophysics Program are listed under the subject code BIOPHYS on the *Stanford Bulletin's* ExploreCourses web site.

The Biophysics Program offers instruction and research opportunities leading to the Ph.D. in Biophysics. Students admitted to the program may perform their graduate research in any appropriate department.

## GRADUATE PROGRAM IN BIOPHYSICS

For information on the University's basic requirements for the Ph.D. degree, see the "Graduate Degrees" section of this bulletin.

A small number of qualified applicants are admitted to the program each year. Applicants should present strong undergraduate backgrounds in the physical sciences and mathematics. The graduate course program, beyond the stated requirements, is worked out for each student individually with the help of appropriate advisers from the Committee on Biophysics. The requirements and recommendations for the Ph.D. degree include:

1. Training in a major with connections to biophysics such as physics, chemistry, or biology, with a quantitative background equivalent to that of an undergraduate physics or chemistry major at Stanford.
2. Completion of the following background courses or their equivalents at other institutions:
  - a. CHEM 131, 171, 173, and 175
  - b. BIOC 200, 201
3. Completion of the following courses or their equivalents:
  - a. BIOPHYS 241 or BIOE 300 and BIOPHYS 242
  - b. at least four additional graduate level courses in physical or biological science, with at least one in physical science and one as a literature-based biological science course
  - c. BIOPHYS 250
  - d. MED 255
4. Opportunities for teaching are available during the first nine quarters, at the discretion of the advising committee.
5. The student must prepare a dissertation proposal defining the research to be undertaken, including methods of procedure. This proposal should be submitted by Winter Quarter of the third year, and it must be approved by a committee of at least three members, including the principal research adviser and at least one member from the Biophysics Program. The candidate must defend the dissertation proposal in an oral examination. The dissertation reading committee normally evolves from the dissertation proposal review committee.
6. The student must present a Ph.D. dissertation as the result of independent investigation that expresses a contribution to knowledge in the field of biophysics.
7. The student must pass the University oral exam, taken only after the student has substantially completed the dissertation research. The examination is preceded by a public seminar in which the research is presented by the candidate.

## CHEMISTRY

*Emeriti: (Professors)* Hans C. Andersen, John I. Brauman, James P. Collman, Carl Djerassi, Harden M. McConnell, Robert Pecora, John Ross

*Chair:* W. E. Moerner

*Vice Chair:* T. Daniel P. Stack

*Professors:* Steven G. Boxer, Hongjie Dai, Michael D. Fayer, Keith O. Hodgson, Wray H. Huestis, Chaitan Khosla, Eric T. Kool, Todd J. Martinez, W. E. Moerner, Vijay S. Pande, Edward I. Solomon, Barry M. Trost, Robert M. Waymouth, Paul A. Wender, Richard N. Zare

*Associate Professors:* Christopher E. D. Chidsey, Justin Du Bois, T. Daniel P. Stack

*Assistant Professors:* Lynette Cegelski, Bianxiao Cui, Matthew Kanan, Thomas E. Markland

*Courtesy Professors:* Stacey F. Bent, Curtis W. Frank, Daniel Herschlag

*Courtesy Associate Professors:* James K. Chen, Yi Cui, Karlene A. Cimprich, Jianghong Rao, Thomas J. Wandless

*Lecturers:* Megan Brennan, Charles Cox, Hillary Hua, Jennifer Schwartz

*Director of Undergraduate Laboratories:* Hillary Hua

\* The curriculum leading to the B.S. degree in Chemical Engineering is described in the "School of Engineering" section of this bulletin.

*Department Offices:* 121 S. G. Mudd

*Mail Code:* 94305-5080

*Phone:* (650) 723-2501

*Web Site:* <http://stanford.edu/dept/chemistry>

Courses offered by the Department of Chemistry are listed under the subject code CHEM on the *Stanford Bulletin's* ExploreCourses web site.

Chemistry is central to many scientific disciplines and plays an important role in the emerging areas of biotechnology, catalysis, health, and materials science. Developing new probes of biological molecules, modeling of protein folding and reactivity, manipulation of carbon nanotubes, development of new oxidation and polymerization catalysts, and synthesis of organic molecules for probing ion-channels are all research areas that are pursued actively in the Chemistry Department. The overarching theme of these pursuits is a focus at the atomic and molecular levels, whether this concerns probing the electronic structure and reactivity of molecules as small as dihydrogen or synthesizing large polymer assemblies. The ability to synthesize new molecules and materials and to modify existing biological structures allows the exploration of properties of well-defined systems.

## MISSION OF THE UNDERGRADUATE PROGRAM IN CHEMISTRY

The mission of the undergraduate program in Chemistry is to provide students with the fundamental concepts driving the molecular sciences. Students in the program acquire in-depth knowledge of the principles of chemistry, the methodologies necessary to solve problems in the subdisciplines through course work and laboratory experiences, and the ability to articulate their ideas effectively to the scientific community. The Chemistry program also has a long-standing tradition of encouraging undergraduate majors to become involved in research during the academic year and through a ten-week summer research program. The major is designed to provide students with excellent preparation for further study in graduate or professional schools as well as careers in chemistry.

## LEARNING OUTCOMES

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the



department's undergraduate program. Students are expected to demonstrate:

1. that they understand the mechanics of working problems by correctly solving basic problems using mathematical and theoretical tools.
2. a conceptual understanding of the theory required to execute problems.
3. that they are able to obtain chemical insight from working problems relevant to chemical questions.
4. that they are able to make connections between their solutions to theoretical problems and the physical world.
5. an understanding of the relationship between theory and experiment in order to use theory to determine chemically important information from experimental data.

## CHEMISTRY PREMEDICAL RECOMMENDATIONS

The department recommends that students interested in a health profession take the following courses for a letter grade: 31A,B or 31X, 33, 35, 36, 130, 131, 135 or 171, and 181. Historically, these courses have fulfilled the chemistry requirements at most medical schools. For information on medical school advising and resources, please download the Undergraduate Advising and Research publication at [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_planning\\_school\\_GraduateSchool.html#5](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_planning_school_GraduateSchool.html#5).

## GRADUATE PROGRAMS IN CHEMISTRY

The University's basic requirements for the M.S. and Ph.D. degrees are discussed in the "Graduate Degrees" section of this bulletin.

## CHEMISTRY GENERAL REQUIREMENTS

**Placement Examinations**—Each new graduate student must take placement examinations upon entrance. These consist of three written examinations of two hours each in the fields of inorganic, organic, and physical chemistry, and cover such material as ordinarily is given in a rigorous one-year undergraduate course in each of these subjects. Students majoring in biophysical chemistry or chemical physics must take examinations in biophysical or chemical physics, physical chemistry, and organic or inorganic chemistry. All placement examinations are given the week before instruction begins in Autumn Quarter, and must be taken at that time. Each new graduate student meets with a member of the graduate study committee to define a program of courses based on results of the placement examinations.

Candidates for advanced degrees must have a minimum grade point average (GPA) of 3.0 for all Chemistry lecture courses as well as for all courses taken during graduate study. Required courses must be taken for a letter grade. Most course work ends in the second year of studies, and students will then focus on full-time dissertation research. During the period in which a dissertation is being read by members of the faculty, candidates must be available for personal consultation until the dissertation has received final department approval.

## CHEMISTRY FELLOWSHIPS AND SCHOLARSHIPS

In addition to school fellowships and scholarships open to properly qualified students, there are several department fellowships in chemistry. Undergraduate scholarships are administered through the Financial Aid Office. Teaching assistantships and research assistantships are open to graduate students. Graduate fellowships, scholarships, and teaching assistantships are administered through the Department of Chemistry.

## BACHELOR OF SCIENCE IN CHEMISTRY

**Entrance Preparation**—Entrance credit in the preparatory subjects of chemistry, physics, and especially mathematics

provides flexibility in creating a four-year schedule for students intending to major in Chemistry.

### Requirements—

**Chemistry option:** University Writing and General Education Requirements; CHEM 31A and B or 31X, 33, 35, 36, 130, 131, 132, 134, 151, 153, 171, 173, 174, 175, 176; MATH 41, 42, 51, 53, or CME 100, 102, 104; PHYSICS 41, 43, 44, 45, 46.

**Biological chemistry option:** University Writing and General Education Requirements; CHEM 31A and B or 31X, 33, 35, 36, 130, 131, 132, 134, 151, 171, 173, 176, 181, 183, 184, 185; BIO 42; MATH 41, 42, 51, 53, or CME 100, 102, 104; PHYSICS 41, 43; a graduate-level elective course related to the student's biochemical interests, selected from: CHEM 221, 223, 225, 227, 235, 255, 271, 285, 297, CSB 220, 260, BIOC 241, BIOPHYS 232, BIOE 214, 222B, 300A, 331, 335, BIO 203, 213, 214, 230, or 232; CHEM 227 (strongly recommended).

In addition, CS 106A and B are recommended for students planning graduate study. All degree courses must be taken for a letter grade. For further information on the undergraduate program, see <http://www.stanford.edu/dept/chemistry/academic/under>.

## TYPICAL SCHEDULE FOR A FOUR-YEAR PROGRAM: CHEMISTRY OPTION

### FIRST YEAR

Subject and Catalog Number	Qtr. and Units		
	A	W	S
CHEM 31X. Chemical Principles	4		
CHEM 33. Structure and Reactivity		4	
CHEM 35. Organic Monofunctional Compounds			4
CHEM 36. Organic Chemistry Laboratory I			3
MATH 41,42,51. Calculus, Linear Equations	5	5	5

### SECOND YEAR

CHEM 130. Organic Chemistry Laboratory II	4		
CHEM 131. Organic Polyfunctional Compounds	3		
CHEM 132. Synthesis Laboratory		3	
CHEM 134. Analytical Chemistry Laboratory			5
MATH 53. Differential Equations			5
PHYSICS 41,43,44. Mechanics, Electricity and Magnetism	4	5	

### THIRD AND FOURTH YEARS

CHEM 151,153. Inorganic Chemistry		3	3
CHEM 171,173,175. Physical Chemistry	3	3	3
CHEM 174,176. Physical Chemistry Laboratory		4	3
PHYSICS 45,46. Light and Heat		5	

\* Elective courses must be used to complete the University Writing, General Education, and Language Requirements. They may also be used to broaden one's background in science and non-science areas and to provide an opportunity for advanced study in Chemistry. Courses offered by other departments that may be of interest to Chemistry majors include BIO 41, 42, 43; CHEMENG 20, 120A,B, 130; CS 106A,B; ECON 1; ENGR 50; MATH 52, 106, 109, 113, 131; MATSCI 50; PHYSICS 110; STATS 60, 110, 116.

### American Chemical Society Certification

Students who wish to be certified as having met the minimum requirements of the American Chemical Society for professional training must complete, in addition to the above requirements, CHEM 181 and 183, and 6 units of CHEM 190.

## HONORS PROGRAM

A B.S. degree in Chemistry with honors is available to those students interested in chemical research. Admission to the honors program requires a scientific grade point average (GPA) of 3.3 and an overall GPA of 3.0 in all University courses. Beyond the standard B.S. course requirements for each track, 9 units of CHEM 190 research credit, and 9 units of course work need to be completed during the junior and senior academic years. A thesis, approved by a Chemistry research adviser, must be completed during the senior year. Theses must be completed by May 15 to be considered for the Firestone or Golden award. The use of a single course for multiple requirements for honors, major, minor, or coterminal requirements is not allowed. Students who wish to be admitted to the honors program should register in the student

services office in the Mudd Chemistry Building in Spring Quarter of their junior year.

CHEM 190 research units towards honors may be completed, once accepted into the program, in any laboratory within Chemistry or with courtesy faculty in Chemistry. Other chemical research can be approved through a formal petitioning of the undergraduate studies committee. At least 3 units of CHEM 190 must be completed during the senior year. Participation in a summer research program in an academic setting between junior and senior years may be used in lieu of 3 units of CHEM 190. For each quarter, a progress report reflecting the units undertaken is required. This report must be signed by the Chemistry faculty adviser and filed in the department student services office in Mudd Chemistry before the last day of finals in the quarter during which the research is performed.

The 9 units of course work for honors must be completed from courses approved by the undergraduate studies committee and taken for a letter grade. At least six of these units need to be taken from the following CHEM courses: 153, 174, 175, 181, 183, 185, 221, 223, 225, 235, 251, 253, 255, 271, 273, 275, 297. Courses from Mathematics (MATH 114 or higher), Physics (PHYSICS 100 or higher), Engineering, and Structural Biology or Biochemistry in the School of Medicine can be used to fulfill this requirement.

### CHEMISTRY TEACHING CREDENTIALS

The requirements for certification to teach chemistry in the secondary schools of California may be ascertained by consulting the section on credentials under the "School of Education" section of this bulletin and the Credential Administrator of the School of Education.

### MINOR IN CHEMISTRY

Courses required for a minor are CHEM 33, 35, 36, 130, 131, 134, 151, 171. MATH 51 is a prerequisite for CHEM 171.

### MASTER OF SCIENCE IN CHEMISTRY

The Master of Science is available only to current Ph.D. students or as part of a coterminal program. Applicants for the M.S. degree in Chemistry are required to complete, in addition to the requirements for the bachelor's degree, a minimum of 45 graduate-level units and a M.S. thesis. Of the 45 units, approximately two-thirds must be in the department and must include at least 12 units of graduate level lecture courses exclusive of the thesis. Of the 12 units, at least 6 units must be from CHEM 221, 223, 225, 235, 251, 253, 255, 271, 273, 275, 276, 277, 280, 285, or 297.

### PH.D. MINOR IN CHEMISTRY

Candidates for the Ph.D. degree in other departments who wish to obtain a minor in chemistry must complete, with a GPA of 3.0 or higher, 20 graduate-level units in Chemistry including four lecture courses of at least three units each.

### DOCTOR OF PHILOSOPHY IN CHEMISTRY

Graduate students are eligible to become formal candidates for the Ph.D. degree after taking the department placement examinations, satisfactory completion of most of the formal lecture course requirements, and satisfactory progress on a dissertation research project. Admission to candidacy for the Ph.D. degree must be done before June of the second year of graduate registration.

After taking the departmental placement examinations, students select a research adviser by interviewing members of the Chemistry faculty. An Application to Start Research form is submitted to the Department as research begins under the supervision of the adviser. All students in good standing are required to start research by the end of Winter Quarter of the first year of graduate registration.

There is no foreign language requirement for the Ph.D. degree.

Candidates for the Ph.D. degree are required to participate continually in the department colloquium (CHEM 300) and in the division seminar of the major subject. In addition, continuous enrollment in CHEM 301 is expected after the student has chosen a research supervisor.

Before candidates may request scheduling of the University oral examination, clearance must be obtained from the major professor and the chair of the Graduate Study Committee. Conditions that must be fulfilled before clearance is granted vary with the different divisions of the department and may be ascertained by consulting the chair of the committee.

It is the policy of the department to encourage and support in every possible way the pursuit of research and other advanced work by qualified students. Information about faculty members with lists of their recent research publications is found in *Chemistry at Stanford, the Directory of Graduate Research* published by the American Chemical Society, and at <http://www.stanford.edu/dept/chemistry/faculty.html>.

### COURSE REQUIREMENTS

Students may major in biophysical, inorganic, organic, or physical chemistry. All graduate students are required to take six graduate-level lecture courses (course numbers greater than 199) of at least 3 units each in chemistry or related disciplines (for example, biochemistry, electrical engineering, mathematics, pharmacology, physics, and so on), to be selected in consultation with their research adviser and the Graduate Study Committee. A minimum of four courses should be completed by the end of the first year for a letter grade.

In addition, students majoring in organic chemistry must complete 3 units of CHEM 231 in the second year and 3 units of 233 in the second and third year. Students in physical or biophysical chemistry or chemical physics must complete CHEM 271, 273, and 275 in the first year, and 2 units of CHEM 278 in the second and third year. Students majoring in inorganic chemistry must complete 3 units of CHEM 258 in the second, third, and fourth year.

### CHEMICAL PHYSICS

Students with an exceptionally strong background in physics and mathematics may, upon special arrangement, pursue a program of studies in chemical physics.

### CHEMISTRY COURSES

Courses offered by the Department of Chemistry are listed under the subject code CHEM on the *Stanford Bulletin's* ExploreCourses web site.

WIM indicates that the course satisfies the Writing in the Major requirements.

*Note*—Lab fees are a minimum of \$75 per quarter and are not refundable. CHEM 31A has a required lab fee of \$20.

# CLASSICS

*Emeriti: (Professors)* Mark W. Edwards, Marsh H. McCall, Jr.,\*  
Susan Treggiari, Michael Wigodsky, Edward Spofford

*Chair:* Walter Scheidel

*Graduate Director:* Grant Parker

*Undergraduate Director:* Giovanna Ceserani

*Professors:* Alessandro Barchiesi, Andrew M. Devine, Richard P. Martin (on leave), Ian Morris (Classics, History), Reviel Netz, Andrea Nightingale, Josiah Ober (Classics, Political Science), Anastasia-Erasmia Peponi, M. Rush Rehm (Classics, Drama), Richard Saller (Classics, History), Walter Scheidel, Michael Shanks, Susan A. Stephens

*Associate Professors:* Giovanna Ceserani, Jody Maxmin (Art and Art History, Classics), Grant Parker, Jennifer Trimble

*Courtesy Professors:* Chris Bobonich (Philosophy), Ian Hodder (Anthropology), Bissera Pentcheva (Art and Art History), Caroline Winterer (History), Yiqun Zhou (East Asian Languages and Cultures)

*Visiting Professor:* Emily Gowers

*Visiting Assistant Professor:* Laura Jansen

*Lecturers:* Maud Gleason, John Klopacz, Peter O'Connell (Mellon Fellow)

\* Recalled to active duty.

*Department Offices:* Building 110, Main Quad

*Mail Code:* 2145

*Phone:* (650) 723-0479

*Email:* classics@stanford.edu

*Web Site:* <http://classics.stanford.edu>

Courses offered by the Department of Classics are listed on the *Stanford Bulletin's* ExploreCourses web site under the subject codes CLASSART (Classics Art/Archaeology), CLASSGEN (Classics General), CLASSGRK (Classics Greek), CLASSHIS (Classics History), and CLASSLAT (Classics Latin).

The study of Classics has traditionally centered on the literature and material culture of ancient Greece and Rome, including Greek and Latin language, literature, philosophy, history, art, and archaeology. At Stanford, Classics also explores connections with other ancient cultures and with the modern world, as well as specialized fields such as ancient economics, law, papyrology, and science. The department's faculty approaches Classics from an interdisciplinary perspective that crosses geographical, temporal, and thematic territories. Studying ancient epic poetry can lead to looking at modern cinema afresh; ancient Athenian politics opens new perspectives on modern politics; and the study of Rome presents parallels with other empires just as Latin illuminates the history of English and the Romance languages. In short, Classics at Stanford is an interdisciplinary subject concerned not only with Greek and Roman civilization but also with the interaction of cultures and societies that influenced the ancient Mediterranean basin and continue to influence human society across the globe.

## MISSION OF THE UNDERGRADUATE PROGRAM IN CLASSICS

The mission of the undergraduate program in Classics is to provide students with a broad background centered on the literature and material culture of ancient Greece and Rome, including Greek and Latin language, literature, philosophy, history, art, and archaeology. At Stanford, students in the Classics program also explore the connections between ancient cultures and the modern world as well as specialized fields such as ancient economics, law, papyrology, and science. The program's faculty approaches Classics from an interdisciplinary perspective that crosses geographical, temporal and thematic territories. The program is concerned not only with Greek and Roman civilization but also with the interaction of cultures and societies that

influenced the ancient Mediterranean basin and continue to influence human society across the globe.

## LEARNING OUTCOMES

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. The ability to develop effective and nuanced lines of interpretation.
2. Critical thinking skills using primary source materials.
3. Facility with the methodologies and presuppositions underlying interpretive positions in secondary literature and in their own work.
4. Well-developed analytical writing skills and close reading skills.

The department offers the following fields of study for undergraduate degrees in Classics:

- Classical Studies
- Ancient History
- Greek
- Latin
- Greek and Latin

The Classical Studies, Greek, and Latin fields of study may also be taken with a Philosophy and Literature focus. The Classics major can be completed in conjunction with a second major in the sciences or in other humanities departments.

The department also offers minors in: Classical Languages, Ancient History, Literature and Philosophy, and Classical Studies.

## BACHELOR OF ARTS IN CLASSICS

Those interested in majoring in Classics are encouraged to declare by the beginning of their junior year, but are urged to discuss their plans with the undergraduate director as early as possible. Students who choose the Greek and Latin field of study (option 5 below) should begin the curriculum as soon as possible because it is difficult to complete the language requirements without an early start; those with no previous knowledge of Latin or Greek should begin study in the freshman year, in a summer program following freshman year, or at the beginning of the sophomore year.

To declare the major, a student must fill out the Declaration of Major on Axess and meet with the undergraduate director in the Department of Classics. At that time, the undergraduate director assigns the student a department adviser. To build a mentoring relationship, students meet with their adviser at least once a quarter. The student should then schedule an orientation with the student services officer. Each student's progress towards fulfillment of the major requirements is recorded in a file kept in the student services officer's office. It is the student's responsibility to work with the adviser to keep this file up to date.

A letter grade is required in all courses taken for the major. No course receiving a grade lower than 'C' is counted toward fulfilling major requirements. Enrollment in an independent study section (CLASSGEN 160) requires the prior approval of the undergraduate director, and a maximum of three such enrollments for a maximum total of 10 units may be counted toward the major.

The B.A. degree may be earned by fulfilling the requirements for one of the following fields of study. Option 6 below describes how to add a Philosophy and Literature focus to some of the major plans.

1. *Classical Studies:* This field of study is declared on Axess. Students are encouraged to meet with the undergraduate director to discuss options for pursuing a period of study in the Mediterranean region. This major is recommended for students who wish to study classical civilizations in depth but do not wish to study the languages to the extent required by options 4, 5 and 6. It is not suitable for students who wish to do graduate work in Classics or to teach Latin or Greek in high school, as

the language work is insufficient for these purposes. Courses counted for the degree must be taken for a letter grade. Students must complete at least 60 units of approved courses including:

- a. CLASSGEN 176. Majors Seminar (WIM).
  - b. at least two courses in Latin or Greek at the 100 level or higher, *or* one course in one of the languages at the 100 level or higher, plus the series 1, 2, 3, or 51, 52 in the other language (or an equivalent approved by the department).
  - c. remaining units fulfilled by courses with the prefix CLASSART, CLASSGEN, CLASSHIS, CLASSLAT or CLASSGRK (or up to 8 units of IHUM 39A,B; IHUM 69A; or SLE). Courses listed in the department's cognate course list may also count towards the major with prior written approval from the undergraduate director; written approval must be submitted to the student services officer for inclusion in the student's academic file prior to the end of the term in which the course is taken.
2. *Ancient History*: This field of study is declared on Axess. Courses chosen must be approved in advance and in writing by the undergraduate director. Approval should be submitted to the student services officer for the student's academic file. With the written approval of the instructor and the undergraduate director, students may substitute graduate seminars in ancient history for some of these courses. Students are also encouraged to meet with the undergraduate director to discuss options for pursuing a period of study in the Mediterranean region. Courses counted for the degree must be taken for a letter grade. Students must complete at least 60 units of approved courses and must satisfy four requirements:
    - a. CLASSGEN 176. Majors Seminar (WIM).
    - b. *Core requirement*: majors must take at least two survey courses in ancient history.
    - c. *Depth requirement*: majors must take at least 33 units of ancient history and civilization courses, drawn from courses with CLASSHIS, CLASSGEN and CLASSART prefixes. IHUM 39A,B, Inventing Classics, or IHUM 69A, History of the World, may be counted toward this requirement. CLASSGRK and CLASSLAT courses may also count toward this requirement if approved by the undergraduate director.
    - d. *Breadth requirement*: majors must take at least 4 units in each of the following areas: archaeology and art; comparative ancient civilizations; and historical and social theory. IHUM 39A,B, Inventing Classics, may be counted toward this requirement. The courses chosen must be approved in advance by the undergraduate director, and are normally chosen from the list of areas below, although courses listed in the department's cognate course list may be substituted for one or more of these courses with prior written approval from the undergraduate director. Written approval must be submitted to the student services officer for inclusion in the student's academic file prior to the end of the term in which the course is taken.
      1. archaeology and art: for example, any CLASSART course; IHUM 40B, ARCHLGY 1/ANTHRO 3, or any 100-level archaeology course.
      2. comparative ancient civilizations: majors must take a course on the ancient world outside the Mediterranean and western Asia, such as ANTHRO 3, 97/297, 142, 100A.
      3. historical and social theory: for example, ANTHRO 1/201, 90B; SOC 1, 108, 140, 142, 170.
  3. *Greek*: This field of study is declared on Axess. Beginning courses in Greek, if required, may be counted towards the total of 60 units. Relevant courses in other departments of the humanities may count towards the major with the consent of the undergraduate director. Students are encouraged to meet with the undergraduate director to discuss options for pursuing a period of study in the Mediterranean region. Courses counted for the degree must be taken for a letter grade. Students must complete at least 60 units of approved courses including:
    - a. CLASSGEN 176. Majors Seminar (WIM).
    - b. a minimum of 31 units in Greek courses at the 100 level or higher. It is recommended that one of these courses be CLASSGRK 175A, although this course should not be taken until students have completed three years of Greek.
    - c. at least three courses with the prefix CLASSART, CLASSGEN, or CLASSHIS (or up to 8 units of IHUM 39A,B; IHUM 69A; or SLE). Courses listed in the department's cognate course list may be substituted for one or more of these courses with prior written approval from the undergraduate director; written approval must be submitted to the student services officer for inclusion in the student's academic file prior to the end of the term in which the course is taken.
    - d. the introductory Latin sequence CLASSLAT 1, 2, 3, *or* 51, 52, *or* one 100-level course in Latin (recommended); or the Sanskrit sequence SPECLANG 183A,B,C.
    - e. it is recommended that students take a course in ancient history.
  4. *Latin*: This field of study is declared on Axess. Beginning courses in Latin, if required, may be counted towards the total of 60 units. Relevant courses in other departments of the humanities may count towards the major with the consent of the undergraduate director. Students are encouraged to meet with the undergraduate director to discuss options for pursuing a period of study in the Mediterranean region. Courses counted for the degree must be taken for a letter grade. Students must complete at least 60 units of approved courses including:
    - a. CLASSGEN 176. Majors Seminar (WIM).
    - b. a minimum of 31 units in Latin courses at the 100 level or higher. It is recommended that one of these courses be CLASSLAT 175A, although this course should not be taken until students have completed three years of Latin.
    - c. at least three courses with the prefix CLASSART, CLASSGEN, or CLASSHIS (or up to 8 units of IHUM 39A,B; IHUM 69A; or SLE). Courses listed in the department's cognate course list may be substituted for one or more of these courses with prior written approval from the undergraduate director; written approval must be submitted to the student services officer for inclusion in the student's academic file prior to the end of the term in which the course is taken.
    - d. (recommended) the introductory sequence CLASSGRK 1, 2, 3, *or* 51, 52, *or* one 100-level course in Greek; or the Sanskrit sequence SPECLANG 183A,B,C.
    - e. it is recommended that students take a course in ancient history.
  5. *Greek and Latin*: This field of study is declared on Axess. Relevant courses in other departments of the humanities may count towards the major with the consent of the undergraduate director. Students are encouraged to meet with the undergraduate director to discuss options for pursuing a period of study in the Mediterranean region. Courses counted for the degree must be taken for a letter grade. Students must complete at least 60 units of approved courses including:
    - a. CLASSGEN 176. Majors Seminar (WIM).
    - b. 30 units in Greek courses and the same number in Latin. It is recommended that students take either or both CLASSGRK or CLASSLAT 175A, although these courses should not be taken until students have completed three years of the respective language.
    - c. it is recommended that students take a course in ancient history and/or the Sanskrit sequence SPECLANG 183A,B,C.
  6. *Philosophy and Literature Focus*: Students who wish to add a Philosophy and Literature focus to the Classical Studies, Greek, Latin, or Greek and Latin majors should also take the courses listed below:
    - a. PHIL 81. Philosophy and Literature.

- b. PHIL 80. Mind, Matter and Meaning. Writing in the Major (WIM) in the Philosophy department.
- c. one course in each of the following areas:
  1. aesthetics, ethics, and social and political philosophy (PHIL 170 series)
  2. philosophy of language, mind, metaphysics, and epistemology (PHIL 180 series)
  3. history of philosophy (above 100 level).
- d. two related courses in Classics or Philosophy. Students may double count a Classics course in Philosophy or ancient science for one of the two related courses provided that this course fulfills the Philosophy and Literature requirements and is approved by a member of the committee in Philosophy and Literature.
- e. *Philosophy and Literature capstone seminar*—This year's capstone seminars are COMPLIT 226/GERLIT 242: Narrative and Ethics (Winter), FRENGEN 284/ITALGEN 284: Poetry and Philosophy (Autumn), and RELIGST 271A: Dante's Spiritual Vision (Autumn). One of these courses must be taken in the student's senior year.

*Note 1:* University credit earned by placement tests or advanced placement work in secondary school is not counted towards any major program in the department; work done in other universities or colleges is subject to department evaluation.

## HONORS PROGRAM

A minimum grade point average (GPA) of 3.6 within the major is required for students to enroll in the honors program. To be considered for honors in Classics, the student must select a professor who can supervise his or her honors thesis. A preliminary proposal, approved by the supervisor, is due April 15 of the junior year, and a final version is due at the beginning of the senior year. The proposal must outline the project in detail, list relevant courses that have been taken, and name the supervisor. The department gives approval only if a suitable faculty supervisor is available and if it is satisfied that the student has a sufficient basis of knowledge derived from department course work in the general areas the thesis covers, such as art, Greek, Latin, history, literature, or philosophy. If the proposal is approved, the student may sign up for CLASSGEN 199, Undergraduate Thesis: Senior Research, during the senior year for a maximum of 6 units per term, up to an overall total of 10 units. Honors are awarded only if the essay receives a grade of 'B+' or higher from the supervisor and a second reader, who is chosen by the department. In addition, students must graduate with a GPA of 3.6 or higher within the major to receive honors.

## STUDY ABROAD

*Funding*—Undergraduates whose record in Classics indicates that they are qualified may apply for funding from the Department of Classics. Students must submit a proposal to the undergraduate director as part of the Undergraduate Summer Research Grant Application; see the undergraduate page at <http://classics.stanford.edu> for the application. The proposal should include an itemized list of expenses based on the fees charged by the program, including room, board, tuition, and other expenses. Food expenses are not normally reimbursed unless they are an integral part of the program package. Limited funding is available each year; preference is shown to students with strong records.

### *Programs*—

1. *Italy:* Classics majors are encouraged to apply for the Intercollegiate Center for Classical Studies in Rome, which is managed by Duke University for about 50 constituent colleges and universities ([http://studyabroad.duke.edu/home/Programs/Semester/ICCS\\_Rome](http://studyabroad.duke.edu/home/Programs/Semester/ICCS_Rome)). It is open to Stanford majors in Classics, History, and Art History. All courses receive full credit at Stanford and may be applied to the respective major. Students interested in this program should consult the undergraduate director and the ICCS representative in the Department of Classics as early as possible in their career at Stanford to plan their course preparation and application. Competition is strong, and

applicants are expected to have taken one or more courses in Roman history and at least one year of Latin before they arrive in Rome. Brochures are available at the department office.

- Other programs offer a quarter, semester, or summer session in Rome. Interested students should consult with the Bing Overseas Studies Program (<http://bosp.stanford.edu>).
2. *Greece:* Students are encouraged to apply for the summer session at the American School of Classical Studies in Athens (<http://ascsa.edu.gr>). The school is recommended principally for Classics majors with at least two years of ancient Greek. A student wishing to apply should prepare by taking courses in Greek history, archaeology, and art; beginning modern Greek is strongly recommended. Applicants should see the undergraduate director early in the academic year. Other programs such as College Year in Athens (<http://cyathens.org>) offer a quarter, semester, or summer session in Greece. Interested students should visit the Bing Overseas Studies Program in Sweet Hall.

## MINOR IN CLASSICS

The undergraduate director meets with each student who opts for a minor to discuss curriculum choices and assigns the student an adviser in the relevant field. Students are required to work closely with their advisers to create a cohesive curriculum within each area. Students who minor in Classics are required to take CLASSGEN 176, Majors Seminar, which is writing intensive.

Students may choose among four minors in Classics:

1. *Classical Languages:* students are required to take a minimum of five courses in Greek or in Latin. In addition to the five required courses, students must take CLASSGEN 176, Majors Seminar. Students wishing to combine Greek and Latin may only do so if courses for one of the two languages are all above the 100 level; for example, CLASSGRK 1, 10, plus CLASSLAT 103, 111, 175.
2. *Ancient History:* students are required to take a minimum of five courses in history, art history, and archaeology. Courses listed in the department's cognate course list may be substituted for one or more of these courses with prior written approval from the undergraduate director; written approval must be submitted to the student services officer for inclusion in the student's academic file prior to the end of the term in which the course is taken. In addition to the five required courses, students must take CLASSGEN 176, Majors Seminar. Courses offered in Latin and Greek that focus on historical topics or authors may count toward this minor.
3. *Literature and Philosophy:* students are required to take a minimum of five courses in classical literature or philosophy, including classical science. Courses listed in the department's cognate course list may be substituted for one or more of these courses with prior written approval from the undergraduate director; written approval must be submitted to the student services officer for inclusion in the student's academic file prior to the end of the term in which the course is taken. In addition to the five required courses, students must take CLASSGEN 176, Majors Seminar. Courses offered in Latin and Greek that focus on philosophical or literary topics or authors may count toward the minor.
4. *Classical Studies:* students are required to take a minimum of five courses in Classics (CLASSART, CLASSGEN, CLASSGRK, CLASSHIS, CLASSLAT) plus the majors seminar (CLASSGEN 176). May count up to 4 units of the following: IHUM 39A,B; IHUM 69A; or SLE.

## MASTER OF ARTS IN CLASSICS

University requirements for the master's degree are described in the "Graduate Degrees" section of this bulletin.

*I and II. Language and Literature, and Philosophy Fields of Study*—Students who have completed an undergraduate major in Classics (Greek, Latin, or Greek and Latin fields of study) or equivalent may be accepted as candidates for the M.A. degree in

Classics and may expect to complete the program in twelve months (usually three quarters of course work plus three months study for the thesis or examination). Students with an undergraduate major in Classics (Ancient History or Classical Studies fields of study) or without an undergraduate major in Classics may also be accepted as candidates, though they may require a longer period of study before completing the requirements for the degree. These requirements are:

1. Attaining a standard of scholarship such as would be reached by three quarters of study in the department after fulfilling the requirements for an undergraduate major in the department. Normally, this means completing at least 25 units of graduate courses and 20 additional units of work at the 100 level or higher.
2. Completion of one Greek course at the 100 level (if the undergraduate major field of study was Latin) or one Latin course at the 100 level (if the undergraduate major field of study was Greek). This requirement is waived for students with an undergraduate major in Classics (Greek and Latin field of study).
3. Passing an examination testing the candidate's ability to translate into English from a selected list of Greek and/or Latin authors.
4. Completion of the 275A,B sequence in at least one language (Latin or Greek).
5. Writing a thesis, or passing of an examination on a particular author or topic, or having written work accepted by the graduate committee as an equivalent. Three completed and satisfactory seminar papers are normally an acceptable equivalent.
6. A reading examination in French or German; these examinations are administered every quarter.
7. Completion and approval of a Program Proposal for a Master's Degree form before the end of the first quarter of enrollment.

Candidates for the Ph.D. degree may also, on the recommendation of the department, become candidates for the M.A. degree. In this case, requirement 5 above is waived provided that the student has completed some work beyond the course requirements listed under requirements 1 and 2 above.

*III. Classical Archaeology*—Students who have completed an undergraduate major in Classics with a Classical Archaeology field of study, or in a closely related field, may be accepted as candidates for the M.A. degree in Classics with a Classical Archaeology field of study, and may expect to complete the program in twelve months (usually three quarters of course work plus three months study for the thesis or examination). Students without an undergraduate major in Classics with a Classical Archaeology field of study may also be accepted as candidates, though they may require a longer period of study before completing the requirements for the degree. These requirements are:

1. Attaining a standard of scholarship such as would be reached by three quarters of study in the department after fulfilling the requirements for an undergraduate major in the department. Normally, this means completing at least 25 units of graduate courses and 20 additional units of work at the 100 level or higher.
2. Completion with a grade of 'B' or higher of at least 15 units of graduate-level courses in classical archaeology, not including CLASSART 302.
3. Passing an examination designed to test the candidate's ability to translate into English from either ancient Greek or Latin.
4. Completion with a grade of 'B' or higher of CLASSART 302, Classical Archaeology: Experiences of the Discipline, or an equivalent course on the history of thought in classical archaeology approved by the Classics department's graduate committee.
5. Writing a thesis, or passing an exam on a particular topic, or having written work accepted by the graduate committee as an equivalent. Three completed and satisfactory seminar papers are normally an acceptable equivalent.

6. Passing a reading examination in French, German, or Italian. These examinations are administered every quarter.
7. Completion and approval of a Program Proposal for a Master's Degree form before the end of the first quarter of enrollment.

Candidates for the Ph.D. degree may also, on the recommendation of the department, become candidates for the M.A. degree. In their case, requirement 5 above is waived provided that the student has completed some work beyond the course requirements listed under requirements 1 and 2 above.

*IV. Ancient History*—Students who have completed an undergraduate major in Classics with a Classical Archaeology field of study, or in a closely related field may be accepted as candidates for the M.A. degree in Classics with an Ancient History field of study, and may expect to complete the program in twelve months (usually three quarters of course work plus three months study for the thesis or examination). Students without an undergraduate major in Classics with a Classical Archaeology field of study may also be accepted as candidates, though they may require a longer period of study before completing the requirements for the degree. These requirements are:

1. Attaining a standard of scholarship such as would be reached by three quarters of study in the department after fulfilling the requirements for an undergraduate major in the department. Normally, this means completing 30 units of graduate courses and 15 additional units of work at the 100 level or higher.
2. Satisfactory completion of 20 units of graduate-level courses in Classics and of 10 units of graduate-level courses in other programs.
3. Satisfactory completion of 15 additional units of courses in either ancient Greek or Latin.
4. Writing a thesis, or passing an exam on a particular topic, or having written work accepted by the Graduate Committee as an equivalent. Three completed and satisfactory seminar papers are normally an acceptable equivalent.
5. Passing a reading examination in French, German, or Italian. These examinations are administered every quarter.
6. Completion and approval of a Program Proposal for a Master's Degree form before the end of the first quarter of enrollment.

Candidates for the Ph.D. degree may also (on the recommendation of the department) become candidates for the M.A. degree. In their case, requirement 4 above is waived provided that they have completed some work beyond the course requirements listed under requirements 1 and 2 above.

## COTERMINAL BACHELOR'S AND MASTER'S DEGREE IN CLASSICS

Stanford students in any undergraduate major who are interested in postgraduate work in Classics may apply for Stanford's coterminal master's program. Students considering a co-term are encouraged to consult with the Director of Undergraduate Studies about their plans before filing an application. No courses used to satisfy the undergraduate requirements (either as General Education Requirements or department requirements) may be applied toward the M.A. No courses taken more than two quarters prior to admission to the coterminal master's program may be used to meet the 45-unit University minimum requirement for the master's degree. Applicants must have a minimum GPA of 3.7 in the major, and no incompletes on record. Undergraduate course work in Greek and Latin is normally a prerequisite for graduate-level work.

To apply, students should submit the Application for Admission to Coterminal Master's Program form, two letters of recommendation from Classics faculty, a sealed, official copy of their undergraduate transcript, a 1-3 page statement of purpose and a 10-15 page writing sample. GRE scores are not required. Applications are due in early January of your intended graduation year; please see the departmental website, <http://classics.stanford.edu> for the specific deadline.

For University coterminal degree program rules and University application forms, see the Undergraduate Academic Life web site.

University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees" section of this bulletin.

## DOCTOR OF PHILOSOPHY IN CLASSICS

University requirements for the Ph.D. are described in the "Graduate Degrees" section of this bulletin. There are four specializations within the Classics Ph.D. program: language and literature; classical archaeology; ancient history; and ancient philosophy.

I. *Language and Literature*—Candidates for the Ph.D. degree in Classics with specialization in language and literature must fulfill the following requirements:

1. Complete 135 units of academic credit or equivalent in study beyond the bachelor's degree at the end of the fourth year.

These must include:

- a. Greek and Latin survey sequence (CLASSGEN 207-208).
- b. Greek and Latin syntax sequence (CLASSGRK 275A,B and CLASSLAT 275A,B).
- c. Semantics of grammar sequence (CLASSGEN 205A,B).
- d. Twelve graduate seminars, nine of which must be Classics seminars, and one of the remaining three of which must be outside the department. The other two seminars may be in Classics, from other departments (with the graduate director's approval), and/or directed readings. However, no more than two directed readings can be taken. Classics seminars are generally offered for 4-5 units. In some cases, instructors allow a student to complete a seminar for 4 units without requiring a written paper but with completion of all other requirements.

2. Examinations:

- a. Students must take Greek and Latin translation exams at the end of each survey sequence (the end of the first and second years). These exams are based on the Greek and Latin reading lists available on the Classics Department web site at: <http://classics.stanford.edu>. Greek and Latin survey courses cover less than half of the material on which the translation exams test, and students need to prepare much of the work on their own. It is possible to take both exams in the same year if the student chooses. However, students are obligated to take the exam in the language which the survey has covered that year. The exam consists of a choice of six of eight passages, and students are allowed three hours. A grade of 'B-' or higher, on every passage, is required to pass. If a student does not attain a 'B-', the exam must be retaken later in the summer before registering for the Autumn Quarter, in order to continue in the program. In order to retake an exam during Summer Quarter, a student must be registered at Stanford at his or her own expense; the department does not cover tuition in these instances. The exam can only be retaken once.
- b. Students must pass modern language translation exams in both German and French; Italian or modern Greek may be substituted in place of French, with consent of the graduate director. Students arrange with the student services officer to take the exam. One modern language exam must be passed by the end of the second year, the other by the end of the third year. These examinations are administered once each quarter.
- c. At the beginning of Autumn Quarter of the third year, students take general examinations in four of the following fields: Greek literature, Latin literature, ancient philosophy, Greek history, and Roman history. Students select the fields in consultation with the graduate director no later than June of the second year of graduate study. Candidates must have taken at least one course at Stanford in each of the chosen fields (in the case of ancient philosophy, a seminar or its equivalent); students need to

confer with the professor overseeing the exam. General examinations must be taken by October of the third year.

- d. The University oral examination, which is a defense of the candidate's dissertation.
3. The graduate director assigns a dissertation proposal director to each candidate who has passed the general examination. During the third year, the candidate, in consultation with the dissertation proposal director, prepares a dissertation proposal which is examined by the dissertation proposal defense committee (set up by the dissertation proposal director and consisting of the dissertation proposal director and two other faculty members, one of whom may be from outside the department), no later than the end of the first quarter of the fourth year. If the proposal is deemed unsatisfactory, this proposal examination is repeated in the following quarter and must be passed. Subsequently, each candidate, in consultation with the graduate director and the dissertation proposal director, selects a dissertation director who must be a member of the Academic Council. The candidate, the dissertation director, and the graduate committee collaborate to select an appropriate dissertation reading committee. Two of the three members of the reading committee, including the chair, must be members of the Academic Council.
  4. Students are required to undertake the equivalent of four one quarter courses of teaching under department supervision. This teaching requirement is normally completed during the second and third years of study. Summer teaching does not satisfy this requirement.
  5. A typical program for a graduate student in Classics is as follows. First year: CLASSLAT 275A,B (6 units), CLASSGRK 275A,B (6 units), CLASSGEN 205A,B, Semantics (3 units), either CLASSGEN 207A-C or 208A-C, Literature Survey (offered alternate years; 15 units), and three elective seminars (12-15 units). Second year: either CLASSGEN 207A-C or 208A-C, Literature Survey (offered alternate years; 15 units), five to nine elective seminars (20-45 units), and one to three teaching assistantships (9-27 units). Third year: three to eight elective seminars (12-40 units), one to three teaching assistantships (9-27 units). Fourth year: three quarters of predoctoral dissertation research assistantship (30 units).

II. *Classical Archaeology*—Candidates for the Ph.D. degree in Classics with a specialization in classical archaeology must fulfill the following requirements:

1. Complete 135 units of academic credit or equivalent in study beyond the bachelor's degree at the end of the candidate's fourth year.

These must include:

- a. At least three graduate (200 or 300) level courses in Latin and/or Greek literature.
- b. History of Classical Archaeology (CLASSART 201), to be taken as early as possible in the candidate's Stanford career.
- c. The interdepartmental graduate core sequence in archaeology. The Archaeology Center announces the courses which fulfill this requirement. The core sequence currently comprises a seminar in archaeology theory and a course on archaeological methods.
- d. At least one further course outside the Classics department.
- e. At least five graduate seminars in classical archaeology.
- f. At least three graduate seminars in ancient history.
- g. Students may petition to count independent study courses in place of up to two required courses, but no more.
- h. Students who enter the program with only one ancient language at the level needed for graduate study are strongly encouraged to take additional course work to reach graduate (200 and above) level in another language.
- i. Students are urged to enroll in or audit other undergraduate courses that may fill gaps in their undergraduate training.
- j. All students are expected to take part in archaeological fieldwork in the classical world areas.

- k. At least three consecutive quarters of course work must be taken at Stanford.
2. Examinations:
- As soon as students arrive, they must take a diagnostic exam in either Greek or Latin. Depending on performance, students may be required to enroll in undergraduate language classes in that language to improve their skills to the level required for graduate work.
  - Reading examinations in two of the following languages: French, German, Italian, and modern Greek. Candidates may petition to substitute a different modern language for one of these, if their area of specialization requires it. One modern language exam must be passed by the end of the second year, the other by the end of the third year. These examinations are administered once each quarter.
  - A translation examination from Latin or Greek into English. This examination must be taken either at the end of the first year or at the end of the second year. A grade of 'B-' or higher on every passage is required to pass. If a student does not attain a 'B-,' the exam must be retaken later in the summer before registering for Autumn Quarter, in order to continue in the program. In order to retake an exam during Summer Quarter, a student must be registered at Stanford at his or her own expense; the department does not cover tuition in these instances. The exam can only be retaken once.
  - General examinations in Greek archaeology and Roman archaeology, and two of the following fields: Greek literature, Latin literature, ancient philosophy, Greek history, Roman history. Candidates select the fields in consultation with the graduate director no later than the first week of Spring Quarter of the second year of graduate study. Candidates must have taken at least one course at Stanford in each of the chosen fields (in the case of ancient philosophy, a seminar or its equivalent). General examinations must be taken by October of the third year.
  - The University oral examination, which is a defense of the candidate's dissertation.
3. The graduate director assigns a dissertation proposal director to each candidate who has passed the general examination. During the third year, the candidate, in consultation with the dissertation proposal director, prepares a dissertation proposal which is examined by the dissertation proposal defense committee (set up by the dissertation proposal director and consisting of the dissertation proposal director and two other faculty members, one of whom may be from outside the department), no later than the end of the first quarter of the fourth year. If the proposal is deemed unsatisfactory, this proposal examination is repeated in the following quarter and must be passed. Subsequently, each candidate, in consultation with the graduate director and the dissertation proposal director, selects a dissertation director who must be a member of the Academic Council. The candidate, the dissertation director, and the graduate committee collaborate to select an appropriate dissertation reading committee. Two of the three members of the reading committee, including the chair, must be members of the Academic Council.
4. Students are required to undertake the equivalent of four one quarter courses of teaching under department supervision. This teaching requirement is normally completed during the second and third years of study. Summer teaching does not satisfy this requirement.
- III. Ancient History*—Candidates for the Ph.D. degree in Classics with specialization in ancient history must fulfill the following requirements:
- Complete 135 units of academic credit or equivalent in study beyond the bachelor's degree at the end of the fourth year. These must include:
    - In the Autumn Quarter of the first year, Approaches to History (HISTORY 304), offered in the History department.
    - Two proseminars. These introduce students to primary sources of evidence for ancient history that require special training: papyrology, epigraphy, paleography, numismatics, and archaeology. The department should offer one each year, but students may also fulfill this requirement by doing a directed reading, or (with the approval of the ancient history track adviser) by taking a course at another university with which Stanford has an exchange agreement.
    - Three skills courses relevant to the individual student's chosen research approach. For example, a student could take classes in economics, demography, legal history, or anthropology. The skills courses can also be used to learn other ancient or modern languages, either by course work or directed reading. Students need to consult with their advisers and the graduate director to determine appropriate skills courses.
    - Ten graduate seminars: These normally have course numbers in the 200s, 300s, or 400s. Most of these are taken in the department, but students may also take seminars outside the department or at another university with which Stanford has an exchange agreement. Approval from the ancient history adviser and the graduate director must be obtained prior to exercising this option. While only two of the ten seminars can be replaced by directed readings, up to three additional seminars may be taken outside the department. This leaves five ancient history seminars that must be chosen from those in the department. Other Classics graduate seminars may be substituted for these ancient history seminars, with approval of the ancient history track adviser.
    - The range and sequence of other courses to be taken depend on which of the following two options the student selects within the Ancient History track.
      - Option 1:* Students focus more on one language. This requires students to take: the three quarter survey course in either Greek or Latin (CLASSGEN 207A-C or CLASSGEN 208 A-C); the fifteen-week syntax course in the same language (CLASSGRK 275A,B or CLASSLAT 275A,B); one quarter of the survey course sequence in the other language; and the two quarter Semantics of Grammar sequence (CLASSGEN 205A,B).
      - Option 2:* Students emphasize broader linguistic skills. This requires students to take the three quarter survey sequence in both Greek and Latin (CLASSGEN 207A-C and 208A-C).
  - Examinations:
    - As soon as students arrive, they take diagnostic exams in two areas of ancient history. Choices are: Egyptian, Greek, and Roman history. The test is mainly on narrative history, especially important names, dates, and events. Depending on performance, students may be asked to sit in on the undergraduate history courses and take directed reading or a graduate survey if offered. Reading lists are available upon request.
    - Students must take the final offered at the end of each quarter of Greek or Latin survey (for Option 1 above) or both Greek and Latin surveys (for Option 2 above). Students must earn a 'B-' or higher on each final to pass.
    - Students must pass modern language translation exams in both German and French; Italian or modern Greek may be substituted in place of French with consent of the graduate director. One modern language exam must be passed by the end of the second year, the other by the end of the third year. These examinations are administered once each quarter.
    - Students must pass general exams in two areas in history (Egyptian, Greek, or Roman) and two of the following fields: Greek literature, Latin literature, Greek archaeology, Roman archaeology, or ancient philosophy.



Students select the fields in consultation with the graduate director no later than June of their second year of graduate study. Candidates must have taken at least one course at Stanford in each of the chosen fields (in the case of ancient philosophy, a seminar or its equivalent). General examinations must be taken by October of the third year. In preparing for the general examinations, candidates are expected to make full use of relevant secondary material in modern languages. They should therefore plan to satisfy the requirements in French and German as soon as possible, preferably before the translation examinations.

- e. The University oral examination which is a defense of the candidate's dissertation.
3. The graduate director assigns a dissertation proposal director to each candidate who has passed the general examination. During the third year, the candidate, in consultation with the dissertation proposal director, prepares a dissertation proposal which is examined by the dissertation proposal defense committee (set up by the dissertation proposal director and consisting of the dissertation proposal director and two other faculty members, one of whom may be from outside the department), no later than the end of the first quarter of the fourth year. If the proposal is deemed unsatisfactory, this proposal examination is repeated in the following quarter and must be passed. Subsequently, each candidate, in consultation with the graduate director and the dissertation proposal director, selects a dissertation director who must be a member of the Academic Council. The candidate, the dissertation director, and the graduate committee collaborate to select an appropriate dissertation reading committee. Two of the three members of the reading committee, including the chair, must be members of the Academic Council.
4. Candidates are required to undertake the equivalent of four one quarter courses of teaching under department supervision. This teaching requirement is normally completed during the second and third years of study. Summer teaching does not satisfy this requirement.

*IV. Joint Program in Ancient Philosophy*—This specialization is jointly administered by the departments of Classics and Philosophy and is overseen by a joint committee composed of members of both departments. It provides students with the training, specialist skills, and knowledge needed for research and teaching in ancient philosophy while producing scholars who are fully trained as either philosophers or classicists.

Graduate students admitted by the Classics department receive their Ph.D. from the Classics department. This specialization includes training in ancient and modern philosophy. Each student in the program is advised by a committee consisting of one professor from each department.

Candidates for the Ph.D. degree in Classics with specialization in ancient philosophy must fulfill the following requirements:

1. Complete 135 units of academic credit or equivalent in study beyond the bachelor's degree at the end of the fourth year. These must include:
  - a. All the requirements listed for the language and literature specialization in the graduate program in Classics (see "I" above).
  - b. Three courses in the Philosophy department (including 100/200 and two courses at the 200 level or higher). These include:
    1. one course in logic which can be fulfilled at the 100 level or higher
    1. one course in aesthetics, ethics, or political philosophy
    2. one course in metaphysics, epistemology, philosophy of mind, or philosophy of science.
  - c. At least three courses in ancient philosophy at the 200 level or above, one of which must be in the Philosophy department.
  - d. All courses taken in the Philosophy department count for seminar credit (i.e., as contributing to the 12 seminar

requirement in the Language and Literature track in the Classics department).

2. *Examinations:* The requirements are the same as those listed in the language and literature specialization, except that one of the four areas of general examination must be taken in ancient philosophy.
3. The graduate director assigns a dissertation proposal director to each candidate who has passed the general examination. During the third year, the candidate, in consultation with the dissertation proposal director, prepares a dissertation proposal which is examined by the dissertation proposal defense committee (set up by the dissertation proposal director and consisting of the dissertation proposal director and two other faculty members, one of whom may be from outside the department), no later than the end of the first quarter of the fourth year. If the proposal is deemed unsatisfactory, this proposal examination is repeated in the following quarter and must be passed. Subsequently, each candidate, in consultation with the graduate director and the dissertation proposal director, selects a dissertation director who must be a member of the Academic Council. The candidate, the dissertation director, and the graduate committee collaborate to select an appropriate dissertation reading committee. Two of the three members of the reading committee, including the chair, must be members of the Academic Council.
4. Students are required to undertake the equivalent of four one quarter courses of teaching under department supervision. This teaching requirement is normally completed during the second and third years of study. Summer teaching does not satisfy this requirement.

#### PH.D IN CLASSICS AND HUMANITIES

The department participated in the Graduate Program in Humanities leading to a Ph.D. degree in Classics and Humanities. At this time, the option is available only to students already enrolled in the Graduate Program in Humanities; no new students are being accepted. The University remains committed to a broad-based graduate education in the humanities; the courses, colloquium, and symposium continue to be offered, and the Division of Literatures, Cultures, and Languages provides advising for students already enrolled who may contact Denise Winters at 650-724-1333 for further information. Courses are listed under the subject code HUMNTIES and may be viewed on the Stanford Bulletin's ExploreCourses web site.

#### CLASSICS AND A MINOR FIELD

The Ph.D. in Classics may be combined with a minor in another field, such as anthropology, history, humanities, or classical linguistics. Requirements for the minor field vary, but might be expected to involve about six graduate-level courses in the field and one written examination, plus a portion of the University oral exam (dissertation defense). Such a program is expected to take five years. The department encourages such programs for especially able and well prepared students. See the department *Graduate Handbook* for more information. The following timetable would be typical for a five-year program:

*First Year:* course work, almost entirely in Classics. One translation exam taken in June. One or both modern language exams taken.

*Second Year:* course work, both in Classics and the minor field. Second translation exam completed. French and German exams completed.

*Third Year:* course work, both in Classics and the minor field. General examinations in Classics.

*Fourth Year:* remaining course work, both in Classics and the minor field. General examination in the minor field. Preparation for dissertation.

*Fifth Year:* dissertation, University oral examination.

## PH.D. MINOR IN CLASSICS

For a graduate minor, the department recommends at least 20 units in Latin or Greek at the 100 level or above, and at least one course at the graduate (200) level.

## OVERSEAS STUDIES COURSES IN CLASSICS

For course descriptions and additional offerings, see the listings in the *Stanford Bulletin's* ExploreCourses web site (<http://explorecourses.stanford.edu>) or the Bing Overseas Studies web site (<http://bosp.stanford.edu>). Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

## COMMUNICATION

*Emeriti: (Professors)* Henry S. Breitrose, Donald F. Roberts;  
(*Professor, Teaching*) Marion Lewenstein

*Chair:* James S. Fishkin

*Director, Institute for Communication Research:* James S. Fishkin

*Director, John S. Knight Fellowships for Professional Journalists:*  
James R. Bettinger

*Director, Media Studies:* Byron Reeves

*Director, Undergraduate Studies:* Fred Turner

*Deputy Director, John S. Knight Fellowships for Professional Journalists:* Dawn E. Garcia

*Director, Journalism:* Ann Grimes

*Professors:* James S. Fishkin, Theodore L. Glasser, Shanto  
Iyengar, Jon Krosnick, Clifford Nass, Byron B. Reeves

*Associate Professors:* Jeremy Bailenson, Fred Turner

*Courtesy Professors:* Jan Krawitz, Walter W. Powell, Kristine M.  
Samuelson

*Lorry I. Lokey Professor of the Practice:* Ann Grimes

*Visiting Hearst Professional in Residence:* Joel Brinkley

*Carlos Kelly McClatchy Visiting Lecturer:* Janine Zacharia

*Lecturers:* R.B. Brenner, Thomas Hayden, Geri Migielicz, Gary  
Pomerantz, Howard Rheingold, David Voelker, James Wheaton

*Department Offices:* McClatchy Hall, Building 120, Room 110

*Mail Code:* 94305-2050

*Phone:* (650) 723-1941

*Web Site:* <http://comm.stanford.edu>

Courses offered by the Department of Communication are listed under the subject code COMM on the *Stanford Bulletin's* ExploreCourses web site.

Stanford's Department of Communication focuses on media in all its forms. The department studies the processes and effects of mass communication: the nature and social role of the various media; their structure, function, and ethics; and their impact on the political system, culture, and society. In this context, it considers not only traditional mass media, such as newspapers, magazines, radio, television, and film, but also information technology, online media, virtual reality, and the Internet. Students are trained as social scientists who can study the media and as potential practitioners in the use of the media in journalism, mass communications, and digital media. The department combines theory and practice and fosters individual research opportunities for its students, employing both quantitative and qualitative approaches.

The Department of Communication engages in research in communication and offers curricula leading to the B.A., M.A., and Ph.D. degrees. The M.A. degree prepares students for a career in journalism. The department also offers current Stanford University undergraduates a coterminal program with an M.A. emphasis in Media Studies. The Ph.D. degree leads to careers in university teaching and research-related specialties.

The Institute for Communication Research offers research experience primarily to advanced Ph.D. students.

The John S. Knight Fellowships Program brings outstanding journalists and journalism entrepreneurs to the university for an academic year. While here, they focus on the issues, challenges and opportunities of journalism innovation, entrepreneurship and leadership. The John S. and James L. Knight Foundation sponsors twelve U.S. journalists. They are joined by eight International Fellows sponsored by the Lyle and Corrine Nelson International Fellowship Fund, the Knight Foundation, Yahoo! Inc., and others.

## MISSION OF THE UNDERGRADUATE PROGRAM IN COMMUNICATION

The mission of the undergraduate program in Communication is to expose students to a broad-based understanding of communication theory and research. Students in this major are expected to become familiar with the fundamental concerns, theoretical approaches, and methods of the field, and to acquire advanced knowledge in one or more sub-areas of the discipline. This is accomplished by several levels of study: a core curriculum; intermediate-level electives; and internships. Majors also have the opportunity to do advanced research projects. The department is committed to providing students with analytical and critical skills needed for success in graduate programs, professional schools, or immediate career entry.

## LEARNING OUTCOMES

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. an understanding of core knowledge within the discipline of communications.
2. the ability to communicate ideas clearly and persuasively in writing.
3. the ability to analyze a problem and draw correct inferences using qualitative and/or quantitative analysis.
4. the ability to evaluate theory and critique research within the discipline of communications.

## ADMISSION

*Prospective Undergraduates*—Applications are available online at <http://admission.stanford.edu>

*Prospective Coterminal Students*—Applications are available online at <http://studentaffairs.stanford.edu/sites/default/files/registrar/files/CotermApplic.pdf>

*Prospective Graduate Students*—Applications are available online at <http://gradadmissions.stanford.edu>.

The department requires that applicants for graduate admission submit verbal and quantitative scores from the Graduate Record Examination (GRE). Admission to each graduate degree program is competitive, based on the pool of applicants each year rather than on standard criteria that can be stated in advance. For detailed information about the Communication Department admission procedures and requirements, see <http://comm/phd/general/commdeptapplicationguide.pdf>.

## THE INSTITUTE FOR COMMUNICATION RESEARCH

The Institute is an office of project research for the faculty of the Department of Communication and operates under grants to faculty from government, industry, and non-profit organizations. Research assistantships are often available to qualified Ph.D. students in Communication.

# BACHELOR OF ARTS IN COMMUNICATION

## PREPARATION

Before declaring the major, students must have completed or be concurrently enrolled in one of the following:

- COMM 1A. Media Technologies, People, and Society *or* COMM 1B. Media, Culture, and Society
- COMM 106. Communication Research Methods
- COMM 108. Media Processes and Effects

Students interested in declaring the major should apply via Axess and meet with the student services administrator in Building 120, Room 110A, during scheduled office hours. Students are required to take at least 60 units (approximately 12 courses), not counting statistics, to complete the major.

## PROGRAM OF STUDY

The undergraduate curriculum is intended for liberal arts students who wish to develop an understanding of communication in society, drawing on the perspective of the social sciences. Undergraduates majoring in Communication are expected to become acquainted with the fundamental concerns, theoretical approaches and methods of the field, and to acquire advanced knowledge in one or more of the sub-areas of communication: institutions, processes, and effects.

While the department does not attempt to provide comprehensive practical training at the undergraduate level, the curriculum provides a diverse range of internship opportunities including professional print journalism, some of which are funded by the department's Rebele Internship Program. The department is committed to providing students with analytical and critical skills for future success in graduate programs, professional schools, or immediate career entry.

The major is structured to provide several levels of study: a core curriculum, intended to expose students to a broad-based understanding of communication theory and research, and a number of intermediate-level options and electives. Majors also have the opportunity to do advanced research in the form of senior projects and honors theses.

All undergraduate majors are required to complete a set of core communication courses which include:

1. COMM 1A. Media Technologies, People, and Society (5 units) *or* COMM 1B. Media, Culture, and Society (5 units)
2. COMM 106. Communication Research Methods (5 units)
3. COMM 108. Media Processes and Effects (5 units)
4. COMM 104W. Reporting, Writing, and Understanding the News (WIM, 5 units) *or* COMM 137W. The Dialogue of Democracy (WIM, 5 units).

Core courses are usually given only once each year.

The department also requires completion of or concurrent registration in an introductory statistics course (STATS 60 *or* PSYCH 10) prior to registration in COMM 106, Communication Research Methods, in preparation for courses in methodology and advanced courses in communication processes and effects. It is recommended that this be done as soon as possible so as not to prevent registration in a course requiring statistical understanding. The statistics course does not count toward the 60 units to complete the Communication major.

In addition to the core courses and the statistics requirement, undergraduate majors select courses from the areas described below. Many of the courses require core courses as prerequisites. Majors select a total of four area courses, taking at least one from each area.

*Area I: Communication Processes and Effects*—Area I emphasizes the ways in which communication scholars conduct research in, and consider the issues of, human communication. These studies aim to provide expert guidance for social policy makers and media professionals and include the following courses: COMM 137, 160, 162, 164, 166, 168, 169, 172, 326.

*Area II: Communication Systems and Institutions*—Area II

considers the roles and interaction of institutions such as broadcasting, journalism, constitutional law, and business within communication and mass communication contexts and includes the following courses: COMM 104, 116, 117, 120, 125, 131, 140, 147, 182, 212.

The remainder of the 60 required units may be fulfilled with any elective Communication courses or cross listed courses in other departments.

To be recommended for the B.A. degree in Communication, the student must complete at least 60 units (approximately 12 courses) in the department. No more than 10 units of course work outside of the department, transfer credit, or Summer Session credit may be applied to meet department requirements. Communication majors must receive a letter grade for all Communication courses unless they are offered only for satisfactory/no credit (S/NC), and must maintain a grade point average (GPA) of 2.0 (C) in courses towards the major. Only courses with a grade of C- or above count towards the major.

## HONORS PROGRAM

The honors program provides undergraduates the opportunity to undertake a significant program of research in an individual professor/student mentoring relationship. The aim is to guide students through the process of research, analysis, drafting, rethinking, and redrafting, which is essential to excellence in scholarship. Working one-on-one with a faculty adviser, seniors earn 15 Communication units, culminating in an honors thesis. In order to be eligible for the honors program, interested majors must have: (1) successfully completed the core requirements (COMM 1A *or* COMM 1B, 106, 108, STATS 60/PSYCH 10) and received a grade of B+ or better in Communication Research Methods (COMM 106); (2) selected an adviser; and (3) submitted an application to the department by the end of their junior year. An application may be picked up outside Room 110, Building 120.

Students are expected to make steady progress on their honors thesis throughout the year.

A final copy of the honors thesis must be read and approved by the adviser and submitted to the department by the eighth week of Spring Quarter (exact date to be arranged). It becomes part of a permanent record held by the department. Honors work may be used to fulfill Communication elective credit but must be completed and a letter grade submitted prior to graduation. A student failing to fulfill all honors requirements may still receive independent study credit for work completed, which may be applied toward fulfilling major requirements.

The designation "with honors" is awarded by the Department of Communication to those graduating seniors who, in addition to having completed all requirements for the Communication major:

1. complete an honors thesis;
2. maintain a distinguished GPA in all Communication course work;
3. are recommended by the Communication faculty.

## MINOR IN COMMUNICATION

### PREPARATION

Before declaring the minor, students must have completed or be concurrently enrolled in one of the following:

- COMM 1A. Media Technologies, People, and Society *or* COMM 1B. Media, Culture, and Society
- COMM 106. Communication Research Methods
- COMM 108. Media Processes and Effects

Students interested in declaring the minor should do so no later than Spring Quarter of their junior year by applying via Axess and meeting with the student services administrator in Building 120, Room 110A, during scheduled office hours.

## PROGRAM OF STUDY

The minor is structured to provide a foundation for advanced course work in communication through a broad-based understanding of communication theory and research.

Students are required to take 35 units (approximately 7 courses), not counting statistics, to complete the minor. The curriculum consists of three introductory communication core courses that include COMM 1A, Media Technologies, People, and Society (5 units), *or* COMM 1B, Media, Culture, and Society (5 units); COMM 106, Communication Research Methods (5 units); and COMM 108, Media Processes and Effects (5 units). The department also requires completion of or concurrent registration in an introductory statistics course (STATS 60 or PSYCH 10) prior to registration in COMM 106, Communication Research Methods, in preparation for courses in methodology and advanced courses in communication processes and effects. It is recommended that this be done as soon as possible so as not to prevent registration in a course requiring statistical understanding. The statistics course does not count toward the 35 units to complete the Communication minor.

The remainder of the 35 required units may be fulfilled with any intermediate-level elective Communication courses or crosslisted courses in other departments. No more than 5 units of course work outside of the department, transfer credit, or Summer Session credit may be applied to meet department requirements. Communication minors must receive a letter grade for all Communication courses unless they are offered only for satisfactory/no credit (S/NC), and must maintain a grade point average (GPA) of 2.0 (C) in courses towards the minor. Only courses with a grade of C- or above count towards the minor. Some courses are not given every year. Refer to ExploreCourses for details.

Core courses are usually offered only once annually:

*Prerequisite*—introductory statistics course (for example, PSYCH 10)

*Core Courses*—COMM 1A or 1B, 106, 108

*Area I: Communication Processes and Effects*—a minimum of one course from COMM 137, 160, 162, 164, 166, 168, 169, 172, 326

*Area II: Communication Systems/Institutions*—a minimum of one course from COMM 104, 116, 117, 120, 125, 131, 140, 147, 182, 212

*Elective courses*—totaling 10 units.

## MEDIA STUDIES COTERMINAL MASTER'S PROGRAM

The Department of Communication offers current Stanford University undergraduates a one-year coterminal program with an M.A. emphasis in Media Studies specializing in either social sciences or journalism. University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees" section of this bulletin. For University coterminal degree program rules and University application forms, see <http://studentaffairs.stanford.edu/registrar/publications#Coterm>.

*Admission*—Applications for coterminal study must be submitted at least four quarters in advance of the expected master's degree conferral date. Applicants must have earned a minimum of 120 units toward graduation (UTG) as shown on the undergraduate unofficial transcript. This includes allowable advanced placement (AP) and transfer credit. Applications must be submitted no later than November 17, 2011 for admission beginning in either Winter or Spring Quarter 2011-12 or Autumn Quarter 2012-13. Journalism track students may begin the program only in Spring Quarter of their senior year. Requirements include: Application for Admission to Coterminal Master's Program form, preliminary program proposal, statement of purpose, three letters of recommendation from Stanford professors, a written statement from a Communication professor agreeing to act as a graduate adviser (social sciences track only), three samples of writing

(journalism track only), and a current unofficial Stanford transcript. GRE scores are not required. Coterminal applications are submitted directly to the department. Review procedures and the Graduate Admissions Committee determine criteria.

*Requirements*—The Media Studies coterminal master's program provides a broad introduction to scholarly literature in mass communication and offers a social sciences or journalism track. Journalism track students may begin the program only in Spring Quarter of their senior year during which time one elective course is taken towards the master's program and any remaining requirements for the undergraduate degree are completed. In the following academic year journalism track students follow the same curriculum as students in the Graduate Program in Journalism (see Master of Arts-Journalism section), less one elective course. Journalism track students may be required to complete more than 45 units. Social Science track students need to satisfy the following four basic requirements:

1. *Required Units and GPA*: students must complete a minimum of 45 units in Communication and related areas, including items 2 and 3 below. Courses must be taken for a letter grade if offered. Courses in related areas outside the department must be approved by the student's adviser. A minimum of 36 units must be in the Communication department. No more than two courses (not including the statistics prerequisite) may be below the 200 level. To remain in good academic standing students must maintain a grade point average (GPA) of 3.0 or better. Graduation requires a GPA of 3.0 or better.
2. *Core Requirements*: students must complete COMM 206, 208, and a statistics course. Typically, the statistics requirement is met with STATS 160. Other courses occasionally are approved as a substitute before the student is admitted to the program. The statistics course does not count toward the 45 units.
3. *Six Media Studies Courses*: students must complete a minimum of six additional Communication courses from the following list concerned with the study of media. Not all the listed courses are offered every year, and the list may be updated from one year to the next. In addition to the core requirements and a minimum of six courses listed below, students may choose additional courses from the list and any related course approved by the student's adviser.
  - COMM 211. Media Technologies, People, and Society
  - COMM 216. Journalism Law
  - COMM 217. Digital Journalism
  - COMM 220. Digital Media in Society
  - COMM 225. Perspectives on American Journalism
  - COMM 231. Media Ethics and Responsibility
  - COMM 237. The Dialogue of Democracy
  - COMM 240. Digital Media Entrepreneurship
  - COMM 247. History and Future of Journalism
  - COMM 260. The Press and the Political Process
  - COMM 262. Campaigns, Voting, Media, and Elections
  - COMM 264. The Psychology of Communication About Politics in America
  - COMM 266. Virtual People
  - COMM 268. Experimental Research in Advanced User Interfaces
  - COMM 269. Computers and Interfaces: Psychology and Design
  - COMM 272. Media Psychology
  - COMM 277. Specialized Writing and Reporting
  - COMM 326. Human Virtual Representation
4. *The Media Studies M.A. Project*: students following the social sciences track enroll in COMM 290 to complete a project over two consecutive quarters that must be pre-approved and supervised by the adviser. The completed M.A. project must be submitted to the adviser no later than the last day of classes of the second consecutive quarter.

Additional courses are chosen in consultation with an academic adviser.

## MASTER OF ARTS IN COMMUNICATION

University requirements for the master's degree are described in the "Graduate Degrees" section of this bulletin.

The department awards a terminal M.A. degree in Communication with a field of study in Journalism. Applicants for this program are evaluated for admission on different criteria. Work to fulfill graduate degree requirements must be in courses numbered 100 or above.

Stanford students who are completing an M.A. degree and who desire entry into the Ph.D. program must file a Graduate Program Authorization Petition in Axess. Such students are considered alongside all other doctoral applicants.

### JOURNALISM

Stanford's graduate program in Journalism focuses on the knowledge and skills required to report, analyze, and write authoritatively about public issues and digital media. The curriculum combines a sequence of specialized reporting and writing courses with seminars and courses devoted to deepening the students' understanding of the roles and responsibilities of American news media in their coverage of public issues.

The program emphasizes preparation for the practice of journalism and a critical perspective from which to understand it. The program's objective is twofold: (1) to graduate talented reporters and writers to foster public understanding of the significance and consequences of public issues and the debates they engender; and (2) to graduate thoughtful journalists to respond openly and eloquently when called on to explain and defend the methods of their reporting and the quality of their writing.

### CURRICULUM

The curriculum includes several required courses, examples of which are shown below, and a master's project:

- COMM 216. Journalism Law
- COMM 217. Digital Journalism
- COMM 225. Perspectives on American Journalism
- COMM 240. Digital Media Entrepreneurship
- COMM 273,274. Public Issues Reporting I,II
- COMM 275. Multimedia Storytelling
- COMM 289. Journalism M.A. Project
- COMM 291. Graduate Journalism Seminar

Additionally, students are usually required to take two specialized writing courses, chosen from a list of seven or eight, and two approved electives from among graduate-level courses in the Department of Communication, or from among courses on campus that deal substantively with issues of public importance. The M.A. degree in Communication (Journalism) requires a minimum of 45 units.

Except for the Graduate Journalism Seminar and the Journalism Project, all courses must be taken for a letter grade. To remain in good academic standing, students must maintain a grade point average (GPA) of 3.0 or better. Graduation requires a GPA of 3.0 or better.

### JOURNALISM PROJECT

The Journalism master's project, a requirement for graduation, is intended as an opportunity for students to showcase their talents as writers and reporters. It is also an opportunity to undertake an in-depth critique of an area of journalism in which the author has a special interest. Work on the project usually begins during Winter Quarter and continues through Spring Quarter. Completed master's projects must be submitted to the project adviser no later than the last day of classes in the Spring Quarter. The project represents a major commitment of time, research, and writing. Although it is not a requirement that the project be published, it must be judged by a member of the faculty to be of a quality acceptable for publication. At a minimum, the project should demonstrate the rigor and discipline required of good scholarship and good journalism; it should offer ample evidence of students' ability to

gather, analyze, and synthesize information in a manner that goes beyond what ordinarily appears in daily news media.

## DOCTOR OF PHILOSOPHY IN COMMUNICATION

University requirements for the Ph.D. are described in the "Graduate Degrees" section of this bulletin. The minimum number of academic units required for the Ph.D. at Stanford is 135, up to 45 of which can be transferred either from a master's degree at the University or from another accredited institution.

The department offers a Ph.D. in Communication Theory and Research. First-year students are required to complete introductory courses in communication theory and research, research methods, and statistics. These core courses, grounded in the social science literature, emphasize how people respond to media and how media institutions function. In addition, Ph.D. students must complete a minimum of three literature survey courses and related advanced seminars in Communication. Students also take significant course work outside the department in their area of interest. Each student builds a research specialty relating communication to current faculty interests in such areas as ethics, human-computer interactions, information processing, information technology, law, online communities, politics and voting, and virtual reality. Regardless of the area of specialization, the Ph.D. program is designed primarily for students interested in university research and teaching or other research or analyst positions.

The Ph.D. program encompasses four years of graduate study (subsequent to completion of the B.A. degree) during which, in addition to fulfilling University residency requirements, Ph.D. candidates are required to:

1. Complete all departmental course requirements with grades of "B+" or above. Currently these courses include COMM 206, 208, 301, 311, 314, 317, and 318. Students are also required to take STATS 160 and two advanced methods courses.
2. Pass the general qualifying examinations by the end of the second academic year of study and pass a specialized area examination by the end of the third academic year of study.
3. Demonstrate proficiency in tools required in the area of research specialization. Identified with the advice of the faculty, such tools may include detailed theoretical knowledge, advanced statistical methods, a foreign language, computer programming, or other technical skills.
4. Complete at least two pre-dissertation research projects (the Major Project and the Complementary Project).
5. Teach or assist in teaching at least two courses, preferably two different courses, at least one of which is ideally a core undergraduate course (COMM 1A, 1B, 106, and 108).
6. Complete a dissertation proposal and proposal meeting approved by the dissertation committee.
7. Apply for candidacy by the end of the second year of graduate study.
8. Complete a dissertation satisfactory to a reading committee of three or more faculty members in the Department of Communication and one faculty member outside of the Department of Communication.
9. Pass the University oral examination, which is a defense of the dissertation.

Because the multifaceted nature of the department makes it possible for the Ph.D. student to specialize in areas that draw on different related disciplines, the plan of study is individualized and developed between the faculty adviser and the student.

Ph.D. candidacy is valid for five years.

Other requirements and details of the requirements can be found in the document, *Official Rules and Procedures for the Ph.D. in the Department of Communication*, available from the student services administrator of the department.

## PH.D. MINOR IN COMMUNICATION

Candidates for the Ph.D. degree in other departments who elect a minor in Communication are required to complete a minimum of

20 units of graduate courses in the Department of Communication, including a total of three theory or research methods courses, and are examined by a representative of the department. A department adviser in consultation with the individual student determines the particular communication theory and methods courses.

## OVERSEAS STUDIES COURSES IN COMMUNICATION

For course descriptions and additional offerings, see the listings in the *Stanford Bulletin's* ExploreCourses web site (<http://explorecourses.stanford.edu>) or the Bing Overseas Studies web site (<http://bosp.stanford.edu>). Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

### AUTUMN QUARTER

#### BEIJING

OSPBEIJ 42. Chinese Media Studies. 4 units, Kun Li, GER:DB:SocSci

### WINTER QUARTER

#### FLORENCE

OSPFLOR 49. The Cinema Goes to War: Fascism and World War II As Represented in Italian and European Cinema. 5 units, Ermelinda Campani, GER:DB:Hum

### SPRING QUARTER

#### BEIJING

OSPBEIJ 20. Communication, Culture, and Society: The Chinese Way. 4 units, G. Gong

## COMPARATIVE LITERATURE

*Emeriti: (Professors)* Joseph Frank, John Freccero, René Girard, Herbert Lindenberger, Elisabeth Mudimbe-Boyi (French and Italian), Mary Pratt; *(Courtesy Professors)* W. B. Carnochan, Gerald Gillespie, David G. Halliburton, Marjorie G. Perloff

*Director:* David Palumbo-Liu

*Chair of Graduate Admissions:* Monika Greenleaf

*Chair of Graduate Studies:* Hans U. Gumbrecht

*Chair of Undergraduate Studies:* Amir Eshel (Autumn), David Palumbo-Liu (Winter, Spring).

*Professors:* John Bender (English, Comparative Literature, on leave Spring), Russell Berman (German Studies, Comparative Literature), Margaret Cohen (Comparative Literature, on leave), Amir Eshel (German Studies, Comparative Literature), Roland Greene (English, Comparative Literature, on leave Spring), Hans U. Gumbrecht (French and Italian, Iberian and Latin American Cultures, Comparative Literature), Franco Moretti (English, Comparative Literature, on leave Autumn), David Palumbo-Liu (Comparative Literature, on leave Autumn), Patricia Parker (English, Comparative Literature), Joan Ramón Resina (Iberian and Latin American Cultures, Comparative Literature), José David Saldívar (Comparative Literature), Ramón Saldívar (English, Comparative Literature), Ban Wang (East Asian Languages and Cultures, Comparative Literature, on leave Autumn)

*Associate Professor:* Monika Greenleaf (Slavic Languages and Literatures, Comparative Literature)

*Assistant Professor:* Dominic Brookshaw (Persian and Comparative Literature)

*Courtesy Professors:* Nancy Ruttenberg

*Lecturers:* Petra Dierkes-Thrun, Kimberly Lewis (Humanities Fellow), Bulbul Tawari (Humanities Fellow)

*Department Offices:* Building 260, Room 108

*Mail Code:* 94305-2031

*Phone:* (650) 723-3566

*Email:* [comparativelit@stanford.edu](mailto:comparativelit@stanford.edu)

*Web Site:* <http://complit.stanford.edu>

Courses offered by the Department of Comparative Literature are listed under the subject code COMPLIT on the *Stanford Bulletin's* ExploreCourses web site.

The Department of Comparative Literature offers courses in the history and theory of literature through comparative approaches. The department accepts candidates for the degrees of Bachelor of Arts and Doctor of Philosophy.

The field of Comparative Literature provides students the opportunity to study imaginative literature in all its forms. While other literary disciplines focus on works of literature as parts of specific national or linguistic traditions, Comparative Literature draws on literature from all contexts in order to examine the nature of literary phenomena from around the globe and from different historical moments, while exploring how literary writing interacts with other elements of culture and society. The field studies literary expression through examinations of genres such as novels, epics, drama, and poetry, and new aesthetic forms such as cinema and electronic media. Although Comparative Literature does not restrict its focus to single traditions or periods, it does investigate the complex interplay of the literary imagination and historical experience. Attention is also paid to questions of literary theory, aesthetic philosophy, and cultural interpretation.

Along with the traditional model of comparative literature that juxtaposes two or more national literary cultures, the department supports teaching and research that examine literary phenomena with additional tools of inquiry such as literary theory, the relationship between literature and philosophy, and the enrichment of literary study with other disciplinary methodologies. Comparative Literature also encourages the study of aspects of literature that surpass national boundaries, such as transnational literary movements or the dissemination of particular genres. In each case, students emerge from the program with enhanced verbal and writing skills, a command of literary studies, the ability to read analytically and critically, and a more global knowledge of literature.

## MISSION OF THE UNDERGRADUATE PROGRAM IN COMPARATIVE LITERATURE

The mission of the undergraduate program in Comparative Literature is to enhance students' verbal and written communication skills, their ability to read analytically and critically as well as to develop their global knowledge of literature. The program provides students with the opportunity to study imaginative literature in all of its forms, investigating the complex interplay of the literary imagination and the historical experience. Courses in the program focus on literary theory, aesthetic philosophy, and cultural interpretation. The program prepares students for a variety of career paths as well as for further study in graduate or professional schools as students learn to think, adapt, and communicate effectively.

The department's undergraduate programs are designed to enhance students' appreciation of literature in all its diversity, particularly through introductory courses that include treatments of the primary literary genres. The course of study at intermediate and advanced levels is flexible in order to accommodate student interest in areas such as specific geographical regions, historical periods, and interdisciplinary connections between literature and other fields such as philosophy, music, the visual arts, and the social sciences. A Comparative Literature major prepares a student to become a better reader and interpreter of literature, through enhanced examination of texts and the development of a critical vocabulary to discuss them. Attention to verbal expression and interpretive argument serves students who plan to proceed into careers requiring strong language skills. In addition, the major in Comparative Literature provides preparation for students who intend to pursue an advanced degree as a gateway to an academic career.

## LEARNING OUTCOMES

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. the ability to interpret a literary text in a non-native language or to compare literary texts from different linguistic traditions, which may be read in translation.
2. a self-reflective understanding of the critical process necessary to read and understand texts.
3. skills in writing effectively about literature.
4. skills in oral communication and public speaking about literature.

## GRADUATE PROGRAMS IN COMPARATIVE LITERATURE

The department offers a Doctor of Philosophy and a Ph.D. minor in Comparative Literature.

## COMPARATIVE LITERATURE COURSE CATALOG NUMBERING SYSTEM

Course numbering system:

Course Topic	Number
Authors	10–19
Genre	20–29
Periods and Movements	30–39
Cultures	40–49
Philosophy and Theory	50–59
Required courses:	101, 121, 122, 123, 199, 369, 396L

## BACHELOR OF ARTS IN COMPARATIVE LITERATURE

The major in Comparative Literature requires students to enroll in a set of core courses offered by the department, to complete electives in the department, and to enroll in additional literature courses, or other courses approved by the Chair of Undergraduate Studies, offered by other departments. This flexibility to combine literature courses from several departments and to address literature from multiple traditions is the hallmark of the Comparative Literature major. Students may count courses which read literature in translation; however, students, and especially those planning to pursue graduate study in Comparative Literature, are encouraged to develop a command of non-native languages.

*Declaring the Major*—Students declare the major in Comparative Literature through Axess. Students should meet with the Chair of Undergraduate Studies to discuss appropriate courses and options within the major, and to plan the course of study. Majors are also urged to attend department events such as public talks and conferences.

*Advising*—Students majoring in Comparative Literature should consult with the Chair of Undergraduate Studies at least once a year. The chair monitors progress to completion of the degree. Students are also encouraged to develop relationships with other faculty members who may act as mentors.

*Overseas Campuses and Abroad Programs*—The Department of Comparative Literature encourages time abroad, both for increased proficiency in language and the opportunity for advanced course work. Course work done at campuses other than Stanford is counted toward the major at the discretion of the Chair of Undergraduate Studies and is contingent upon the Office of the University Registrar's approval of transfer credit. To that end, students abroad are advised to save syllabi, notes, papers, and correspondence.

*Honors College*—The Department of Comparative Literature encourages honors students to enroll in the honors college scheduled during the weeks preceding the beginning of every academic year. Applications to the college are available from the

DLCL student affairs officer. The honors college is coordinated by the Division of Literatures, Cultures, and Languages (DLCL).

## REQUIREMENTS

All majors in Comparative Literature (including honors) are required to complete the following requirements. All courses applied to the major must be taken for a letter grade, and a grade point average (GPA) of 2.0 or better must be achieved in each core course.

1. **COMPLIT 101. What is Literature?** (5 units). This gateway to the major is normally taken by the end of sophomore year. It provides an introduction to literature and its distinctions from other modes of linguistic expression, and a fundamental set of interpretive skills. This course fulfills the Writing in the Major requirement.
2. *The genre core*—(5 units each)
  - a. **COMPLIT 121. Poems, Poetry, Worlds: An Introductory Course**
  - b. **COMPLIT 122. Literature as Performance**
  - c. **COMPLIT 123. The Novel, the World**
 Students should complete these courses as soon as possible. Each course draws on examples from multiple traditions to ask questions about the logic of the individual genres.
3. **COMPLIT 199 (5 units)**. This senior seminar is designed as a culmination to the course of study while providing reflection on the nature of the discipline. Topics vary.
4. *Electives*—Majors must complete at least 40 units of electives. Three of these electives must be Comparative Literature courses. The remaining courses may be drawn from Comparative Literature offerings, from other literature departments, or from other fields of interdisciplinary relevance to the student's interest. Up to 10 units of IHUM or SLE courses may be counted towards the elective requirement. Electives are subject to advisor consultation and approval.
5. *Total unit load*—Students must complete course work for a total of at least 65 units.

## PHILOSOPHICAL AND LITERARY THOUGHT

Undergraduates may major in Comparative Literature with a special track in interdisciplinary studies at the intersection of literature and philosophy. Students in this option take courses alongside students from other departments that also have specialized options associated with the program for the study of Philosophical and Literary Thought. Each student in this option is assigned an advisor in Comparative Literature, and student schedules and course of study must be approved in writing by the advisor, the Chair of Undergraduate Studies of Comparative Literature, and the Chair of Undergraduate Studies of the program. See <http://philil.stanford.edu>.

A total of 65 units must be completed for this option, including the following requirements:

1. Seven courses taught by Comparative Literature faculty. Of the seven, the following five (5 units each) are required courses:
  - **COMPLIT 101. What is Literature?**
  - **COMPLIT 121. Poems, Poetry, Worlds: An Introductory Course**
  - **COMPLIT 122. Literature as Performance**
  - **COMPLIT 123. The Novel, the World**
  - **COMPLIT 199. Senior Seminar.**
  - The remaining two courses must be instructed by Comparative Literature faculty and approved by the Chair of Undergraduate Studies.
2. *Philosophy and Literature Gateway Course* (4 units)—**COMPLIT 181** (same as PHIL 81). This course should be taken as early as possible in the student's career, normally in the sophomore year.
3. *Philosophy Writing in the Major* (5 units)—**PHIL 80**. Prerequisite: introductory philosophy class.
4. *Aesthetics, Ethics, Political Philosophy* (ca. 4 units)—One course from the PHIL 170 series.

5. *Language, Mind, Metaphysics, and Epistemology* (ca. 4 units)—One course from the PHIL 180 series.
6. *History of Philosophy* (ca. 8 units)—Two courses in the history of philosophy, numbered above PHIL 100.
7. *Related Courses* (ca. 8 units)—Two upper division courses relevant to the study of philosophy and literature as identified by the committee in charge of the program. A list of approved courses is available from the undergraduate advisor of the program in philosophical and literary thought.
8. One course, typically in translation, in a literature distant from that of the student's concentration and offering an outside perspective on that literary tradition.
9. *Capstone Seminar* (ca. 4 units)—In addition to COMPLIT 199, students take a capstone seminar of relevance to philosophy and literature approved by the undergraduate advisor of the program in philosophical and literary thought. The student's choice of a capstone seminar must be approved in writing by the Chair of Undergraduate Studies of Comparative Literature and by the Chair of Undergraduate Studies of the program. Offered this year is: PHIL 194. Montaigne (Winter Quarter).
10. *Seminar Paper Requirement*—Students must write at least one seminar paper that is interdisciplinary in nature. This paper brings together material from courses taken in philosophy and literature, and may be an honors paper (see below), an individual research paper (developed through independent work with a faculty member), or a paper integrating materials developed for two separate courses (by arrangement with the two instructors). Though it may draw on previous course work, the paper must be an original composition, 18-20 pages in length. It must be submitted to the Chair of Undergraduate Studies and receive approval no later than the end of Winter Quarter in the fourth year of study.

At least two of the courses counted toward requirements 1, 2, 7, 8, and 9 must be taught by Comparative Literature faculty. Transfer units may not normally be used to satisfy requirements 2, 3, 4, 5, 6 and 9. Units devoted to acquiring language proficiency are not counted toward the 65-unit requirement.

## HONORS PROGRAM

The honors option offers motivated Comparative Literature majors the opportunity to write a senior honors paper. During Spring Quarter of the junior year, a student interested in the honors program should consult with the Chair of Undergraduate Studies and submit a thesis proposal (2-5 pages), an outline of planned course work for the senior year, and proof of a 3.5 GPA or higher within the student's Comparative Literature course work to date. During this quarter, the student may enroll for 2 units of credit for independent research in COMPLIT 189B to prepare this statement and undertake initial planning for the honors paper. The proposal is reviewed by the honors committee, including the Chair of Undergraduate Studies and the chair of the department.

The Chair of Undergraduate Studies designates a faculty tutor appropriate to the topic and a second reader for approved honors papers.

Students in the honors program enroll in DLCL 189 (5 units) in Autumn Quarter of the senior year to refine the project description and begin research in preparation for composing the honors paper. During Winter Quarter of the senior year, the student enrolls in COMPLIT 189A (5 units), independent study with the faculty tutor, to draft the honors paper.

At the end of the quarter, the student submits a completed draft to the tutor. If approved, two copies are forwarded to the honors committee, which ultimately awards honors. If revisions are advised, the student has until the fifth week of Spring Quarter to submit the final paper. Students who did not enroll in a 189B course in the junior year may enroll in COMPLIT 189B in Spring Quarter of the senior year while revising the thesis, if approved by the thesis advisor. 10-12 units of course work associated with the honors paper (DLCL 189 and COMPLIT 189A and 189B) may be counted toward the 65 units required for the major.

Honors papers vary considerably in length as a function of their topic, historical scope, and methodology. They may make use of previous work developed in seminars and courses, but display an enhanced comparative or theoretical scope. Quality rather than quantity is the key criterion. Typically, however, honors papers are 40-70 pages.

*Honors Awards*—The two readers of any honors thesis in Comparative Literature may elect to nominate the thesis in question for University-wide awards. In addition, the department honors committee evaluates on a competitive basis the honors theses completed in a given year and nominates one for University-wide awards competitions.

## MINORS IN COMPARATIVE LITERATURE

The undergraduate minor in Comparative Literature represents an abbreviated version of the major. It is designed for students who are unable to pursue the major but who nonetheless seek an opportunity to gain a deeper understanding of literature. Plans for the minor should be discussed with the Chair of Undergraduate Studies. The minimum number of units required for a minor at Stanford is 20, and all courses must be taken for a letter grade. Requirements for the minor in Comparative Literature include:

1. COMPLIT 101. What is Literature?
2. One course from the genre core: COMPLIT 121, 122, or 123
3. At least two other Comparative Literature courses.

## MINOR IN MODERN LANGUAGES

The Division of Literatures, Cultures, and Languages offers an undergraduate minor in Modern Languages. This minor draws on literature and language courses offered in this and other literature departments. See the "Literatures, Cultures, and Languages" section of this bulletin for further details about the requirements.

## DOCTOR OF PHILOSOPHY IN COMPARATIVE LITERATURE

University requirements for the Ph.D. are described in the "Graduate Degrees" section of this bulletin.

The Ph.D. program is designed for students whose linguistic background, breadth of interest in literature, and curiosity about the problems of literary scholarship and theory (including the relation of literature to other disciplines) make this program more appropriate to their needs than the Ph.D. in one of the individual literatures. Students take courses in at least three literatures (one may be that of the native language), to be studied in the original. The program is designed to encourage familiarity with the major approaches to literary study prevailing today.

Before starting graduate work at Stanford, students should have completed an undergraduate program with a strong background in one literature and some work in a second literature studied in the original language. Since the program demands an advanced knowledge of two non-native languages and a reading knowledge of a third non-native language, students should at the time of application have an advanced enough knowledge of one of the three to take graduate-level courses in that language when they enter the program. They should be making enough progress in the study of a second language to enable them to take graduate courses in that language not later than the beginning of the second year, and earlier if possible. Language courses at the 100- or 200- level may be taken with approval from the Chair of the department or the Chair of Graduate Studies. Applicants are expected to take an intensive course in the third language before entrance.

Students are admitted under a financial plan which attempts to integrate financial support and completion of residence requirements with their training as prospective university teachers. Tenure as a Ph.D. student, assuming satisfactory academic progress, is for a maximum of five years.



## APPLICATION PROCEDURES

Competition for entrance into the program is keen. The program is kept small so that students have as much opportunity as possible to work closely with faculty throughout the period of study. Because of the special nature of comparative literature studies, the statement of purpose included in the application for admission should contain the following information besides the general plan for graduate work called for on the application:

1. A detailed description of the applicant's present degree of proficiency in each of the languages studied, indicating the languages in which the applicant is prepared to do graduate work at present and outlining plans to meet additional language requirements of the program.
2. A description of the applicant's area of interest (for instance, theoretical problems, genres, periods) within literary study and the reasons for finding comparative literature more suitable to his or her needs than the study of a single literature. Applicants should also indicate their most likely prospective primary field, including the literatures on which they intend to concentrate.
3. All applicants should arrange to have the results of the general section of the Graduate Record Examination sent to the Department of Comparative Literature.
4. A letter of recommendation that focuses on the applicant's language skills, or a current ACTFL Oral Proficiency Interview (OPI) certificate, or a critical paper written in a non-native language.
5. Recommendations should, if possible, come from faculty in at least two of the literatures in which the student proposes to work.
6. Applicants must submit a copy of an undergraduate term paper which they consider representative of their best work.

For further information see the Graduate Admissions web site.

## DEGREE REQUIREMENTS

*Residence*—A candidate for the Ph.D. degree must complete three years (nine quarters) of full-time work, or the equivalent, in graduate study beyond the B.A. degree. The student must take 135 units of graduate work, in addition to the doctoral dissertation. At least three consecutive quarters of course work must be taken at Stanford.

*Languages*—Students must know three non-native languages, two of them sufficiently to qualify for graduate courses in these languages and the third sufficiently to demonstrate the ability to read a major author in this language. Only the third language may be certified by examination. The other two are certified by graduate-level course work specified below. Language preparation must be sufficient to support graduate-level course work in at least one language during the first year and in the second language during the second year. Students must demonstrate a reading knowledge of the third non-native language no later than the beginning of the third year.

Literatures made up of works written in the same language (such as Spanish and Latin American) are counted as one. One of the student's three literatures usually is designated as the primary field, the other two as secondary fields, although some students may offer two literatures at the primary level (six or more graduate courses).

*Teaching*—Students, whatever their sources of financial support, are ordinarily required to undertake a total of five quarters of supervised apprenticeships and teaching at half time. Students must complete whatever pedagogy courses are required by the departments in which they teach. The department's minimum teaching requirement is a total of three quarters.

*Minimum Course Requirements*—Students are advised that the range and depth of preparation necessary to support quality work on the dissertation, as well as demands in the present professional marketplace for coverage of both traditional and interdisciplinary areas of knowledge, render these requirements as bare minimums. The following are required:

1. COMPLIT 369
2. COMPLIT 396L
3. A sufficient number of courses (six or more) in the student's primary field to assure knowledge of the basic works in one national literature from its beginnings until the present.
4. At least two additional complementary courses, with most of the reading in the original, in each of two different national literatures. Students whose primary field is a non-native language are required to take two courses in one additional literature not their own.

Minimum course requirements must be completed before the student is scheduled to take the University oral examination. These requirements are kept to a minimum so that students have sufficient opportunity to seek out new areas of interest. A course is an offering of 3-5 units. Independent study may take the place of up to two of the required courses, but no more; classroom work with faculty and other students is central to the program. The principal conditions for continued registration of a graduate student are the timely and satisfactory completion of the university, department, and program requirements for the degree, and fulfillment of minimum progress requirements. Failure to meet these requirements results in corrective measures which may include a written warning, academic probation, and/or the possible release from the program.

*Examinations*—Three examinations are required. The first two are one-hour exams, taken at the end of the first and second year of study. The first of these is on literary genre, designed to demonstrate the student's knowledge of a substantial number of literary works in a single genre, ranged over several centuries and over at least three national literatures. This exam is also designed to demonstrate the student's grasp of the theoretical problems involved in his or her choice of genre and in the matter of genre in general. The second of these examinations is on literary theory and criticism, designed to demonstrate the student's knowledge of a particular problem in the history of literary theory and criticism, or the student's ability to develop a particular theoretical position. In either case, this exam should demonstrate wide reading in theoretical and critical texts from a variety of periods. The third and last is the University oral examination, which covers a literary period, to consist of in-depth knowledge of a period of approximately a century in three or more literatures with primary emphasis on a single national literature or, in occasional cases, two national literatures.

1. *First One-Hour Examination*: The genre exam is generally administered the second week of April of the student's first year. All first-year students take the exam during the same period, with an examination committee established by the department. Exam lists should be approved by the Chair of Graduate Studies well in advance of the exam. Students are urged to focus on poetry, drama, or the novel or narrative, combining core recommendations from the department with selections from their individual areas of concentration. Any student who does not pass the exam has the opportunity to retake the exam the second week of May of the same quarter. Students who do not pass this exam a second time may be dismissed from the program.
2. *Second One-Hour Examination*: The theory exam is administered the Autumn Quarter of the student's second year. All second-year students take the exam during the same period, with an examination committee established by the department. Exam lists should be approved by the Chair of Graduate Studies well in advance of the exam. Any student who does not pass the exam has the opportunity to retake the exam the second week of the Winter Quarter. Students who do not pass this exam a second time may be dismissed from the program.
3. *University Oral Examination*: Students are required to take this exam during the Autumn Quarter of their third year. The oral exam is individually scheduled, with a committee established by the student in consultation with the Chair of Graduate

Studies. The reading list covers chiefly the major literary texts of a period of approximately one hundred years but may also include some studies of intellectual backgrounds and modern critical discussions of the period. Students must demonstrate a grasp of how to discuss and define this period as well as the concept of periods in general. This examination is not to be on the dissertation topic, on a single genre, or on current criticism, but rather on a multiplicity of texts from the period. Students whose course work combines an ancient with a modern literature have the option of dividing the period sections into two wholly separate periods.

*Qualifying Procedures*—The department meets at the end of each year to review all graduate student progress. Students may be admitted to candidacy for the Ph.D. upon successful completion of the first year examination and a thorough review of the student's academic record, after which the faculty will vote on whether or not to advance the student to candidacy. A student will only advance to candidacy if, in addition to the student's fulfilling departmental prerequisites, the faculty makes the judgement that the student has the potential to successfully complete all the requirements of the degree program in a timely fashion. Should a student not be admitted to candidacy, s/he will be dismissed from the doctoral program. In unusual cases, the faculty may decide to extend the pre-candidacy period and require the student to complete specific steps in a predetermined time period prior to evaluating the student for advancement to candidacy.

*Prospectus Colloquium*—The prospectus colloquium normally takes place during the spring of the third year. The student should furnish the committee with a five-page prospectus, 20-page draft of a chapter, and working bibliography well before the colloquium. The colloquium lasts one hour, begins with a brief introduction to the dissertation prospectus by the student lasting no more than five minutes, and consists of a discussion of the prospectus by the student and the three readers of the dissertation. At the end of the hour, the faculty readers vote on the outcome of the colloquium. If the outcome is favorable (by majority vote), the student is free to proceed with work on the dissertation. If the proposal is found to be unsatisfactory (by majority vote), the dissertation readers may ask the student to revise and resubmit the dissertation prospectus and to schedule a second colloquium.

The prospectus must be prepared in close consultation with the dissertation adviser during the months preceding the colloquium. It must be submitted in its final form to the readers no later than one week before the colloquium. A prospectus should not exceed ten double spaced pages, in addition to which it should include a working bibliography of primary and secondary sources. It should offer a synthetic overview of the dissertation, describe its methodology and the project's relation to prior scholarship on the topic, and lay out a complete chapter by chapter plan.

It is the student's responsibility to schedule the colloquium no later than the first half of the quarter after that quarter in which the student passed the University Oral Examination. The student should arrange the date and time in consultation with the department administrator and with the three examiners. The department administrator schedules an appropriate room for the colloquium.

Members of the dissertation reading committee are ordinarily drawn from the University oral examination committee.

## PH.D. MINOR IN COMPARATIVE LITERATURE

This minor is designed for students working toward the Ph.D. in the various foreign language departments. Students working toward the Ph.D. in English are directed to the program in English and Comparative Literature described among the Department of English offerings. Students must have:

1. A knowledge of at least two foreign languages, one of them sufficient to qualify for graduate-level courses in that

language, the second sufficient to read a major author in the original language.

2. A minimum of six graduate courses, of which three must be in the department of the second literature and three in the Department of Comparative Literature, the latter to include a seminar in literary theory or criticism. At least two of the three courses in comparative literature should originate in a department other than the one in which the student is completing the degree. Except for students in the Asian languages, students must choose a second literature outside the department of their major literature.

## COMPARATIVE STUDIES IN RACE AND ETHNICITY (CSRE)

*Director:* José David Saldívar

*Associate Director:* Tania D. Mitchell

*Curriculum Committee:* Tania Mitchell, David Palumbo-Liu, José David Saldívar, Gary Segura, C. Mathew Snipp

*Affiliated Faculty and Teaching Staff:* David Abernethy (Political Science, emeritus), H. Samy Alim (Education), JoEllen Anderson (Native American Studies), Anthony Antonio (Education), Arnetha Ball (Education), Rick Banks (Law), Lucius Barker (Political Science, emeritus), Donald Barr (Pediatrics), Karen Biestman (Native American Studies), Jennifer Brody (Drama), Bryan Brown (Education), Cheryl Brown (African and African American Studies), Albert Camarillo (History), James T. Campbell (History), Martin Carnoy (Education), Clayborne Carson (History), Prudence Carter (Education), Gordon Chang (History), Chris Chen (Asian American Studies), Kathleen Coll (Chicana/o Studies), Karen Cook (Sociology), Michele Dauber (Law), Linda Darling-Hammond (Education), Carolyn Duffey (American Studies), Jennifer Eberhardt (Psychology), Paulla Ebron (Anthropology), Penny Eckert (Linguistics), Harry Elam (Drama), Michele Elam (English), James Ferguson (Anthropology), Corey Fields (Sociology), Shelley Fisher Fishkin (English), James Fishkin (Communication), Charlotte Fonrobert (Religious Studies), Estelle Freedman (History), Susana Gallardo (Chicana/o Studies), Gabriel Garcia (Medicine), Leah Gordon (Education), David Grusky (Sociology), Sean Hanretta (History), Georgina Hernandez (Comparative Studies in Race and Ethnicity), Allyson Hobbs (History), Miyako Inoue (Anthropology), Shanto Iyengar (Communication), Tomás Jiménez (Sociology), Gavin Jones (English), Terry Karl (Political Science), Pamela Karlan (Law), Matthew Kohrman (Anthropology), Jan Krawitz (Art and Art History), Jon Krosnick (Communication), Teresa LaFromboise (Education), David Laitin (Political Science), Sandra Lee (Asian American Studies), Julie Lythcott-Haims (Comparative Studies in Race and Ethnicity), Liisa Malkki (Anthropology), Hazel Markus (Psychology), Barbaro Martinez-Ruiz (Art and Art History), Douglas McAdam (Sociology), Tania Mitchell (Comparative Studies in Race and Ethnicity, Education), Cherríe Moraga (Drama), Paula Moya (English), Elisabeth Mudimbe-Boyi (French and Italian), Thomas S. Mullaney (History), Stephen Murphy-Shigematsu (Asian American Studies), Hilton Obenzinger (Undergraduate Advising and Research), Susan Olzak (Sociology), Amado Padilla (Education), David Palumbo-Liu (Comparative Literature), Arnold Rampersad (English), Vaughn Rasberry (English), Delphine Red Shirt Shaw (Native American Studies), Robert Reich (Political Science), John Rickford (Linguistics), Cecilia Ridgeway (Sociology), Richard Roberts (History), Aron Rodrigue (History), Michael Rosenfeld (Sociology), José David Saldívar (Comparative Literature), Ramón Saldívar (English), Joel Samoff (History), Stephen Sano (Music), Debra Satz (Philosophy), Gary Segura (Political Science), Vered Shemtov (Division of Literatures, Cultures and Languages), C. Matthew

Snipp (Sociology), Paul Sniderman (Political Science), Stephen Sohn (English), Jayashiri Srikantiah (Law), James Steyer (Comparative Studies in Race and Ethnicity), Ewart Thomas (Psychology), Jeanne L. Tsai (Psychology), Linda Uyechi (Music), Guadalupe Valdés (Education), Barbara Voss (Anthropology), Elizabeth Wahl (Comparative Studies in Race and Ethnicity), Gregory Walton (Psychology), Richard White (History), Jeremy Weinstein (Political Science), Michael Wilcox (Anthropology), Bryan Wolf (Art and Art History), Sylvia Yanagisako (Anthropology), Yvonne Yarbro-Bejarano (Iberian and Latin American Cultures), Steven Zipperstein (History)

*Teaching Fellows:* Jakeya Caruthers, Whitney Trump

*Senior Seminar Coordinator:* Patricia Seo

*Program Office:* Building 360, Room 361D

*Mail Code:* 2152

*Email:* sgamino@stanford.edu

*Phone:* (650) 724-2088

*Web Site:* <http://csre.stanford.edu>

The Undergraduate Program in Comparative Studies in Race and Ethnicity is home to four areas of study: Asian American Studies, Chicana/o Studies, Comparative Studies, and Native American Studies. Students can pursue a major or minor in any of these four areas, and are encouraged to build their interdisciplinary study around a focus or theme. Students can then select from more than 150 course options from across departments and schools to customize a curriculum. The major requires 60 units of study and a culminating research project (either a senior paper or honors thesis).

Courses offered by the Program in Comparative Studies in Race and Ethnicity are listed under the subject code CSRE on the Stanford Bulletin's ExploreCourses web site.

Courses offered by Asian American Studies are listed under the subject code ASNAMST on the Stanford Bulletin's ExploreCourses web site.

Courses offered by Chicana/o Studies are listed under the subject code CHICANST on the Stanford Bulletin's ExploreCourses web site.

Courses offered by Native American Studies are listed under the subject code NATIVEAM on the Stanford Bulletin's ExploreCourses web site.

## MISSION OF THE UNDERGRADUATE PROGRAM IN COMPARATIVE STUDIES IN RACE AND ETHNICITY

The Interdepartmental Program in Comparative Studies in Race and Ethnicity (CSRE) is an interdisciplinary program offering students the opportunity to investigate the significance of race and ethnicity in all areas of human life.

Devoted to a rigorous analysis of race and ethnicity and using a comparative and interdisciplinary approach, CSRE is committed to promoting and deepening students' understanding of the multiple meanings of racial diversity in the United States and abroad in ways that prepare students for living and working effectively in a multicultural society.

The interdisciplinary and integrated nature of our academic programs means that students take courses from across the university including: anthropology, art, communication, drama, economics, education, history, languages, linguistics, literature, music, philosophy, political science, psychology, sociology, and religion, among others.

## LEARNING OUTCOMES

The IDP in CSRE expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the undergraduate program. Students are expected to:

1. demonstrate an understanding of interdisciplinary approaches to the knowledge of experiences related to race and ethnicity in the United States.

2. demonstrate the ability to employ diverse analytical resources and comparative modes of study as tools to frame and address research questions.
3. be critical readers of both primary and secondary sources, who can use and properly cite both types of evidence in their written work.
4. actively and critically engage in verbal and/or written discussion of issues.
5. demonstrate analytical writing skills that convey their understanding of the topic.
6. expand their ability to think critically about issues in political, social, scientific, economic and cultural life stemming from the diversity of experiences related to race and ethnicity.

## UNDERGRADUATE PROGRAM IN COMPARATIVE STUDIES IN RACE AND ETHNICITY

### MAJORS: CORE CURRICULUM

The Interdepartmental Program in Comparative Studies in Race and Ethnicity (CSRE) provides students the opportunity to structure a major or minor in comparative ethnic studies or to focus their course work in a single ethnic studies area. Four majors and minors (Asian American Studies, Chicana/o Studies, Comparative Studies, and Native American Studies) are offered as part of the IDP in CSRE. All courses taken for the major must be taken for a letter grade. The directors of the program and of each major constitute the CSRE curriculum committee, the policy making body for the interdisciplinary program.

Students who declare any of the four majors participate in a common curriculum consisting of at least two core courses and a senior seminar.

There are two types of introductory courses taught by senior CSRE-affiliated faculty: core courses that are interdisciplinary and compare across racial and ethnic groups; and foundational courses that focus on a specific racial or ethnic group. These requirements illustrate how different disciplines approach the study and interpretation of race and ethnicity and provide a foundation for the student's program of study.

### MINORS

Students who wish to minor in the study areas must complete a minimum of 30 units from the approved course list, one of which must be a core course and a second that is foundational to the area of study. Proposals for the minor must be approved by the director of each study area.

### DIRECTED READING AND RESEARCH

Directed reading and research allows students to focus on a special topic of interest. In organizing a reading or research plan, the student consults with the director of the major and one or more faculty members specializing in the area or discipline.

Courses that fulfill directed reading and research requirements:

- ASNAMST 200R. Directed Research (1-5 units)
- ASNAMST 200W. Directed Reading (1-5 units)
- CHICANST 200R. Directed Research (1-5 units)
- CHICANST 200W. Directed Reading (1-5 units)
- CSRE 200R. Directed Research (1-5 units)
- CSRE 200W. Directed Reading (1-5 units)
- NATIVEAM 200R. Directed Research (1-5 units)
- NATIVEAM 200W. Directed Reading (1-5 units)

### SENIOR SEMINAR

Research and writing of the senior honors thesis or senior paper is under the supervision of a faculty project adviser. All majors in the IDP in CSRE, even those who opt to write honors theses in other departments and programs, must enroll in CSRE 200X: Senior Seminar, offered in Autumn Quarter. The course takes students through the process of research including conceptualization, development of prospectus, development of theses, research, analysis, and writing. This course meets the

Writing in the Major requirement (WIM). Those who opt to write senior papers are organized into tutorial groups in Autumn Quarter.

## SPECIAL PROGRAMS

CSRE majors have several unique opportunities available to them. The program supports full-time paid summer research internships for those who apply to complete a self-designed research project in collaboration with a community agency. The Public Policy Institute is a two week, pre-Autumn Quarter seminar that provides exposure to critical public policy issues. The residence-based institute provides room and board and all seminar materials for participants, including a visit to Sacramento to meet with policy makers. CSRE also sponsors quarterly luncheons and community programs for all majors and minors.

## MURRAY HOUSE

Murray House, 566 Governor's Avenue, is an undergraduate residence with a CSRE focus that is devoted to developing an intellectual community amongst students interested in the study of race and ethnicity. Programs, including an in-house seminar, are developed with the guidance of CSRE faculty to increase the understanding of issues of race and ethnicity amongst its residents through social events and discussions. Students may apply for pre-assignment to Murray House to participate in the CSRE Focus. Contact Residential Education for more information.

## AFRICAN AND AFRICAN AMERICAN STUDIES (AAAS)

*Director: Arnetha Ball*

AAAS is an affiliated program of CSRE. For major and minor descriptions and requirements, see the "African and African American Studies" section of this bulletin.

## HONORS PROGRAM IN COMPARATIVE STUDIES IN RACE AND ETHNICITY

### FOR MAJORS IN COMPARATIVE STUDIES IN RACE AND ETHNICITY

The Interdepartmental Program in Comparative Studies in Race and Ethnicity offers a program leading to honors for majors in:

- Asian American Studies
- Chicana/o Studies
- Comparative Studies
- Native American Studies

The honors program offers an opportunity to do independent research for a senior thesis. It is open to majors who have maintained a grade point average (GPA) of at least 3.5 in the major and 3.3 overall. The honors thesis is intended to enable students to synthesize skills to produce a document or project demonstrating a measure of competence in their specialty.

Majors interested in honors are encouraged to enroll in CSRE 199, Pre-Honors Seminar, in Autumn Quarter of the junior year. This course is preparation for the honors thesis and allows the student to work with a mentor to select a topic, construct a research question, and develop a research plan.

The application for honors must be submitted by June 1 of the junior year, but students are encouraged to apply earlier. The application includes a proposal describing the project that is approved by the faculty adviser and director of the undergraduate program. Students are required to identify both a faculty adviser and a second reader for the thesis project.

Honors students take CSRE 200X, Senior Seminar, which fulfills the program's WIM requirement, and also enroll in CSRE 200Y and 200Z, CSRE Senior Honors Research, in Winter and Spring quarters to continue to access peer and faculty support as they write their theses. Students must complete their theses with a grade of 'B+' to receive honors in CSRE.

An honors colloquium held near the end of Spring Quarter affords students an opportunity to present their research formally. Prizes for best undergraduate honors thesis are awarded annually by the CSRE curriculum committee.

Applications are available in the CSRE Undergraduate Program office and on the program web site.

## FOR MAJORS IN OTHER DEPARTMENTS

The Interdisciplinary Honors Program for Non-Majors in Comparative Studies in Race and Ethnicity is intended to complement study in any major. Students who participate in the honors program receive their degree from their program of study with departmental honors in Comparative Studies in Race and Ethnicity.

Honors certification will be open to students majoring in any field with a GPA in their chosen major of 3.5 and an overall GPA of 3.3. As a prerequisite, students apply for entry by Spring Quarter of the junior year (deadline June 1), but students are encouraged to begin earlier. During the application process, students outline a plan for course work and design an honors project in consultation with their proposed thesis adviser and the CSRE senior seminar coordinator.

The application describes how the student may fulfill the course requirements for interdisciplinary honors in CSRE and includes a proposal describing the project that is approved by the faculty adviser and director of the undergraduate program. Students are required to identify both a faculty advisor and a second reader for the thesis project. Applications are available in the CSRE undergraduate program office and on the program web site.

Students pursuing a minor in Asian American Studies, Chicana/o Studies, Comparative Studies in Race and Ethnicity, or Native American Studies who wish to pursue honors in their area of study, apply through the process for non-majors. Students may use their course work for the minor toward the requirements of the interdisciplinary honors program.

## REQUIREMENTS:

Students applying for the interdisciplinary honors program in CSRE are required to take the following courses:

- CSRE 196C/ENGLISH 172D/PSYCH 155. Introduction to Comparative Studies in Race and Ethnicity
- a second course identified as core or foundational to CSRE, such as:
  - AFRICAAM 105. Introduction to African and African American Studies (5 units)
  - ANTHRO 32. Theories of Race and Ethnicity (5 units)
  - ASNAMST 59/HISTORY 59. Introduction to Asian American History (5 units)
  - ASNAMST 146S/CSRE 146S/AMSTUD 146/COMPLIT 146. Asian American Culture and Community (5 units)
  - CHICANST 180E/CSRE 180E. Introduction to Chicana/o Studies (5 units)
  - CSRE 125V/POLISCI 125V. Minority Representation and the Voting Rights Act. (5 units)
  - CSRE 149/COMPLIT 148. Introduction to Asian American Cultures (3-5 units)
  - CSRE 245/EDUC 245. Understanding Racial and Ethnic Identity Development (3-5 units)
  - CSRE 255D/HISTORY 255D. Racial Identity in the American Imagination (4-5 units)
  - ENGLISH 43C/ENGLISH 143C. Introduction to Asian American Literature (3-5 units)
  - HISTORY 64. Introduction to Race and Ethnicity in 20th Century America (5 units)
  - NATIVEAM 16/ANTHRO 16. Native Americans in the 21st Century: Encounters, Identity, and Sovereignty in Contemporary America (5 units)
  - NATIVEAM 138/SOC 138. American Indians in Comparative Historical Perspective (5 units)

- NATIVEAM 139/SOC 139. American Indians in Contemporary Society (5 units)
- PSYCH 75. Introduction to Cultural Psychology (5 units)
- SOC 147A. Comparative Ethnic Conflict (5 units)
- SOC 166. Mexicans, Mexican Americans, and Chicanos in American Society (5 units)

In addition, it is recommended that students complete CSRE 199: Pre-Honor Seminar, to best prepare for the application process and to frame their research topics.

These courses must be completed with a grade of 'B+' or better for the honors program.

In addition, students are required to take:

- a core, foundational, thematic, or cognate course related to the topic of the proposal or honors research (selected in consultation with the thesis advisor)
- CSRE 200X. Senior Seminar
- CSRE 200Y. and 200Z. CSRE Senior Honors Research (in Winter and Spring quarters)

These courses must be completed with a minimum grade of 'B+'. Throughout the year, students work with faculty adviser and the senior seminar coordinator to complete their theses. Students must complete their theses with a grade of 'B+' to receive honors in CSRE.

An honors colloquium held near the end of Spring Quarter affords students an opportunity to present their research formally. Prizes for best undergraduate honors thesis are awarded annually by the CSRE curriculum committee.

## ASIAN AMERICAN STUDIES

*Director:* David Palumbo-Liu

Asian American Studies (AAS) provides an interdisciplinary approach to understanding the historical and current experiences of persons of Asian ancestry in the United States. In using the term Asian American, the AAS faculty recognize that the term seeks to name a rapidly developing, complex, and heterogeneous population and that there is neither a single Asian American identity nor one community that comprises all Asian Americans. Asian Americans include those with ancestral ties to countries or regions in East Asia, South Asia, Southeast Asia, or the Philippines, among others.

AAS brings together courses that address the artistic, historical, humanistic, political, and social dimensions of Asian Americans and is an appropriate course of study for students interested in a variety of concerns related to Asian Americans, including: artistic and cultural contributions; current social significance; historical experiences; immigration, intellectual, and policy issues; relationships with other social groups; and the construction of the notion of Asian American as it addresses important theoretical and practical issues.

## BACHELOR OF ARTS IN ASIAN AMERICAN STUDIES

A total of 60 units of course work is required for the major.

1. *Core Curriculum*—Asian American majors must take the 15-unit CSRE core curriculum including two core courses and a senior seminar taken in Autumn Quarter of the senior year. One foundational course that focuses on a non-Asian ethnic group may be counted toward the 15-unit core requirement.
2. *Foundational Course*—Majors are required to take one foundational course in Asian American Studies. This may be either ASNAMST 59/HISTORY 59, Introduction to Asian American History, ASNAMST 146S/COMPLIT 146/ CSRE 146S, Asian American Culture and Community, or ENGLISH 43C/ENGLISH 143C, Introduction to Asian American Literature.
3. *Area Study*—Majors must complete an additional 40 units of course work from an approved list. One course must have an international dimension, preferably a focus on Asia. Five other courses must have an Asian American focus and must be selected from social science and humanities departments.

4. *Language Study (optional)*—Students may obtain credit for their study of a related Asian language towards their degree. If students take 15 or more units of an Asian language relevant to Asian American Studies, they may apply 5 of those units toward their Asian American Studies degree.
5. *Senior Paper or Honors Thesis*—All Asian American Studies majors complete a culminating research paper under the supervision of a faculty adviser.

## ASIAN AMERICAN STUDIES MINOR

A total of 30 units of approved course work is required for the minor. One CSRE core course and at least one foundational course are needed to fulfill the requirements for the minor. Proposals must be approved by the director.

## COURSES

Students in Asian American Studies may find the following courses useful in fulfilling course requirements in the major or minor.

### CORE COURSES

- ANTHRO 32. Theories of Race and Ethnicity (5 units)
- CSRE 196C/ENGLISH 172D/PSYCH 155. Introduction to Comparative Studies in Race and Ethnicity (5 units)
- COMPLIT 149/CSRE 149. The Laboring of Diaspora and Border Literary Cultures (3-5 units)
- CSRE 200X. CSRE Senior Seminar (WIM; 5 units)
- EDUC 245/CSRE 245. Understanding Racial and Ethnic Identity Development (3-5 units)
- HISTORY 64. Introduction to Race and Ethnicity in 20th Century America (5 units)
- HISTORY 255D/CSRE 255D. Racial Identity in the American Imagination (4-5 units)
- POLISCI 125V/CSRE 125V. Minority Representation and the Voting Rights Act (5 units)
- PSYCH 75. Introduction to Cultural Psychology (5 units)
- SOC 147A. Comparative Ethnic Conflict (5 units)

### FOUNDATIONAL COURSES

- ASNAMST 59/HISTORY 59. Introduction to Asian American History (5 units)
- ASNAMST 146S/COMPLIT 146/ CSRE 146S. Asian American Culture and Community (5 units)
- ENGLISH 43C/ ENGLISH 143C. Introduction to Asian American Literature (5 units)

### THEMATIC COURSES

- ASNAMST 144/CSRE 144. Transforming Self and Systems: Crossing Borders of Race, Ethnicity, Gender, Sexuality, and Class (5 units)
- ASNAMST 159: Introduction to Contemporary Asian American Poetry (5 units)
- ASNAMST 161. Asian American Immigration and Health (3-5 units)
- ASNAMST 295F/HISTORY 295F. Race and Ethnicity in East Asia (4-5 units)

### COGNATE COURSES

- COMPLIT 41Q. Ethnicity and Literature (3-5 units)
- EDUC 181. Multicultural Issues in Higher Education (4 units)
- EDUC 193F. Psychological Well-Being on Campus: Asian American Perspectives (1 unit)
- ENGLISH 261B. Bright Lights, Global Cities: Reading Transnational Asia/Pacific Spatial Geographies (5 units)
- ENGLISH 362S. Phantoms That Follow: Trauma and Disillusionment in Asian American Literature (5 units)
- HISTORY 54S. America's Cold War in Asia from Korea to Vietnam, 1945-1975 (5 units)

- HISTORY 166B. Immigration Debates in America, Past and Present (3-5 units)
- HISTORY 256. Writing Asian American History (5 units)
- MUSIC 17Q. Perspectives in North American Taiko (4 units)
- PSYCH 217. Topics and Methods in Cultural Psychology (1-3 units)

## CHICANA/O STUDIES

*Director:* Gary Segura

Chicana/o Studies is an interdisciplinary major focusing on the Mexican-origin population of the U.S., the second largest ethnic group in the nation. Students who major or minor in Chicana/o Studies have an opportunity to select from courses in the humanities, social sciences, and courses offered by affiliated faculty in the School of Education. The Chicana/o Studies program affords students an opportunity to explore the culture, society, economy, and politics of this important and growing segment of our national population.

### BACHELOR OF ARTS IN CHICANA/O STUDIES

A total of 60 units of course work are required for the major.

1. *Core Curriculum*—Chicana/o Studies majors must take the 15-unit CSRE core curriculum including two core courses and a senior seminar taken in Autumn Quarter of the senior year. One foundational course that focuses on a non-Mexican origin group may be counted toward the 15-unit core requirement.
2. *Foundational Courses*—Majors are required to take one foundational course in Chicana/o Studies. This may be either CHICANST 180E, Introduction to Chicana/o Studies, or CHICANST 166/SOC 166, Mexicans, Mexican Americans, and Chicanos in American Society.
3. *Thematic Concentration*—Chicana/o Studies majors select a thematic concentration which allows students to customize their curriculum and to synthesize course work taken across various departments into a coherent focus. Majors complete an additional 40 units of courses relevant to the thematic concentration and approved by the adviser.
4. *Senior Paper or Honors Thesis*—All Chicana/o Studies majors complete a culminating research paper under the supervision of a faculty adviser.

### CHICANA/O STUDIES MINOR

Students who wish to minor in Chicana/o Studies must complete one CSRE core course and one foundational course, either CHICANST 180E or CHICANST 166/SOC 166. Minors will also select a thematic concentration and choose additional courses relevant to that theme to customize their curriculum. A total of 30 units of approved course work is required for each minor.

### COURSES

Students in Chicana/o Studies may find the following courses useful in fulfilling course requirements in the major or minor.

#### CORE COURSES

- ANTHRO 32. Theories of Race and Ethnicity (5 units)
- CSRE 196C/ENGLISH 172D/PSYCH 155. Introduction to Comparative Studies in Race and Ethnicity (5 units)
- COMPLIT 149/CSRE 149. The Laboring of Diaspora and Border Literary Cultures (3-5 units)
- CSRE 200X. CSRE Senior Seminar (WIM; 5 units)
- EDUC 245/CSRE 245. Understanding Racial and Ethnic Identity Development (3-5 units)
- HISTORY 64. Introduction to Race and Ethnicity in 20th Century America (5 units)
- HISTORY 255D/CSRE 255D. Racial Identity in the American Imagination (4-5 units)

- POLISCI 125V/CSRE 125V. Minority Representation and the Voting Rights Act (5 units)
- PSYCH 75. Introduction to Cultural Psychology (5 units)
- SOC 147A. Comparative Ethnic Conflict (5 units)

#### FOUNDATIONAL COURSES

- CHICANST 180E. Introduction to Chicana/o Studies (5 units)
- CHICANST 166/SOC 166. Mexicans, Mexican Americans, and Chicanos in American Society (5 units)

#### THEMATIC COURSES

- CHICANST 14N/CSRE 14N/EDUC 114N. Growing up Bilingual (3 units)
- CHICANST 160N/CSRE 160N/DRAMA 17N. Latino/Latina Performance in the U.S. (3-5 units)
- CHICANST 164/CSRE 164/SOC 164. Immigration and the Changing United States (5 units)
- CHICANST 189W/CSRE 189W. Language and Minority Rights (3-5 units)
- CHICANST 197/CSRE 197/NATIVEAM 197/DRAMA 355. The Rite to Remember: Performance and Chicana Indigenous Thought (3-5 units)
- CHICANST 201B/CSRE 201B. From Racial Justice to Multiculturalism: Movement-based Arts Organizing in the Post-Civil Rights Era (5 units)

#### COGNATE COURSES

- EDUC 149. Theory and Issues in the Study of Bilingualism (3-5 units)
- EDUC 177. Education of Immigrant Students: Psychological Perspectives (4 units)
- EDUC 178X. Latino Families, Languages, and Schools (3-5 units)
- EDUC 193B. Peer Counseling in the Chicano/Latino Community (1 unit)
- ENGLISH 45/145. Another Way to be: Writing by Women of Color (3-5 units)
- ENGLISH 64N. Growing Up in America (3 units)
- HISTORY 165. Mexican American History through Film (4-5 units)
- ILAC 193. The Cinema of Pedro Almodóvar (3-5 units)
- ILAC 389E. Race, Gender, and Sexuality in Cultural Representations (3-5 units)
- POLISCI 125S. Chicano/Latino Politics (5 units)
- POLISCI 327. Minority Behavior and Representation (5 units)
- SOC 164. Immigration and the Changing United States (5 units)

### COMPARATIVE STUDIES IN RACE AND ETHNICITY

*Director:* José David Saldívar

Comparative Studies in Race and Ethnicity does not focus on a particular ethnic group. Rather, a student in consultation with the adviser designs a curriculum in relation to a thematic concentration that compares various ethnic groups or explores topics that cut across group experiences in the United States and elsewhere in the world. For example, students may compare groups within the U.S., or compare groups in the U.S. to ethnic groups elsewhere, or study the diaspora of a single group or the sovereignty of indigenous peoples within and across different national contexts. Students in this major are able to take advantage of courses in over 22 fields offered by the affiliated faculty of CSRE.

### BACHELOR OF ARTS IN COMPARATIVE STUDIES IN RACE AND ETHNICITY

A total of 60 units of course work are required for the major.

1. *Core Curriculum*—All CSRE majors enroll in the 15-unit core curriculum, which consists of two core courses and a senior seminar taken in Autumn Quarter of the senior year. One foundational course may be counted toward the 15-unit core requirement.
2. *Thematic Concentration*—Comparative Studies majors complete another 45 units of course work relevant to the thematic concentration they have chosen in consultation with the adviser.
3. *Senior Paper or Honors Thesis*—All CSRE majors complete a culminating research paper under the supervision of a faculty adviser.

## COMPARATIVE STUDIES MINOR

Students who wish to minor in Comparative Studies must complete a minimum of 30 units from the approved course list. Two core courses (or one core and one foundational course) are needed to fulfill the minor requirements.

## COURSES

Students in Comparative Studies may find the following courses useful in fulfilling course requirements in the major or minor.

### CORE COURSES

- ANTHRO 32. Theories of Race and Ethnicity (5 units)
- CSRE 196C/ENGLISH 172D/PSYCH 155. Introduction to Comparative Studies in Race and Ethnicity (5 units)
- COMPLIT 149/CSRE 149. The Laboring of Diaspora and Border Literary Cultures (3-5 units)
- CSRE 200X. CSRE Senior Seminar (WIM; 5 units)
- EDUC 245/CSRE 245. Understanding Racial and Ethnic Identity Development (3-5 units)
- HISTORY 64. Introduction to Race and Ethnicity in 20th Century America (5 units)
- CSRE 255D/HISTORY 255D. Racial Identity in the American Imagination (4-5 units)
- POLISCI 125V/CSRE 125V. Minority Representation and the Voting Rights Act (5 units)
- PSYCH 75. Introduction to Cultural Psychology (5 units)
- SOC 147A. Comparative Ethnic Conflict (5 units)

### FOUNDATIONAL COURSES

- AFRICAAM 105. Introduction to African and African American Studies (5 units)
- ASNAMST 59/HISTORY 59. Introduction to Asian American History (5 units)
- ASNAMST 146S/CSRE 146S/COMPLIT 146. Asian American Culture and Community (5 units)
- CHICANST 166/SOC 166. Mexicans, Mexican Americans, and Chicanos in American Society (5 units)
- CHICANST 180E/CSRE 180E. Introduction to Chicana/o Studies (5 units)
- NATIVEAM 16/ANTHRO 16. Native Americans in the 21st Century: Encounters, Identity, and Sovereignty in Contemporary America (5 units)
- NATIVEAM 138/SOC 138. American Indians in Comparative Historical Perspective (5 units)
- NATIVEAM 139/SOC 139. American Indians in Contemporary Society (5 units)
- ENGLISH 43C/143C. Introduction to Asian American Literature (3-5 units)

### THEMATIC COURSES

- CSRE 14N/CHICANST 14N/EDUC 114N. Growing up Bilingual (3 units)
- CSRE 16N/AFRICAAM 16N/SOC 16N. African Americans and Social Movements (3 units)

- CSRE 28N/PSYCH 28N. The Cultural Shaping of Health and Illness (3 units)
- CSRE 51N/COMPLIT 51N. Comparative Fictions of Ethnicity (5 units)
- CSRE 56N/ENGLISH 56N. Mixed Race in the New Millennium: Crossing of Kin, Culture and Faith (3 units)
- CSRE 99/DRAMA 110. Identity, Diversity, and Aesthetics: The Institute for Diversity in the Arts (5 units)
- CSRE 103B/AFRICAAM 106/EDUC 103B/EDUC 337. Race, Ethnicity, and Linguistic Diversity in Classrooms: Sociocultural Practices (3-5 units)
- CSRE 108/AMSTUD 107/FEMST 101/HISTORY 107. Introduction to Feminist Studies (4-5 units)
- CSRE 133/HISTORY 258G. Women and Race in the American West, 1849-1950 (5 units)
- CSRE 135H. Conversations in CSRE: Case Studies in the Stanford Community (1-2 units)
- CSRE 133/HISTORY 258G. Women and Race in the American West, 1849-1950 (5 units)
- CSRE 137R/POLISCI 137R/337R/EDUC 261X/ETHICSOC 137R. Justice at Home and Abroad: Civil Rights in the 21st Century (5 units)
- CSRE 145A/AFRICAAM 145A. Poetics and Politics of Caribbean Women's Literature (5 units)
- CSRE 144/ASNAMST 144. Transforming Self and Systems: Crossing Borders of Race, Ethnicity, Gender, Sexuality, and Class (5 units)
- CSRE 146. Community Matters. Research and Service with Community Organizations (2 units)
- CSRE 146S/ASNAMST 146S/AMSTUD 146/COMPLIT 146. Asian American Culture and Community (5 units)
- CSRE 150/SOC 150/SOC 250. Race and Political Sociology (5 units)
- CSRE 159H/DRAMA 159H. Creating Comedy, Performing Identity (4 units)
- CSRE 160N/CHICANST 160N/DRAMA 17N. Latina/Latino Performance in the United States (3 units)
- CSRE 162/AMSTUD 161/HISTORY 161. Women in Modern America (4-5 units)
- CSRE 163S/AFRICAAM 163S/AMSTUD 163S/DRAMA 163S. Post Black Drama in the Age of Obama (5 units)
- CSRE 164/CHICANST 164/SOC 164. Immigration and the Changing United States (5 units)
- CSRE 166B/HISTORY 166B. Debates in American Immigration, Past and Present (3-5 units)
- CSRE 177/DRAMA 177. Writing for Performance: The Fundamentals (5 units)
- CSRE 178/ETHICSOC 133/HUMBIO 178/PHIL 175A/POLISCI 133/PUBLPOL 103D/URBANST 122. Ethics and Politics of Public Service (5 units)
- CSRE 183/AMSTUD 183. Border Crossings and American Identities (5 units)
- CSRE 189W/CHICANST 189W. Language and Minority Rights (3-5 units)
- CSRE 197/CHICANST 197/NATIVEAM 197/DRAMA 255. The Rite to Remember: Performance and Chicana Indigenous Thought (3-5 units)
- CSRE 198. Internship for Public Service (1-5 units)
- CSRE 199. Pre-Honors Seminar (1-2 units)
- CSRE 201B/CHICANST 201B. From Racial Justice to Multicultural Movement-based Arts Organizing in the Post Civil Rights Era (5 units)
- CSRE 203A. The Changing Face of America: Civil Rights and Education Strategies for the 21st Century (5 units)
- CSRE 260/HISTORY 260. California's Majority-Minority Cities (4-5 units)

**COGNATE COURSES**

- AFRICAAM 152G/AMSTUD 152G/ENGLISH 152G. Global Harlem Renaissance (5 units)
- AFRICAAM 166/AMSTUD 166/HISTORY 166. Introduction to African American History: The Modern African American Freedom Struggle (4-5 units)
- AFRICAAM 21/LINGUIST 65. African American Vernacular English (3-5 units)
- AFRICAAM 262D/AMSTUD 262D/ENGLISH 262D. African American Poetics (5 units)
- AFRICAAM 43/AMSTUD 143/ENGLISH 43. Introduction to African American Literature (3-5 units)
- AFRICAAM 50B/HISTORY 50B. 19th Century America (3 units)
- AFRICAAM 54N/HISTORY 54N. African American Women's Lives (3-5 units)
- AFRICAST 111. Education for All? The Global and Local in Public Policy Making in Africa (5 units)
- AFRICAST 112. AIDS, Literacy, and Land: International Aid and the Problems of Development in Africa (5 units)
- AMSTUD 140. Stand Up Comedy and the Great American Joke Since 1945 (3-5 units)
- AMSTUD 184. Cityscapes of the Imaginary: The Urban World in Literature and Film (5 units)
- AMSTUD 260G/ENGLISH 260G/JEWISHST 250G. Century's End: Race, Gender, and Ethnicity at the Turn of the Century (5 units)
- ANTHRO 82. Medical Anthropology (4-5 units)
- ANTHRO 126. Cities in Comparative Perspective (5 units)
- ARTHIST 160A. Twentieth Century African American Art (4 units)
- ARTHIST 256A. Critical Race Art History (5 units)
- COMM 160/POLISCI 323R. The Press and the Political Process (5 units)
- COMM 162/POLISCI 323S. Analysis of Political Campaigns (5 units)
- COMPLIT 41Q. Ethnicity and Literature (3-5 units)
- COMPLIT 242. The Global South - Faulkner, García Márquez, Morrison, and Cisneros (3-5 units)
- DANCE 197. Dance in Prisons: The Arts, Juvenile Justice, and Rehabilitation in America (4 units)
- DRAMA 177. Writing for Performance: The Fundamentals (5 units)
- EDUC 110/SOC 132. Sociology of Education: The Social Organization of Schools (4 units)
- EDUC 112X/SOC 129X. Urban Education (3-4 units)
- EDUC 115Q. Identities, Race, and Culture in Urban Schools (3 units)
- EDUC 116X. Service Learning as an Approach to Teaching (3 units)
- EDUC 146X. Perspectives on the Education of Linguistic Minorities (3-5 units)
- EDUC 148X. Critical Perspectives on Teaching and Tutoring English Language Learners (3 units)
- EDUC 149. Theory and Issues in the Study of Bilingualism (3-5 units)
- EDUC 165. History of Higher Education in the U.S. (3-4 units)
- EDUC 177. Education of Immigrant Students: Psychological Perspectives (4 units)
- EDUC 178X. Latino Families, Languages, and Schools (3-5 units)
- EDUC 193B. Peer Counseling in the Chicano/Latino Community (1 unit)
- EDUC 193C. Peer Counseling in the African American Community (1 unit)
- EDUC 193F. Psychological Well-Being on Campus: Asian American Perspectives (1 unit)
- EDUC 193N. Peer Counseling in the Native American Community (1 unit)
- EDUC 201. History of Education in the United States (3-4 units)
- EDUC 201B. Education for Liberation (3-4 units)
- EDUC 233A. Adolescent Development and Mentoring in the Urban Context (3 units)
- EDUC 367. Cultural Psychology (3-5 units)
- EDUC 181. Multicultural Issues in Higher Education (4 units)
- EDUC 389X. Race, Ethnicity and Language (3-4 units)
- ENGLISH 45. Writings by Women of Color (3-5 units)
- ENGLISH 140A. Creative Resistance and the Holocaust (5 units)
- ENGLISH 152D/AFRICAAM 152. W. E. B. Du Bois as Writer and Philosopher (5 units)
- ENGLISH 162. Critical Methods: Literary Theory and Criticism in New Race Studies (5 units)
- ENGLISH 261B. Bright Lights, Global Cities: Reading Transnational Asia/Pacific Spatial Geographies (5 units)
- ENGLISH 362S. Phantoms That Follow: Trauma and Disillusionment in Asian American Literature (5 units)
- ENGLISH 380. Narratives of Redress and Human Rights: Readings from the 19th through 21st Centuries (5 units)
- ENGLISH 381B. Race Theory in the Post-Race Era (5 units)
- FEMST 102. Contemporary Topics in Feminist and Queer Theories (5 units)
- FEMST 120. Introduction to Queer Studies (4-5 units)
- HISTORY 48Q. South Africa: Contested Transitions (3 units)
- HISTORY 52N. The Harlem Renaissance (5 units)
- HISTORY 64C. From Freedom to Freedom Now! African American History (3 units)
- HISTORY 85S. Jews, Christians and Muslims in a Mediterranean Port City: Salonica, 1821-1945 (5 units)
- HISTORY 150C. The United States in the Twentieth Century (5 units)
- HISTORY 151. Slavery and Freedom in American History (5 units)
- HISTORY 166. Introduction to African American History: The Modern African American Freedom Struggle (4-5 units)
- HISTORY 185B/JEWISHST 185B. Jews in the Modern World (5 units)
- HISTORY 186D/JEWISHST 186D. Jews, Citizenship, and Europe's Others (5 units)
- HISTORY 201. Introduction to Public History in the U.S., 19th Century to the Present (4-5 units)
- HISTORY 237/JEWISHST 183. The Holocaust (4-5 units)
- HISTORY 258. History of Sexuality in the U.S. (4-5 units)
- HISTORY 261. Race, Gender, and Class in Jim Crow America (5 units)
- HUMBIO 122S/SOC 141A. Social Class, Race, Ethnicity, Health (5 units)
- HUMBIO 129. Critical Issues in International Women's Health (4 units)
- ILAC 193. The Cinema of Pedro Almodóvar (3-5 units)
- ILAC 194E. Black Brazil (3-5 units)
- LINGUIST 150. Language in Society (4 units)
- LINGUIST 156. Language and Gender (4 units)
- MUSIC 17Q. Perspectives in North American Taiko (4 units)
- MUSIC 37N. Ki ho'alu: The New Renaissance of a Hawaiian Musical Tradition (3 units)
- POLISCI 22N. Inequality and American Democracy (5 units)
- POLISCI 120B. Parties, Voting, the Media, and Elections (5 units)
- POLISCI 125S. Chicano/Latino Politics (5 units)



- POLISCI 137R/EDUC 261X/ETHICSOC 137R. Justice at Home and Abroad: Civil Rights in the 21st Century (5 units)
- POLISCI 141. The Global Politics of Human Rights (5 units)
- POLISCI 323R/COMM 160. The Press and the Political Process (4-5 units)
- POLISCI 323S/COMM 162. Analysis of Political Campaigns (4-5 units)
- POLISCI 327. Minority Behavior and Representation (5 units)
- PSYCH 25N. Psychology, Inequality, and the American Dream (3 units)
- PSYCH 70. Introduction to Social Psychology (4 units)
- PSYCH 183. Mind, Culture, and Society Research Core (2-3 units)
- PSYCH 215. Mind, Culture, and Society (3 units)
- PSYCH 236. The Social Self (3 units)
- PSYCH 245. Social Psychological Perspectives on Stereotyping and Prejudice (3 units)
- RELIGST 203. Myth, Place, and Ritual in the Study of Religion (3-5 units)
- SOC 45Q. Understanding Race and Ethnicity in American Society (5 units)
- SOC 46N. Race, Ethnic, and National Identities: Imagined Communities (3 units)
- SOC 118. Social Movements and Collective Action (5 units)
- SOC 119. Understanding Large-Scale Societal Change: The Case of the 1960s (5 units)
- SOC 120. Interpersonal Relations (5 units)
- SOC 133. Law and Wikinomics: The Economic and Social Organization of the Legal Profession (1-5 units)
- SOC 135. Poverty, Inequality, and Social Policy in the United States (5 units)
- SOC 136. Sociology of Law (5 units)
- SOC 140. Introduction to Social Stratification (5 units)
- SOC 141. Controversies about Inequality (5 units)
- SOC 142. Sociology of Gender (5 units)
- SOC 145. Race and Ethnic Relations (5 units)
- SOC 149/URBANST 112. The Urban Underclass (5 units)
- SOC 155. The Changing American Family (5 units)
- SOC 180B. Evaluation of Evidence (5 units)

## TAUBE CENTER FOR JEWISH STUDIES

*Director:* Steven Weitzman

Jewish Studies is an affiliated program of CSRE. For program and course descriptions, see the "Jewish Studies" section of this bulletin.

## NATIVE AMERICAN STUDIES

*Director:* C. Matthew Snipp

Native American Studies (NAS) provides an intensive approach to understanding the historical and contemporary experiences of Native American people. Attention is paid not only to the special relationship between tribes and the federal government, but to issues across national boundaries, including tribal nations within Canada, and North, Central, and South America. In using the term Native American, the NAS faculty recognize the heterogeneous nature of this population. Native Americans include the Alaska Native population, which comprises Aleuts, Eskimo, and other Native American people residing in Alaska, as well as Native Hawaiian communities.

The purpose of the Native American Studies major and minor is to introduce students to approaches in the academic study of Native American people, history, and culture. Students who major in Native American Studies have the opportunity of doing advanced work in related fields, including literature, sociology, education, and law. In addition to specialized course work on Native American issues, students also are expected to concentrate in a traditional discipline such as anthropology, history, or

psychology to ensure a well rounded educational experience. The area of concentration and related course work should be chosen in consultation with a faculty adviser in Native American Studies. All courses in the program promote the discussion of how academic knowledge about Native Americans relates to the historical and contemporary experiences of Native American people and communities.

## BACHELOR OF ARTS IN NATIVE AMERICAN STUDIES

A total of 60 units of course work are required for the major.

1. *Core Curriculum*—Native American Studies majors must take the 15-unit CSRE core curriculum, including two core courses and a senior seminar taken in Autumn Quarter of the senior year. One foundational course that focuses on a non-Native American group may be counted toward the 15-unit core requirement.
2. *Foundational Courses*—Majors are required to take one foundational course in Native American Studies. This may be either NATIVEAM 138/SOC 138, American Indians in Comparative Historical Perspective; NATIVEAM 139/SOC 139, American Indians in Contemporary Society; or NATIVEAM 16/ANTHRO 16, Native Americans in the 21st Century: Encounters, Identity, and Sovereignty in Contemporary America.
3. *Area Study*—Majors complete an additional 40 units of course work that satisfy three categories in their area of study: Native American focus, comparative focus, and a methodology/research course.
4. *Language Study (optional)*—Students may obtain credit for their study of a related native language towards their degree. If students take 15 or more units of a native language relevant to Native American Studies, they may apply 5 of those units toward their Native American Studies degree.
5. *Senior Paper or Honors Thesis*—All Native American Studies majors complete a culminating research paper under the supervision of a faculty adviser.

## NATIVE AMERICAN STUDIES MINOR

Students who wish to minor in Native American Studies must complete one CSRE core course and at least one foundational course in Native American Studies. Additional courses relevant to the area of concentration selected by the student in consultation with a faculty adviser must also be completed. A total of 30 units of approved course work is required for the minor. Proposals must be approved by the director.

## COURSES

Students in Native American Studies may find the following courses useful in fulfilling course requirements in the major or minor.

### CORE COURSES

- ANTHRO 32. Theories of Race and Ethnicity (5 units)
- CSRE 196C/ENGLISH 172D/PSYCH 155. Introduction to Comparative Studies in Race and Ethnicity (5 units)
- COMPLIT 149/CSRE 149. The Laboring of Diaspora and Border Literary Cultures (3-5 units)
- CSRE 200X. CSRE Senior Seminar (WIM; 5 units)
- EDUC 245/CSRE 245. Understanding Racial and Ethnic Identity Development (3-5 units)
- HISTORY 64. Introduction to Race and Ethnicity in 20th Century America (5 units)
- HISTORY 255D/CSRE 255D. Racial Identity in the American Imagination (4-5 units)
- POLISCI 125V/CSRE 125V. Minority Representation and the Voting Rights Act (5 units)
- PSYCH 75. Introduction to Cultural Psychology (5 units)
- SOC 147A. Comparative Ethnic Conflict (5 units)

**FOUNDATIONAL COURSES**

- NATIVEAM 16/ANTHRO 16. Native Americans in the 21st Century: Encounters, Identity, and Sovereignty in Contemporary America (5 units)
- NATIVEAM 138/SOC 138. American Indians in Comparative Historical Perspective (5 units)
- NATIVEAM 139/SOC 139. American Indians in Contemporary Society (5 units)

**THEMATIC COURSES**

- NATIVEAM 109A/CSRE 109A. Federal Indian Law (5 units)
- NATIVEAM 109B/CSRE 109B. Indian Country Economic Development (5 units)
- NATIVEAM 116/CSRE 116. Language, Culture, and Education in Native North America (5 units)
- NATIVEAM 117S/CSRE 117S. History of California Indians (5 units)
- NATIVEAM 123/CSRE 123. American Indians and the Cinema (5 units)
- NATIVEAM 124. Gender in Native American Societies (5 units)
- NATIVEAM 143A/ ENGLISH 43A/ ENGLISH 143A. American Indian Mythology, Legend, and Lore (3-5 units)

**COGNATE COURSES**

- EDUC 193N. Peer Counseling in the Native American Community (1 unit)
- LINGUIST 169. Linguistic Perspectives on American Indian Languages (3-4 units)
- MUSIC 37N. Ki ho'alu: The New Renaissance of a Hawaiian Musical Tradition (3 units)
- RELIGST 203. Myth, Place and Ritual in the Study of Religion
- SPECLANG 189B. Beginning Hawaiian, Second Quarter (4 units)
- SPECLANG 189C. Beginning Hawaiian, Third Quarter (4 units)
- SPECLANG 247. Introduction to Siouan Language and Culture I (5 units)
- SPECLANG 248. Introduction to Siouan Language and Culture II (5 units)
- SOC 45Q. Understanding Race and Ethnicity in American Society (5 units)

**THEMATIC CONCENTRATION IN AMERICAN DIVERSITY**

The American Diversity concentration is designed for students who wish to explore how the United States was and is constituted with relation to issues of race and ethnicity. The concentration investigates how American domestic and foreign policy, law, history, culture, and society are formed within conversations, debates, policies and studies regarding race and ethnicity. Issues of immigration, citizenship, empire and expansion, defense, diplomacy, human rights, public welfare, social justice and law, educational rights and other topics are explored from the angle of how racial and ethnic difference impacts debate and policy.

The concentration is not declared on Axess; it does not appear on the transcript or diploma. Students interested in the American Diversity thematic concentration should contact the CSRE undergraduate program office.

The American Diversity concentration requires 15 units including two approved CSRE core courses and CSRE 200X: Senior Seminar (WIM), taken Autumn Quarter of the senior year. One foundational course may be counted toward the 15 unit core requirement. In addition to the core curriculum, students complete 45 units of course work relevant to the thematic concentration.

Students may find the following courses useful in fulfilling requirements in the American Diversity thematic concentration.

- ASNAMST 161/CSRE 161. Asian American Immigration and Health (3-5 units)
- CHICANST 14N/CSRE 14N. Growing up Bilingual (3 units)
- CSRE 125V/POLISCI 125V. Minority Representation and the Voting Rights Act (5 units)
- CSRE 149/COMPLIT 149. The Laboring of Diaspora & Border Literary Cultures (3-5 units)
- CSRE 150/SOC 150. Race and Political Sociology (5 units)
- CSRE 201B/CHICANST 201B. From Racial Justice to Multiculturalism: Movement-based Arts Organizing in the Post Civil Rights Era (5 units)
- CSRE 203A. Changing Face of America: Strategies for Civil Rights and Education in the 21st Century (5 units)
- EDUC 177. Education of Immigrant Students: Psychological Perspectives (4 units)
- EDUC 201. History of Education in the U.S. (5 units)
- POLISCI 141. Global Politics of Human Rights (5 units)
- POLISCI 327. Minority Politics (5 units)
- SOC 135. Poverty, Inequality and Social Policy in the United States (5 units)
- SOC 140. Introduction to Social Stratification (5 units)
- SOC 164. Immigration and the Changing United States (5 units)

**THEMATIC CONCENTRATION IN EDUCATION, ACCESS, AND EQUITY**

The concentration in Education, Access, and Equity explores history, policy, and practice in education to understand how educational opportunity is shaped by issues of race, ethnicity, and difference. The goal of the concentration is to develop an understanding of the core issues facing educators and policy makers so that students may learn how they can contribute to the social and political discourse surrounding issues of education and opportunity policy in the U.S.

The concentration is not declared on Axess; it does not appear on the transcript or diploma. Students interested in the Education, Access, and Equity concentration should contact the CSRE undergraduate program office.

The Education, Access, and Equity concentration requires 15 units including two approved CSRE core courses and CSRE 200X: Senior Seminar (WIM), taken Autumn Quarter of the senior year. One foundational course may be counted toward the 15 unit core requirement. In addition to the core curriculum, students complete 45 units of course work relevant to the thematic concentration.

Students may find the following courses useful in fulfilling requirements in the Education, Access, and Equity thematic concentration.

- AFRICAST 111: Education for All? The Global and Local in Public Policy Making in Africa (5 units)
- CHICANST 14N: Growing Up Bilingual (CSRE 14N) (3 units)
- CSRE 121X: Hip Hop, Youth Identities, and the Politics of Language (3-4 units)
- CSRE 203A. The Changing Face of America: Civil Rights and Education Strategies for the 21st Century (5 units)
- CSRE 216X. Education, Race, and Inequality in African American History, 1880-1990 (3-5 units)
- CSRE 233A. Counseling Theories and Interventions from a Multicultural Perspective (3-5 units)
- CSRE 245: Understanding Racial and Ethnic Identity Development (3-5 units)
- EDUC 112X. Urban Education (3-4 units)
- EDUC 120C: Education and Society (4-5 units)
- EDUC 146X: Perspectives on the Education of Linguistic Minorities (3-4 units)
- EDUC 149: Theory and Issues in the Study of Bilingualism (3-5 units)

- EDUC 165. History of Higher Education in the U.S. (5 units)
- EDUC 197. Education, Gender, and Development (4 units)
- EDUC 233A. Counseling Theories and Interventions from a Multicultural Perspective (5 units)
- EDUC 277: Education of Immigrant Students: Psychological Perspectives (4 units)
- LINGUIST 65: African American Vernacular English (5 units)
- SOC 132. Sociology of Education: The Social Organization of Schools (4 units)

## THEMATIC CONCENTRATION IN IDENTITY, DIVERSITY AND AESTHETICS (IDA)

Students in any major in the Comparative Studies in Race and Ethnicity undergraduate program can choose a concentration in Identity, Diversity and Aesthetics (IDA). The concentration is not declared on Axess; it does not appear on the transcript or diploma. Students interested in IDA should contact the CSRE undergraduate program office.

A minimum of 60 units is required for the thematic concentration in IDA. Students take two of the CSRE core courses (10 units), and an IDA course which must focus on the arts. In addition, CSRE 200X: Senior Seminar (WIM) is required of students in the IDA concentration and is taken in Autumn Quarter of the senior year. As a capstone experience, majors must write an honors thesis or senior paper.

IDA concentration students must also complete a senior project. Possible senior projects include a stage production, CD, or arts workshop curriculum in a community setting. Students who elect to write an honors thesis may incorporate their project as the basis for their thesis.

In addition to the core curriculum, students complete 40 units drawing from new and existing courses in departments and programs such as Art and Art History, Music, Drama, Comparative Literature, African and African American Studies, Asian American Studies, Chicana/o Studies, Comparative Studies, and Native American Studies. Thematic courses may focus on performance, visual aesthetics, writing for performance, critical studies in art and performance, and critical arts theory.

Students may find the following courses useful in fulfilling requirements in the Identity, Diversity and Aesthetics (IDA) concentration.

- ARTHIST 160A. Twentieth-Century African American Art (4 units)
- ARTHIST 256A. Critical Race Art History (5 units)
- CHICANST 160N/CSRE 160N/DRAMA 17N. Latino/Latina Performance in the United States (3 units)
- DRAMA 110. Identity, Diversity, and Aesthetics: The Institute for Diversity in the Arts (5 units)
- COMPLIT 142/ ENGLISH 172E. Literature of the Americas (5 units)
- CSRE 179G/DRAMA 179G. Indigenous Identity in Diaspora People of Color Art Practice in North America (5 units)
- CSRE 177/DRAMA 177. Writing for Performance: The Fundamentals (5 units)
- CSRE 197/CHICANST 197/NATIVEAM 197/DRAMA 355. The Rite to Remember: Performance and Chicana Indigenous Thought (3-5 units)
- CSRE 201B/CHICANST 201B. From Racial Justice to Multiculturalism: Movement-based Arts Organizing in the Post Civil Rights Era (5 units)
- MUSIC 17Q. Perspectives on North American Taiko (4 units)
- MUSIC 37N. Ki ho'alu: The New Renaissance of a Hawaiian Musical Tradition (3 units)

## THEMATIC CONCENTRATION IN PUBLIC SERVICE

The Public Service thematic concentration is open to students in any major in the Comparative Studies in Race and Ethnicity Undergraduate Program. The concentration allows a student to develop an area of study focused on community development, public service, and social change. Studying how issues of race and ethnicity impact and are impacted by community and social problems, this concentration is designed to ensure that students interested in service and community have access to a structured curriculum that provides a solid grounding in the theory and practice of community and civic engagement in order to provide the skills and experiences that enable students to become leaders and actors in the sphere of public life.

Students who wish to pursue a thematic concentration in public service must organize their studies to include 15 units, including two approved CSRE core courses and CSRE 200X: Senior Seminar (WIM), taken Autumn Quarter of the senior year. Public Service concentration students should also prepare to complete 25 units (at least 5 courses) relevant to the theme of public service. Three of these courses should include a service learning component (i.e., require the student to participate in service in the local community as a central component to the course).

Students who select a thematic concentration in public service must complete an internship as part of their program of study. This internship can be completed during the academic year for credit or during the summer, but must be at least 300 hours.

Finally, students who pursue the concentration in public service should select a topic for their senior paper or honors thesis that reflects their interest in community work (i.e., service or organizing) or a community issue or concern that is addressed through public service.

This concentration is not declared on Axess; it does not appear on the transcript or diploma. Students interested in this thematic concentration should contact the CSRE Undergraduate Program Office for details about its requirements.

Students may find the following courses useful in fulfilling requirements for the Public Service thematic concentration:

- ASNAMST 146S/CSRE 146S/COMPLIT 146. Asian American Culture and Community (5 units)
- CHICANST 168/CSRE 168/ANTHRO 169A/FEMST140H. New Citizenship: Grassroots Movements for Social Justice in the U.S. (5 units)
- CHICANST/CSRE 201B. From Racial Justice to Multiculturalism: Movement-based Arts Organizing in the Post-Civil Rights Era (5 units)
- CSRE 146. Community Matters: Research and Service with Community Organizations (2 units)
- CSRE 178/ETHICSOC 133/HUMBIO 178/PHIL 175A/POLISCI 133/PUBPOL 103D/URBANST 122. The Ethics and Politics of Public Service (5 units)
- CSRE 198. Internship for Public Service (1-5 units)
- CSRE 203A. The Changing Face of America: Civil Rights and Education Strategies for the 21st Century (5 units)
- DANCE 197. Art and Community: Dance in Prisons (4 units)
- EDUC 116X. Service Learning as an Approach to Teaching (3 units)
- EDUC 270A. Learning to Lead in Public Service Organizations (3-5 units)
- HISTORY 260. California's Majority Minority Cities (5 units)
- HISTORY 251A. Poverty and Homelessness in America (5 units)
- POLISCI 137R. Justice at Home and Abroad: Civil Rights in the 21st Century (5 units)
- SOC 118. Social Movements and Collective Action (5 units)
- SOC 135. Poverty, Inequality, and Social Policy in the United States (5 units)
- SOC 141. Controversies about Inequality (5 units)

- URBANST 112. The Urban Underclass (5 units)

## THEMATIC CONCENTRATION IN RACE AND HEALTH

The concentration in Race and Health is designed for students who are seeking an interdisciplinary exploration of health disparities, health access, and health policy. Through course work, students examine how health experiences are influenced by issues of race and ethnicity.

The concentration is not declared on Axess; it does not appear on the transcript or diploma. Students interested in the Race and Health concentration should contact the CSRE undergraduate program office.

The Race and Health concentration requires 15 units including two approved CSRE core courses and CSRE 200X: Senior Seminar (WIM), taken Autumn Quarter of the senior year. One foundational course may be counted toward the 15 unit core requirement. In addition to the core curriculum, students complete 45 units of course work relevant to the thematic concentration.

Students may find the following courses useful in fulfilling requirements in the Race and Health thematic concentration.

- ANTHRO 185A. Race and Biomedicine (3-5 units)
- ASNAMST 161. Asian American Immigration and Health (3-5 units)
- HUMBIO 121E. Ethnicity and Medicine (1-3 units)
- HUMBIO 122S. Social Class, Race, Ethnicity, and Health (4 units)
- NATIVEAM 240. Psychology and American Indian Mental Health (3-5 units)
- PEDS 111Q: Issues of Race and Ethnicity in the Health of Children (3-4 units)
- PEDS 222: Beyond Health Care: Seeking Health in Society (3 units)
- PEDS 250: Social and Environmental Determinants of Health (3 units)
- PSYCH 28N: The Cultural Shaping of Mental Health and Illness (3 units)
- PSYCH 101. Community Health Psychology (4 units)

## THEMATIC CONCENTRATION IN RACE AND THE AMERICAN CITY

The Race and the American City concentration is designed for students who wish to develop methodologies, data, and theoretical and conceptual materials concerning how urban life, infrastructure, and policies are influenced by race and ethnicity. As virtual laboratories of social interaction, cities embody negotiations around resources, residences, financial districting, economic flow, health and educational resources, environmental policies, and city planning. A primary goal is for students to learn how they might contribute to the social and political discourse on race and ethnicity in the U.S. Participation in a public service internship and/or Stanford in Washington is encouraged.

The concentration is not declared on Axess; it does not appear on the transcript or diploma. Students interested in the Race and the American City concentration should contact the CSRE undergraduate program office.

The Race and the American City concentration requires 15 units including two approved CSRE core courses and CSRE 200X: Senior Seminar (WIM), taken Autumn Quarter of the senior year. One foundational course may be counted toward the 15 unit core requirement. In addition to the core requirements, students must take an additional 45 units of course work relevant to the thematic concentration which may include courses such as:

- AMSTUD 184. Cityscapes of the Imaginary: The Urban World in Literature and Film (5 units)
- ANTHRO 126. Cities in Comparative Perspective (5 units)
- HISTORY 260. California's Minority-Majority Cities (5 units)

- PEDS 250. Social and Environmental Determinants of Health (3 units)
- SOC 135. Poverty, Inequality and Social Policy in the United States (5 units)
- SOC 148. The Urban Underclass (5 units)
- SOC 155. The Changing American Family (5 units)
- URBANST 114. Cities in Comparative Perspective (5 units)
- URBANST 173. Suburbs and Sprawl (5 units)
- URBANST 162. Managing Local Governments (5 units)

## DRAMA

*Emeriti: (Professors)* Helen W. Schrader, Carl Weber; (*Associate Professor*) William S. Eddelman; (*Senior Lecturers*) Susan Cashion, Patricia Ryan  
*Chair:* Alice Rayner

### DRAMA

*Professors:* Jean-Marie Apostolides (French and Italian; Drama), Harry J. Elam, Jr. (Vice Provost for Undergraduate Education), Peggy Phelan (Drama; English; on leave), Alice Rayner (Drama; Graduate Studies Committee Chair), Rush Rehm (Drama; Classics), Jennifer Brody (Drama; Center for Comparative Studies in Race and Ethnicity)

*Assistant Professors:* Branislav Jakovljevic (Undergraduate Faculty Adviser), Jisha Menon

*Professors (Teaching):* Michael F. Ramsaur, Janice Ross (on leave)

*Associate Professors (Teaching):* Helen Paris, Leslie Hill

*Senior Lecturer:* Connie Strayer

*Lecturers:* Erik Flatmo Gambatese, Daniel Klein, Kathryn Kostopoulos

*Visiting Artist:* Ann Carlson

*Guest Lecturers:* Linda Apperson, Jeffrey Bihl, Mark Gonzales, Chad Bonaker

*Artists in Residence:* Amy Freed, Cherrie Moraga

*Department Administrator:* Patrice O'Dwyer

### INSTITUTE FOR DIVERSITY IN THE ARTS AND BLACK PERFORMING ARTS DIVISION

*IDA Faculty Director:* H. Samy Alim (Education and, by courtesy, Anthropology and Linguistics)

*Executive Director:* Georgina Hernandez

*Associate Director (IDA):* Ericka Bratton

*Director (CBPA):* Robert Moses

### DANCE DIVISION

*Director:* Janice Ross (on leave 2011-2012)

*Acting Director:* Diane Frank

*Lecturers:* Kristine Elliott, Diane Frank, Aleta Hayes, Muriel Maffre, Richard Powers, Ronnie Reddick, Mark Franko

*Artist in Residence:* Robert Moses

*Mail Code:* Drama, 94305-5010; Dance, 94305-8125

*Drama Department Office:* 551 Serra Mall, Memorial Auditorium, Room 144

*Dance Division Office:* 375 Santa Teresa Street, Roble Gym, Room 2

*Phone:* Drama (650) 723-2576; Dance (650) 723-1234

*Department Administrator Email:* podwyer@stanford.edu

*Student Services Email:* dramastudentservices@stanford.edu

*Web Site, Drama:* <http://drama.stanford.edu>

*Web Site, Dance:* <http://dance.stanford.edu>

Courses offered by the Department of Drama are listed on the *Stanford Bulletin's* ExploreCourses web site under the subject codes DRAMA and DANCE.

## MISSION OF THE DEPARTMENT OF DRAMA

The Drama Department integrates theory, criticism, and performance. Convinced that scholarship is strengthened by direct

engagement in performance, and that performance is enhanced by practitioners whose analytic skills have been honed in scholarship, the department produces more than a dozen productions each academic school year, including canonical plays, commissioned dance works, experimental projects, and the works of visiting artists.

## MISSION OF THE UNDERGRADUATE PROGRAMS IN DRAMA AND DANCE

The mission of the undergraduate program in Drama is to provide a strong non-conservatory program for students studying Drama and Dance in a liberal arts context. Joining academic research with performance and technical practice, department majors pursue areas of interest in acting, directing, playwriting, dance, design, stage management, performance theory, and cultural studies. Students explore these fields in a collaborative environment with close faculty contact. One of the requirements of the major is to fulfill a stage management course, generally in the junior year, which allows students practical exposure to managing and/or crewing a production. It is essential that students understand the concrete workings of theater in order to appreciate its history and literature. With faculty collaboration, students of Drama and Dance integrate research, theory, intellectual engagement, and performance. During the senior year, students have the option of completing a senior project in addition to fulfilling the 60 units required for the major.

## LEARNING OUTCOMES

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. the ability to find organic and meaningful ways of integrating theory and practice.
2. the ability to perform critical and theoretical analysis within the discipline.
3. effective research and writing skills that complement practical work.

## MISSION OF THE GRADUATE PROGRAM IN DRAMA

The mission of the graduate program in Drama is to produce students who work on the leading edge of both scholarly and performance practice. The Ph.D. program in Drama emphasizes the combination of theory and practice. Graduate students complete a program with a study of critical theory and textual history and an understanding that such theory is informed by practical elements in directing, acting, writing, and design.

## BACHELOR OF ARTS IN DRAMA

The requirements for the B.A. degree in Drama are designed to integrate the critical and historical study of drama with the study and experience of performance. A total of 60 units are required to obtain a B.A. degree in Drama. The major provides aesthetic and critical opportunities for students to develop special aptitudes. Students are encouraged to declare the major in their sophomore year.

## SUGGESTED PREPARATION FOR THE MAJOR

Prospective majors in the first two years of study at Stanford are encouraged to take part in casting opportunities in department productions or independent undergraduate performing arts groups.

*Recommended Preparatory Courses*—Two years of a college-level foreign language.

## DEGREE REQUIREMENTS

*Required Courses*—60 units total for the major

A course may be listed in more than one area; however, each course can only satisfy one major requirement. A course cannot be double-counted for different requirements in the major. Additionally, students may petition the department undergraduate adviser to have additional courses offered by the department count towards requirements in areas 2, 3, and 4. All introductory courses are required with no exceptions.

1. *Introductory Core Courses*—12 units
  - a. DRAMA 30. How Theater is Designed (4 units)
  - b. DRAMA 101H. How Theater Thinks (4 units)
  - c. DRAMA 101P. How Practice Practices (4 units)
2. *Theatrical Literature/History*—14 units
  - Any course between DRAMA 150-169, DANCE 160-161 (Instructor on leave; no courses offered in DANCE 160-161 for academic year 2011-12). The following courses are offered in 2011-12:
    - DRAMA 151T. Great Books
    - DRAMA 152H. Food and Performance
    - DRAMA 155H. *Our Town*
    - DRAMA 157H. Pop Up: Race and Popular Culture
    - DRAMA 159H. Comedy and Identity
    - DRAMA 162H. Baroque Modernities: Dance, Theater, Film, and Political Theory
    - DRAMA 163S. New Black or Postblack Drama in the Age of Obama
    - DRAMA 164. Performance and Gender
    - DRAMA 164T. Queer Theory
    - DRAMA 165T. Africa in the African American Imaginary
    - DRAMA 166H. Historiography of Theater
    - DRAMA 167T. Critical Theory
    - DRAMA 168H. Avant Garde Theater II
    - DRAMA 168T. Inside Story: Biology and Biography in Performance and Art
    - DRAMA 169T. Photography and Memory
    - DRAMA 176H. Black Women Playwrights
3. *Theatrical Performance Courses: Acting, Dance, Design, Directing, and Playwriting*—13 units
  - Any course in DANCE 30-149
  - Acting courses between DRAMA 21-29, 103-105, 120-129, 203, 201V, 210. The following courses are offered in 2011-12:
    - DRAMA 103. Beginning Improvising
    - DRAMA 105V. Improv and Design
    - DRAMA 120A. Introduction to Acting I
    - DRAMA 120B. Introduction to Acting II
    - DRAMA 120V. Vocal Production and Audition
    - DRAMA 121S. Acting Shakespeare
    - DRAMA 122. Contemporary Vernacular Dance in New Musical Theater
    - DRAMA 122P. Undergraduate Acting Project
    - DRAMA 110. Identity, Diversity, and Aesthetics: The Institute for Diversity in the Arts (IDA)
  - Directing, Playwriting and Dramaturgy courses between DRAMA 170-179. The following courses are offered in 2011-12:
    - DRAMA 170B. Actor/Director Dialogue
    - DRAMA 171. Performance Making: Process
    - DRAMA 174A. Performance Making: Production
    - DRAMA 177. Writing for Performance
    - DRAMA 178. Playwriting
    - DRAMA 179F. *Flor y Canto*: Poetry Writing
  - Design, Stage Management, and Production courses between DRAMA 31, 131-133, 137-39D, 42, 140, 231-240. The following courses are offered in 2011-12:
    - DRAMA 28. Makeup for the Stage
    - DRAMA 31. Introduction to Lighting and Production
    - DRAMA 32F. History of Fashion

- DRAMA 34S. Fundamentals of Sound in Performance: Theory and Technique
  - DRAMA 42. Costume Construction
  - DRAMA 131. Lighting Design
  - DRAMA 132. Costume Design
  - DRAMA 133. Stage Scenery Design
  - DRAMA 137. Hand Drafting for Designers
  - DRAMA 138. Digital Production
4. *Theatrical Production*—9 units
    - a. DRAMA 34. Stage Management Techniques (2 units)
    - b. DRAMA 39. Theater Crew (3 units)
    - c. DRAMA 134. Stage Management Project (4 units)
  5. *Senior Project*—2 units
    - DRAMA 200. Senior Project
      - All Drama Majors must complete a Senior Project. The project must be a significant work in any area of theatre/performance, such as: creating a performance through devising an original piece; writing, directing, and/or performing a major role; or another creative enterprise that requires an original contribution.
      - The student has the option of writing an essay associated with the project.
      - All majors must submit a two-page proposal to a faculty adviser of their choice area early in the junior year; details available from the undergraduate adviser. Students considering projects that include practical production should consult with the Director of Production. Practical projects are typically approved by department faculty at the end of Spring Quarter of the junior year.
      - The proposal should include an outline of the courses the student has taken and grades received in the area requirements, and should describe the courses in which the student plans to enroll as part of the project.
      - The proposal should describe in detail the purpose and methods involved in the project; it should include a bibliography, if appropriate, and a 1-2 page abstract of the associated essay if an essay is part of the project.
      - Students receive credit for senior projects through DRAMA 200; 2 units minimum are required, but additional units are available for larger projects.
  6. *Electives*—10 units
    - Any courses with the subject code DRAMA or DANCE.
  7. *WIM*—Writing in the Major.
    - The following courses are offered in 2011-12:
      - DRAMA 101H. How Theater Thinks
      - DRAMA 168H. Avant Garde Theater II
  5. Students must have completed half of the courses in their specialization by the end of the junior year.
  6. Students must complete 4 units in the honors colloquia, described below, beginning in Spring Quarter of the junior year and continuing in the following three regular quarters. Each quarter's colloquium is offered for 1 unit, S/NC. In extenuating circumstances (overseas study, for example), an honors program student may substitute other equivalent work for one quarter of the colloquium, with the approval of the honors adviser.
  7. By the end of the sixth week of the quarter in which they plan to graduate, students in the honors program must submit an honors thesis, described below, to be read and evaluated by their thesis committee.
  8. On the basis of a student's work in the Drama core, in the area of specialization, on the senior project, in the honors colloquia, and on the honors thesis, the faculty determines and confers honors on graduating students who have completed the honors program.
  9. Failure to meet any of these requirements, or to make satisfactory progress on the honors thesis, leads to dismissal from the Honors program.
  10. Entry into the honors program does not guarantee a degree with honors. The final decision to confer honors is made by the student's thesis committee, upon evaluating the quality of the Senior Project and the thesis.
 

*Honors Colloquium*—The honors colloquium aims to engage honors program students in important issues in the field focusing on the students' areas of specialization and research. The honors program adviser convenes the colloquium three times per quarter and sets the agenda for meetings and discussion. Students discuss their work in the department and present and discuss their research for their Honors thesis. Students must enroll in DRAMA 202, Honors Thesis.

*Honors Thesis*—The honors thesis typically consists of a 40-60 page essay presenting the student's research on an important issue or subject, determined by the student. The honors program adviser, the senior project adviser, and another faculty member constitute the student's honors thesis committee. They read and evaluate the thesis, and make recommendations to the faculty at large regarding its strengths and weaknesses. Additionally, students have the option of using their own senior project as a case study. In these situations, the honors thesis must critically analyze the strengths and weaknesses of the creative work. Generally, these essays tend to be shorter (about 20-25 pages) because the creative work constitutes one-half of the honors project.

*Honors in Humanities*—The Program in Interdisciplinary Studies in Humanities is not accepting new students; it will provide courses and advising for students already enrolled. See the "Interdisciplinary Studies in Humanities" section of this bulletin for a description of the honors program. Students who are already enrolled in this program may take HUMNTIES 160 and two seminars from 190-198 in fulfillment of the departmental elective requirement.

## HONORS PROGRAM

For a limited number of students, the department confers the degree of Bachelor of Arts with Departmental Honors in Drama. To be considered for departmental honors, students must meet the following requirements in addition to the other requirements of the Drama major:

1. Prospective honors students must submit a written application, including transcript, establishing the student's work to date in the department and outlining the area of research that the student wishes to pursue.
2. To be admitted to the honors program, students must have an overall minimum University GPA of 3.3, as well as a GPA of 3.5 in courses counting towards the Drama major.
3. For transfer students, the same GPA requirement applies at the time of transfer.
4. Students must complete the Drama core requirements by the end of the junior year. Only in exceptional circumstances can this requirement be waived. Transfer from another university, extended overseas study, or temporary withdrawal from the major due to illness might constitute extenuating circumstances.

## MINOR IN DRAMA

The requirements for the Minor in Drama are designed to integrate the critical and historical study of drama with the study and experience of performance. A total of 30 units are required to obtain a Minor in Drama. The minor provides aesthetic and critical opportunities for students to develop special aptitudes. Students are encouraged to declare a minor in their sophomore year.

### MINOR REQUIREMENTS

*Required Courses*—30 units total for the minor

A course may be listed in more than one area; however, each course can only satisfy one minor requirement. There is no double credit for a course. A student may petition to the department Undergraduate Adviser to have additional courses offered by the department count towards requirements in areas 2 and 3. Drama 101H, How Theater Thinks, is required with no exceptions. All

core courses must be taken for a letter grade to satisfy the requirement.

1. *Introductory Core Courses*—8 units  
DRAMA 101H. How Theater Thinks (4 units) REQUIRED  
DRAMA 30. How Theater is Designed (4 units)  
DRAMA 101P. How Practice Practices (4 units)
2. *Theatrical Literature/History*—4 units  
Any course between DRAMA 150-169, DANCE 160-161 (Instructor on leave; no courses offered in DANCE 160-161 for academic year 2011-12). The following courses are offered in 2011-12
  - DRAMA 151T. Great Books
  - DRAMA 152H. Food and Performance
  - DRAMA 155H. Our Town
  - DRAMA 157H. Pop Up: Race and Popular Culture
  - DRAMA 159H. Comedy and Identity
  - DRAMA 162H. Baroque Modernities: Dance, Theater, Film, and Political Theory
  - DRAMA 163S. New Black or Postblack Drama in the Age of Obama
  - DRAMA 164. Performance and Gender
  - DRAMA 164T. Queer Theory
  - DRAMA 165T. Africa in the African American Imaginary
  - DRAMA 166H. Historiography of Theater
  - DRAMA 167T. Critical Theory
  - DRAMA 168H. Avant Garde Theater II
  - DRAMA 168T. Inside Story: Biology and Biography in Performance and Art
  - DRAMA 169T. Photography and Memory
  - DRAMA 176H. Black Women Playwrights
3. *Theatrical Performance Courses: Acting, Dance, Design, Directing, and Playwriting*—4 units  
Acting courses between DRAMA 21-29, 103-105, 120-129, 203, 201V, 210.  
The following courses are offered in 2011-12:
  - DRAMA 103. Beginning Improvising
  - DRAMA 105V. Improv and Design
  - DRAMA 110. Identity, Diversity, and Aesthetics: The Institute for Diversity in the Arts (IDA)
  - DRAMA 120A. Introduction to Acting I
  - DRAMA 120 B. Introduction to Acting II
  - DRAMA 120V. Vocal Production and Audition
  - DRAMA 121S. Acting Shakespeare
  - DRAMA 122. Contemporary Vernacular Dance in New Musical Theater
  - DRAMA 122P. Undergraduate Acting ProjectDirecting, Playwriting and Dramaturgy courses between DRAMA 170-179.
  - The following courses are offered in 2011-12:
    - DRAMA 170B. Actor/Director Dialogue
    - DRAMA 171. Performance Making: Process
    - DRAMA 174A. Performance Making: Production
    - DRAMA 177. Writing for Performance
    - DRAMA 178. Playwriting
    - DRAMA 179F. *Flor y Canto*: Poetry Writing
  - Design, Stage Management, and Production courses between DRAMA 31, 131-133, 137-39D, 42, 140, 231-240
  - The following courses are offered in 2011-12:
    - DRAMA 28. Makeup for the Stage
    - DRAMA 31. Introduction to Lighting and Production
    - DRAMA 32F. History of Fashion
    - DRAMA 34S. Fundamentals of Sound in Performance: Theory and Technique
    - DRAMA 42. Costume Construction
    - DRAMA 131. Lighting Design
    - DRAMA 132. Costume Design
    - DRAMA 133. Stage Scenery Design
    - DRAMA 137. Hand Drafting for Designers

- DRAMA 138. Digital Production
- DANCE courses between 30-149.
4. *Theatrical Production*—2 units  
DRAMA 39. Theater Crew
  5. *Electives*—12 units  
Any courses in DRAMA or DANCE.

## DOCTOR OF PHILOSOPHY IN DRAMA

University requirements for the Ph.D. are described in the "Graduate Degrees" section of this bulletin. All graduate study in the Department of Drama leads to the Ph.D. degree. The doctoral program in Drama aims to integrate practical theater work with the critical and historical study of dramatic literature and theory. Candidates are expected to function both as scholars and as theater directors. The curriculum offers a two-year practical concentration in directing along with the study of critical and performance theory, aesthetics, history, and literature. The goal of the program is to give students a thorough knowledge of the field that leads to original and significant scholarly work grounded in practice as well as an inventive directorial practice that is based on solid scholarly analysis.

*Admission*—Applicants for the Ph.D. program can visit our web site at <http://drama.stanford.edu> or write directly to the Department of Drama, Attention: Graduate Admissions, for information. Online graduate applications are available at <http://gradadmissions.stanford.edu>. In addition to the required statement of purpose, applicants must submit a statement detailing their practical theater experience, a sample of their written critical work, and a statement on directing. An invitation to interview may be extended by the end of January. Graduate students in the Department of Drama begin study in Autumn Quarter of each academic year; there are no mid-year admissions. Graduate students must be degree candidates.

The Department of Drama awards a number of fellowships to students in the Ph.D. program.

## DEGREE REQUIREMENTS

Department requirements 2 through 9 following are in addition to the University's basic requirements for the doctorate.

1. *Units and Course Requirements*—
  - a. A minimum of 135 units of graduate courses and seminars in support of the degree. These units are in addition to units for the doctoral dissertation.
  - b. Core seminars: DRAMA 300A, 300B, 301, 302 or 303, and 304.
  - c. Three additional graduate seminars within the Department of Drama to be worked out with the adviser.
  - d. Four workshops in directing: DRAMA 371, 372, 374A, 374B.
    - a. DRAMA 371. Performance Making: Process
    - b. DRAMA 372. Actor and Director Dialogue
    - c. DRAMA 374A. Performance Making: Production
    - d. DRAMA 374B. Production Project; Students take DRAMA 374B, Production Project, to stage a more fully developed production chosen in consultation with the faculty.

In the first year, students take DRAMA 371, Performance Making: Process which focuses on generating original creative work through a range of techniques. They also take DRAMA 372, Actor and Director Dialogue, which explores the relationship between acting and directing and actors and directors. In the second year they take DRAMA 374A, Performance Making: Production, which focuses on honing aesthetic and production skills for mounting a piece of work. This leads to DRAMA 374B, Production Project, which is the production and performance of creative work approved by the Graduate Studies Committee (GSC) and supervised by a faculty member.

- e. Students are allowed to take up to 6 units of DRAMA 390, Drama Tutorial/Directed Reading, to count towards their degree program and towards the 135 units requirement.
2. *Language Requirement*—The candidate must demonstrate reading knowledge of one foreign language in which there is a major body of dramatic literature. The language requirement must be met before the student can be advanced to candidacy. The language requirement may be fulfilled in any of the following ways:
    - a. achievement of a sufficiently high score (70th percentile) on the foreign language examination prepared by the Educational Testing Service (ETS). Latin and Greek are not tested by ETS.
    - b. a reading examination given each quarter by the various language departments, except for Latin and Greek.
    - c. pass with a grade of 'B' or higher courses in Literature/History numbered 100 or higher in a foreign language department at Stanford.
  3. *Examinations*—Candidates must complete three examinations (comprehensive, qualifying, and department oral) by the end of the first three years of study at Stanford.
    - a. *First-Year Comprehensive*—The comprehensive examination is taken over the first weekend in December of the first year. The exam is based on texts given to the student by the department before the start of the first year. Students study these texts independently. For the exam, they should be able to identify and compare plays and playwrights from the list of texts in terms of dramatic genres, styles, and periods, and to address comparatively and analytically critical issues of texts and performance.
    - b. *Second-Year Qualifying*—The qualifying examination, which must be completed before advancement to candidacy at the end of the second year, consists of two 25-35-page essays. Each of these essays should demonstrate a broad knowledge of two different historical periods (pre-20th century), with emphasis on particular dramatic texts and/or performance practices. Essay topics should be designed and written up in consultation with a faculty adviser. The reading list for each period should be approved by the end of the first quarter. These essays should not duplicate any written work from seminars. After approval by the adviser, the Graduate Studies Committee reads and evaluates these essays. For the first qualifying examination, candidates must choose from the following historical periods:
      1. Classical
      2. Medieval and Renaissance
      3. 17th, 18th, or early 19th century
    - c. *Third-Year Department Oral*—The department oral examination requires three faculty members, at least two from the Department of Drama, who most likely form the dissertation reading committee. This exam is based on a 2-3 page summary of the project and a 40-page review of the literature for the dissertation that the student creates in conjunction with the committee. This exam should be taken by the end of Spring Quarter in the third year.
  4. *Dissertation Prospectus*—The dissertation prospectus must be approved by the candidate's adviser and by the departmental Graduate Studies Committee two quarters after taking the department oral. This should be done in the Autumn Quarter of the fourth year. Within 30 days of approval, a student should schedule a prospectus colloquium with the proposed reading committee (the dissertation director and two other faculty members). The prospectus must be prepared in close consultation with the dissertation adviser during the months preceding the colloquium. The prospectus should be approximately 15-20 pages and minimally cover three things:
    - a. the research question and context
    - b. the methodology for research
    - c. a lay-out of a complete chapter by chapter plan
  5. *University Oral Examination*—The University oral examination is a defense of the dissertation based on a full draft submitted at least 75 days before the proposed degree conferral. The examining committee consists of four faculty members, at least two of whom must be from the Department of Drama, as well as one faculty chair from outside the department who does not share an appointment with the department of any of the examiners.
  6. *Assistantships*
    - a. *Research Assistantship*—Three quarters of research assistantship with faculty members are required. Generally, this requirement is fulfilled in the third year.
    - b. *Teaching Assistantship*—Four quarters of supervised teaching at half time are a required part of the Ph.D. program. The requirement is normally met by teaching three courses during the fourth year and one course during the fifth year.
  7. *Application for Candidacy*—By the end of the second year of residence, the following requirements or appropriate equivalents must be completed:
    - a. the core seminars: DRAMA 300A, 300B, 301, 302 or 303, and 304
    - b. the directing workshop series, including the successful production of at least one work in public performance
    - c. a foreign language
    - d. successful completion of the comprehensive and qualifying exams.  
Based on its evaluation of the student's progress, the Graduate Studies Committee certifies the student's qualifications for candidacy. Upon favorable action, the student files a formal application for candidacy, as prescribed by the University, by the end of Summer Quarter of the second year. By University policy, candidacy is valid for five years unless terminated by the department.
  8. *Dissertation*—Normally, the Ph.D. program in Drama is completed in five years. The first two years should be devoted to full-time graduate study, and the third, fourth, and fifth years to research, teaching, and writing the dissertation. A candidate taking more than five years is required to reinstate candidacy by repassing the written examinations on dramatic literature.
  9. *Satisfactory Progress, Annual Review*—The program and progress of each student must be evaluated by the Graduate Studies Committee at the end of each academic year. At the end of the first year, the Graduate Studies Committee evaluates the work of each student in classes, seminars, examinations, and performance. Production planning in the Spring of each year for the following season is contingent upon students making satisfactory progress. Continuation in the program depends upon the recommendation of this faculty group. At the end of the second year, the committee reviews the student's work in consideration of advancement to candidacy. At the end of the third year, students are expected to have developed an approved dissertation prospectus. Funding is contingent upon satisfactory progress. Failure to make satisfactory progress may result in dismissal from the program. University policy states that all requirements including dissertation must be completed before candidacy expires.

## PH.D. IN DRAMA AND HUMANITIES

The Drama department participated in the Graduate Program in Humanities leading to a Ph.D. degree in Drama and Humanities. At this time, the option is available only to students already enrolled in the Graduate Program in Humanities; no new students are being accepted. The University remains committed to a broad-based graduate education in the humanities; the courses, colloquium, and symposium continue to be offered, and the Division of Literatures, Cultures, and Languages provides advising for students already enrolled who may contact Denise Winters at 650-724-1333 for further information. Courses are listed under the



subject code HUMNTIES and may be viewed on the *Stanford Bulletin's* ExploreCourses web site.

## INSTITUTE FOR DIVERSITY IN THE ARTS AND BLACK PERFORMING ARTS DIVISION

The Institute for Diversity in the Arts (IDA) is an interdisciplinary program in the humanities that involves students in the study of culture, identity and diversity through artistic expression. The Committee on Black Performing Arts (CBPA) and the Institute for Diversity in the Arts (IDA) merged in Autumn 2005. The mission of IDA/CBPA is to engage artists, students, and the local community collaboratively to create performance and visual art that examine the intersections among race, diversity, and social action through programming that includes artist residencies, classes, workshops, public performances, a lecture series, and symposia. The division produces annual student productions and is a resource for student organizations promoting artistic expression through the exploration of the impact of ethnic representation in the arts, literature, media, and pop culture. The programs prepare students for work in areas including the arts and community development. Students have gone on to graduate-level critical studies, M.F.A. programs, public service, government and politics, arts administration, and teaching. Students can pursue an IDA concentration through the Comparative Studies in Race and Ethnicity major; students can also emphasize Black performance through the African and African American Studies major.

### DANCE DIVISION

The Stanford Dance Division offers a range of broadly diverse approaches to dance as a performing art, cultural practice, political act and embodiment of ideology and beliefs. All of the dimensions through which one comes to experience dance, from studying a range of dance techniques, choreographing and performing, to viewing and critically and historically assessing dance, are represented in the course offerings of the Dance Division.

### MINOR IN DRAMA WITH DANCE CONCENTRATION

A student declaring a minor in Drama with a Dance Concentration must complete 30 units of course work in Dance/Drama. Upon declaring the minor, a proposed course of study must be submitted by each student in consultation with the Acting Dance Director, Diane Frank, [dfrank1@stanford.edu](mailto:dfrank1@stanford.edu), and approved by her no later than one quarter following the declaration. Declaration of the Drama/Dance Minor should also be made on-line at <http://axess.stanford.edu>. Please note that special elective dance classes are offered every year and the following lists are some, but not all of the classes that fulfill the requirements. Other classes may be substituted with adviser's consent.

*Requirements*—30 total units

- Technique Classes:** Studio Classes: Minimum of six studio dance classes (12 units)
  - A concentration of at least three classes chosen from a specific dance form (e.g., Contemporary, Modern, Jazz, Hip-Hop, Ballet, Social), and the attainment of intermediate or advanced level (at least two classes) in a style other than the concentration
- Dance Studies Classes and Drama Course Courses** (12 units):
  - DRAMA 101H. How Theater Thinks (Required)
  - DANCE 162H. Baroque Modernities (4 units)
  - DANCE 191 or 290. Special Project (3-5 units)
  - DRAMA 30. How Theater is Designed (4 units)
  - DRAMA 101P. How Practice Practices (4 units)
- Choreography/Repertory/Performance Classes** -- 6 units including 1 unit of production crew (6 units)
  - DANCE 27. Faculty Choreography (1 unit)
  - DANCE 28. Choreography; The Color Purple (1 unit)
  - DANCE 30. Chocolate Heads (1 unit)

- DANCE 57. Dance Repertory: Anna Sokolow (1 unit)
- DANCE 103. Dance, Text, and Gesture (1 unit)
- DANCE105. Contemporary Afro Styles and Dance Making (1 unit)
- DANCE 151. Dance, Theater, and Music (1 unit)
- DANCE 152. Dance and the Visual Arts (1 unit)
- DRAMA 39. Theater Crew (2 units)

## OVERSEAS STUDIES COURSES IN DRAMA

For course descriptions and additional offerings, see the listings in the *Stanford Bulletin's* ExploreCourses web site (<http://explorecourses.stanford.edu>) or the Bing Overseas Studies web site (<http://bosp.stanford.edu>). Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

### WINTER QUARTER

#### BERLIN

- OSPBER 20. German Film and the Berlin Film Festival. 3-5 units, Rush Rehm
- OSPBER 23. Opera in Berlin. 3-5 units, Rush Rehm, GER: DB: Hum

### SPRING QUARTER

#### BERLIN

- OSPBER 101A. Contemporary Theater. 5 units, Karen Kramer, GER: DB:Hum

## EAST ASIAN LANGUAGES AND CULTURES

*Emeriti:* (Professors) Albert E. Dien, David S. Nivison, Makoto Ueda, John Wang\*; (Associate Professor) Susan Matisoff; (Senior Lecturer) Yin Chuang\*

*Chair:* Ban Wang

*Directors of Graduate Studies:* James Reichert (Japanese), Li Liu (Chinese)

*Directors of Undergraduate Studies:* Yoshiko Matsumoto (Japanese), Haiyan Lee (Chinese)

*Professors:* Steven D. Carter, Li Liu, Yoshiko Matsumoto (on leave Autumn), Chao Fen Sun (on leave Winter, Spring), Melinda Takeuchi (East Asian Languages and Cultures, Art and Art History), Ban Wang (East Asian Languages and Cultures, Comparative Literature)

*Associate Professors:* Haiyan Lee, Indra Levy, James Reichert

*Assistant Professors:* Yiqun Zhou (on leave)

*Consulting Professor:* Richard Dasher

*Visiting Fellow:* Paul Festa

*Postdoctoral Fellow:* Minku Kim

#### **Chinese-Japanese Area Studies Faculty:**

*Professors:* Carl W. Bielefeldt (Religious Studies), Gordon Chang (History, on leave Spring), Richard Dasher (Center for Integrated Systems), Mark E. Lewis (History), Paul Harrison (Religious Studies), Jean Oi (Political Science), David Palumbo-Liu (Comparative Literature), Gi-Wook Shin (Sociology), Richard Vinograd (Art and Art History), Andrew Walder (Sociology), Kären Wigen (History), Arthur P. Wolf (Anthropology), Lee H. Yearley (Religious Studies), Xueguang Zhou (Sociology)

*Associate Professors:* Jindong Cai (Music), Matthew Sommer (History), Miyako Inoue (Anthropology, on leave), Matthew Kohrman (Anthropology, on leave Spring)

*Assistant Professors:* Jennifer Adams (Education), Melissa Brown (Anthropology, on leave), Phillip Lipsky (Political Science),

Jean Ma (Art and Art History), Yumi Moon (History, on leave), Thomas Mullaney (History), Jun Uchida (History, on leave)

\* Recalled to active duty.

Department Office: Building 250, Room 106

Mail Code: 94305-2000

Phone: (650) 725-2742

Email: asianlanguages@stanford.edu

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

Courses offered by the Department of East Asian Languages and Cultures are listed on the *Stanford Bulletin's* Explore Courses web site under the subject codes CHINGEN (Chinese General), CHINLIT (Chinese Literature), JAPANGEN (Japanese General), JAPANLIT (Japanese Literature), and KORGEN (Korean General). Courses with the suffix -GEN do not require reading knowledge of an Asian language. Language courses are listed on the *Stanford Bulletin's* Explore Courses web site under CHINLANG (Chinese Language), JAPANLNG (Japanese Language), and KORLANG (Korean Language).

The Department of East Asian Languages and Cultures offers programs for students who wish to engage with the cultures of China, Japan, and Korea as articulated in language, linguistics, literature, film, cultural studies, and visual arts. Students emerge with a sophisticated understanding of culture as a dynamic process embodied in language and other representational media, especially the verbal and visual forms that are central to humanistic study. Department faculty represent a broad range of research interests and specialties, and visiting scholars and postdoctoral fellows from the Stanford Humanities Center, the Andrew W. Mellon Fellowship of Scholars in the Humanities, the Freeman Spogli Institute for International Studies, and the Center for East Asian Studies add to the intellectual vitality of the department.

East Asian Languages and Cultures offers a full range of courses at the undergraduate and graduate levels. Undergraduate courses concentrate on language, literature, and other cultural forms from the earliest times to the present, covering traditional and contemporary topics from Confucian conceptions of self and society to inflections of gender in the twentieth century. Emphasis in classes is on developing powers of critical thinking and expression that will serve students well no matter what their ultimate career goals. Graduate programs offer courses of study involving advanced language training, engagement with primary texts and other materials, literary history, and training in research methodologies and critical approaches.

East Asian language skills provide a foundation for advanced academic training and professional careers in fields such as business, diplomacy, education, and law. The department also offers opportunities for students who choose to double-major or minor in other academic disciplines, including anthropology, art history, economics, education, history, linguistics, philosophy, political science, religious studies, and sociology.

The department accepts candidates for the degrees of Bachelor of Arts, Master of Arts, and Doctor of Philosophy in Chinese and Japanese, and Bachelor of Arts in East Asian Studies. It also offers undergraduate minors and the Ph.D. minor in Chinese or Japanese language and literature.

For information concerning other opportunities for study about Asian history, societies, and cultures, see the following departments and programs: Anthropology, Art and Art History, Business, Comparative Literature, East Asian Studies, Economics, History, Law, Linguistics, Philosophy, Political Science, Religious Studies, and Sociology.

## UNDERGRADUATE MISSION STATEMENTS FOR EAST ASIAN LANGUAGES AND CULTURES

### CHINESE MAJOR

The mission of the undergraduate program in Chinese is to expose students to a variety of perspectives in Chinese language,

culture, and history by providing them with training in writing and communication, literature, and civilization. Emphasis in courses is on developing powers of critical thinking and expression that serve students well no matter what their ultimate career goals are. The program prepares students for diverse professions and enterprises, including business, government service, and academia.

### LEARNING OUTCOMES

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. effective and nuanced skills interpreting primary and secondary source materials.
2. in their own work a good grasp of the course material and methodologies in the studies of Chinese.
3. analytical writing skills and close reading skills.
4. effective oral communication skills.

### JAPANESE MAJOR

The mission of the undergraduate program in Japanese is to expose students to a variety of perspectives in Japanese language, culture, and history by providing students with training in writing and communication, literature, and civilization. Emphasis in classes is on developing powers of critical thinking and expression that will serve students well no matter what their ultimate career goals are. The program prepares students for diverse professions and enterprises, including business, government service, and academia.

### LEARNING OUTCOMES

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. effective and nuanced skills interpreting primary and secondary source materials.
2. in their own work a good grasp of the course material and methodologies in the studies of Japanese.
3. analytical writing skills and close reading skills.
4. effective oral communication skills.

### EAST ASIAN STUDIES MAJOR

The mission of the program in East Asian Studies is to enable students to obtain a comprehensive understanding of East Asia broadly conceived, which is the area stretching from Japan through Korea and China to the contiguous areas of the Central Asian land mass. Majors are expected to have a good mastery of an East Asian language, and focus on a particular sub-region or a substantive issue involving the region as a whole. Emphasis in classes is on developing powers of critical thinking and expression to serve students well no matter what their ultimate career goals in business, government service, academia, or the professions.

### LEARNING OUTCOMES

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. effective and nuanced skills interpreting primary and secondary source materials.
2. in their own work a good grasp of the course material and methodologies in East Asian studies.
3. analytical writing skills and close reading skills.
4. effective oral communication skills.

## OVERSEAS STUDIES

Courses approved for the East Asian Languages and Cultures majors which are taught overseas can be found in the "Overseas Studies" section of this Bulletin, or in the Overseas Studies office, Sweet Hall. To find course offerings in Explore Courses, click on OSPKYOTO or OSPBEIJ.

## STUDY ABROAD

Students interested in Japanese language, history, culture, and social organization are encouraged to apply to the Kyoto Center for Japanese Studies (KCJS), a two-semester academic program primarily for undergraduates wishing to do advanced work in the Japanese language and in Japanese studies.

In Spring Quarter, the Stanford Center for Technology and Innovation (SCTI), also in Kyoto, focuses on Japanese organizations and the political economy of research, development, and production of high technology and advanced industries, followed by an optional two-to-three month internship in an agency, firm, or laboratory in Japan. For information about either program in Kyoto, students should contact the Bing Overseas Studies Program office in Sweet Hall.

Undergraduates interested in studying Chinese language, history, culture, and society are encouraged to apply to the Stanford Program in Beijing, also offered through the Bing Overseas Studies Program. This program is located at Peking University and is open Autumn and Spring Quarters.

Students should take note of the Inter-University Program for Chinese Language Studies (IUP) at Tsinghua University (<http://ieas.berkeley.edu/iup>; [iub@socrates.berkeley.edu](mailto:iub@socrates.berkeley.edu); 510-642-3873) and the Inter-University Center (IUC) for Japanese Language Studies in Yokohama (<http://stanford.edu/dept/IUC>; [stacey.campbell@stanford.edu](mailto:stacey.campbell@stanford.edu); 650-725-1490). Stanford is a member of these consortia.

Students interested in the graduate exchange program with the Department of Chinese at Peking University in Beijing should consult the chair of the department early in the academic year.

## SUMMER PROGRAM

A nine-week summer program of intensive instruction is offered in both Chinese and Japanese. The intensive courses provide the equivalent in instruction to regular academic-year courses. (See courses CHINLANG 5, 25, 105, and JAPANLNG 10, 20, 130, as described in the "Language Center" section of this bulletin.) For detailed information about these and other aspects of the summer program, inquire at the Language Center.

## GRADUATE PROGRAMS IN EAST ASIAN LANGUAGES AND CULTURES

### ADMISSION

All students contemplating application for admission to graduate study must have a creditable undergraduate record. The applicant need not have majored in Chinese or Japanese as an undergraduate, but must have had the equivalent of at least three years of training in the language in which he or she intends to specialize, and must also demonstrate a command of English adequate for the pursuit of graduate study. Applicants should not wish merely to acquire or improve language skills, but to pursue study in one of the following fields: Chinese history (pre-modern), Chinese linguistics, Chinese literature, Chinese philosophy, Japanese cultural history, Japanese literature, Japanese linguistics, and Japanese visual culture.

## BACHELOR OF ARTS PROGRAMS IN EAST ASIAN LANGUAGES AND CULTURES

### BACHELOR OF ARTS IN CHINESE OR JAPANESE

The B.A. degree is granted both in Chinese and in Japanese. The following courses and their prerequisites must be completed with a grade point average (GPA) of 2.0 or better:

1. Concentration in Chinese:
  - a. CHINGEN 91 and JAPANGEN 92
  - b. Chinese language requirement:
    1. first-year modern Chinese (one of the following series: CHINLANG 1, 2, 3, or CHINLANG 1B, 2B, 3B, or CHINLANG 5)
    1. second-year modern Chinese (one of the following series: CHINLANG 21, 22, 23, or CHINLANG 21B, 22B, 23B, or CHINLANG 25)
    2. third-year modern Chinese (one of the following series: CHINLANG 101, 102, 103 or CHINLANG 101B, 102B, 103B)
    3. beginning classical Chinese (CHINLIT 125)
  - c. three CHINGEN or CHINLIT courses at the 100 level with one in each of the following areas: pre-modern China, modern China, and Chinese linguistics
  - d. four other content courses dealing with China, primarily at the 100 level, as approved by the undergraduate adviser
  - e. CHINGEN 133 is the required Writing in the Major (WIM) course
  - f. CHINGEN 198, Senior Colloquium: completion of a capstone essay of approximately 7,500 words, written either in a directed reading course or for one of the courses above.
2. Concentration in Japanese:
  - a. CHINGEN 91 and JAPANGEN 92
  - b. Japanese language requirement:
    1. first-year modern Japanese (one of the following series: JAPANLNG 1, 2, 3, or JAPANLNG 7, 8, 9, or JAPANLNG 5)
    2. second-year modern Japanese (JAPANLNG 17, 18, 19, or JAPANLNG 20)
    3. third-year modern Japanese (JAPANLNG 117, 118, 119)
  - c. three JAPANGEN or JAPANLIT courses at the 100 level with one in each of the following areas: pre-modern Japan, modern Japan, and Japanese linguistics
  - d. four other content courses dealing with Japan primarily at the 100 level, as approved by the undergraduate adviser
  - e. JAPANGEN 138 is the required Writing in the Major (WIM) course
  - f. JAPANGEN 198, Senior Colloquium: completion of a capstone essay of approximately 7,500 words, written either in a directed reading course or for one of the courses above.
  - g. JAPANGEN 71N can be used to satisfy the Japanese linguistics requirement. JAPANGEN 51/251 is not counted toward the major. Students who complete third-year Japanese at KCJS satisfy the language requirement but are required to take a placement test if they wish to enroll in JAPANLNG 211, 212, 213.

Students who want to concentrate in Chinese or Japanese linguistics can substitute the four other content courses primarily at the 100 level with LINGUIST 1 and three other linguistics courses at the 100 level, as approved by the undergraduate adviser in consultation with the student's academic adviser.

These requirements are in addition to the University's basic requirements for the bachelor's degree. Letter grades are mandatory for required courses.

## HONORS PROGRAM

Majors with an overall grade point average (GPA) of 3.5 may apply for the honors program by submitting a senior thesis proposal to the honors committee during Winter or Spring Quarter of the junior year. The proposal must include a thesis outline, a list of all relevant courses the student has taken or plans to take, a preliminary reading list including a work or works in Chinese or Japanese, and the name of a faculty member who has agreed to act as honors supervisor.

If the proposal is approved, research begins in spring quarter of the junior year, or by autumn quarter of the senior year at the latest, when the student enrolls in CHINLIT 189A or JAPANLIT 189A for 2-5 units of credit for independent study. In winter quarter of the senior year, students enroll for five units in independent study (CHINLIT 199 or JAPANLIT 199) with the thesis supervisor while writing the thesis, and the finished essay (normally about 15,000 words) is submitted to the committee no later than April 15 of the senior year. Students enroll in the Senior Colloquium, CHINGEN 198 or JAPANGEN 198, in the senior year to polish and present their theses (instead of writing a capstone essay). Eight to eleven units of credit are granted for honors course work and the finished thesis.

## BACHELOR OF ARTS IN EAST ASIAN STUDIES

Majors in East Asian Studies begin or continue the mastery of Chinese, Japanese, or Korean. Within the humanities or social sciences, they may focus on a particular sub-region, for example, Japan; South China, Hong Kong, and Taiwan; or western China and Central Asia; or a substantive issue involving the region as a whole, such as environmental protection, public health, rural development, historiography, cultural expression, or religious beliefs. The major seeks to reduce the complexity of a region to intellectually manageable proportions and illuminate the interrelationships among the various facets of a society.

Potential majors must submit a Student Proposal for a Major in East Asian Studies form not later than the end of the first quarter of the junior year. Majors must complete at least 75 units of course work on China, Japan, and/or Korea in addition to a one unit Senior Colloquium. Courses to be credited toward major requirements must be completed with a grade of 'C' or better. Requirements are:

1. *Language*: proficiency in Chinese, Japanese, or Korean language at the second-year level or above, to be met either by course work or examination. Students who meet the requirement through examination are still expected to take an additional 15 units of language at a higher level, or literature courses taught in the language, or the first year in an additional Asian language. No more than 30 units of language courses are counted toward the major.
2. *Area Courses*: a minimum of three area courses, one in each category below (courses listed are examples and by no means exhaustive--if uncertain whether a particular course fits into one of these categories, please contact the department to check).
  - a. Art, Literature and Religion
    - ARTHIST 2. Asian Art and Culture [Same as JAPANGEN 60]
    - ARTHIST 186. Theme and Style in Japanese Art
    - CHINGEN 91. Traditional East Asian Civilization: China
    - JAPANGEN 92. Traditional East Asian Civilization: Japan
    - RELIGST 18. Zen Buddhism
  - b. History
    - HISTORY 93. Late Imperial China
    - HISTORY 94B. Japan in the Age of the Samurai
    - HISTORY 95. Modern Korean History
    - HISTORY 98. The History of Modern China

- HISTORY 98B. The Construction of Modern China in Time and Space
- c. Contemporary Social Sciences
  - POLISCI 140L. China in World Politics
  - POLISCI 148. Chinese Politics: The Transformation and the Era of Reform
  - OSPKYOTO 215X. The Political Economy of Japan
  - SOC 107. China Under Mao
  - SOC 111. State and Society in Korea
  - SOC 167A. Asia-Pacific Transformation
- 3. *Substantive Concentration*: additional courses on East Asia, one of which must be a seminar above the 100 level. Majors are encouraged to distribute their course work among at least three disciplines and two subregions in Asia. The subregions need not be traditionally defined. Examples include China, Japan, or Korea; or, in recognition of the new subregions which are emerging, South China and Taiwan, or Central Asia. At least four courses must have a thematic coherence built around a topic. Examples include:
  - East Asian religions and philosophies
  - Culture and society of modern Japan
  - Ethnic identities in East Asia
  - Arts and literature in late imperial China
  - Foreign policy in East Asia
  - Social transformation of modern Korea
  - China's political economy

These courses are listed at the East Asian Studies website, and under CHINGEN, CHINLIT, JAPANGEN, and JAPANLIT.

4. *Capstone Essay*: completion of a paper of approximately 7,500 words, written either in a directed reading course or for one of the courses in item 3 above, which should be built upon the student's thematic interest. CHINGEN or JAPANGEN 198, Senior Colloquium (1 unit), is required of majors during their senior year to develop and present the capstone essay or honors paper.
5. At least one quarter overseas in the country of focus.
6. An East Asian Studies course that satisfies the University Writing in the Major requirement (WIM) should be completed before beginning the senior essay. This year, CHINGEN 133 and JAPANGEN 138 satisfy the WIM requirement.
7. The courses for the major must add up to at least 76 units, comprised of the one-unit Senior Colloquium and at least 75 additional units, all taken for a letter grade. Courses must be at least three units to be counted towards the degree.

These requirements are in addition to the University's basic requirements for the bachelor's degree. Letter grades are mandatory for required courses.

## HONORS PROGRAM

Majors with an overall grade point average (GPA) of 3.5 may apply for the honors program by submitting a senior thesis proposal to the honors committee during Winter or Spring Quarter of the junior year. The proposal must include a thesis outline, a list of all relevant courses the student has taken or plans to take, a preliminary reading list including a work or works in Chinese or Japanese, and the name of a faculty member who has agreed to act as honors supervisor.

If the proposal is approved, research begins in Spring Quarter of the junior year, or by Autumn Quarter at the latest, when the student enrolls in 2-5 units of credit for independent study. In Winter Quarter, students enroll for five units in independent study with the thesis supervisor while writing the thesis, and the finished essay (normally about 15,000 words) is submitted to the committee no later than April 15 of the senior year. Students enroll in the Senior Colloquium, CHINGEN 198 or JAPANGEN 198, in the senior year to polish and present their theses (instead of writing a capstone essay). Eight to eleven units of credit are granted for honors course work and the finished thesis. One advanced level colloquium or seminar dealing with China, Japan, or Korea is required as well.

## MINORS IN EAST ASIAN LANGUAGES AND CULTURES

### MINOR IN CHINESE OR JAPANESE

The undergraduate minors in Chinese and Japanese have been designed to give students majoring in other departments an opportunity to gain a substantial introduction to Chinese or Japanese language, as well as an introduction to the culture and civilization of East Asia. The minors consist of a minimum of 20 units from the following requirements:

1. Completion of language study through the second-year level (that is, the one year sequence of CHINLANG 21, 22, 23 or 21B, 22B, 23B; or JAPANLNG 17, 18, 19) for students with no previous training in Chinese or Japanese. Students who already have first-year competence in Chinese or Japanese must complete the third-year course (CHINLANG 101, 102, 103 or 101B, 102B, 103B; or JAPANLNG 117, 118, 119). Students who already have a competence at the second-year level may fulfill the language component of the minor by taking three courses in the department using materials in either Chinese or Japanese. These courses may be language courses such as the third-year sequence mentioned above, the fourth-year language sequence, or they may be advanced literature and linguistics courses, depending on the capabilities and interests of the student.
2. The core courses, CHINGEN 91, Traditional East Asian Civilization: China, and JAPANGEN 92, Traditional East Asian Civilization: Japan.
3. Two courses selected from among the department's other offerings in the literature, linguistics, and civilization of a given minor area (CHINGEN, CHINLIT, JAPANGEN, JAPANLIT). All courses for the minor must be taken for a letter grade and completed with a GPA of 2.0 or better.

### MINOR IN EAST ASIAN STUDIES

The goal of the minor in East Asian Studies is to provide the student with a broad background in East Asian culture as a whole, while allowing the student to focus on a geographical or temporal aspect of East Asia. The minor may be designed from the following, for a total of six courses and a minimum of 20 units. All courses should be taken for a letter grade.

1. Three area courses, one in each category (see major for listing of area courses).
2. One undergraduate seminar above the 100 level and two other courses from among those listed as approved for East Asian Studies majors, including literature courses but excluding language courses. These courses are listed under East Asian Studies (EASTASN) in this bulletin, and under CHINGEN, CHINLIT, JAPANGEN, and JAPANLIT.

Applications for the minor should be submitted online through Axess and are due no later than the second quarter of the junior year.

### COTERMINAL B.A. AND M.A. PROGRAMS IN EAST ASIAN LANGUAGES AND CULTURES

With department approval, students may be able to combine programs for the B.A. and M.A. degrees in Chinese or Japanese. Prospective applicants must consult with the graduate adviser. For details, see the "Graduate Degrees" section of this bulletin or <http://registrar.stanford.edu/shared/publications.htm#Coterm>.

For those interested in a coterminal program with an M.A. in East Asian Studies, please contact the Center for East Asian Studies for application procedures and deadlines, or visit the center's web site at <http://ceas.stanford.edu>.

## MASTER OF ARTS PROGRAMS IN EAST ASIAN LANGUAGES AND CULTURES

The M.A. is granted in Chinese and in Japanese. The normal length of study for the degree is two years.

No financial aid is available for those applicants who wish to obtain the M.A. only.

Students who wish to spend the first year of graduate study at the Beijing or Yokohama centers must obtain department approval first.

Candidates for the degree must be in residence at Stanford in California during the final quarter of registration.

A thesis or an annotated translation of a text of suitable literary or historical worth is required for the M.A. degree. Under special circumstances, a paper approved by the graduate adviser may be substituted.

The University's basic requirements for the master's degree, including a 45-unit minimum requirement, are given in the "Graduate Degrees" section of this Bulletin. Department requirements are set forth below.

### REQUIREMENTS FOR THE M.A. IN CHINESE

The M.A. program in Chinese is designed for students with strong academic records and an interest in pursuing postgraduate research in Chinese literature, history (pre-modern), philosophy, or linguistics, but who have not yet acquired the language skills or disciplinary foundation necessary to enter a Ph.D. program. (*Note:* Students who wish to pursue advanced language training in preparation for post-graduate research in other fields of Chinese studies are referred to the interdisciplinary M.A. program in the Center for East Asian Studies.)

The candidate must:

1. Demonstrate proficiency in both modern and classical Chinese through:
  - a. completion with a letter grade of 'B' or higher of third-year Chinese through CHINLANG 103 and
  - b. one of three advanced classical Chinese courses in the series CHINLIT 221-223.

(*Note:* qualified students may, upon consultation with the graduate adviser, be permitted to certify that they have attained the equivalent level of proficiency by passing examinations.)

2. Complete the following for a letter grade of 'B' or higher:
  - a. four courses in Chinese literature or linguistics numbered between CHINLIT 230 and 292
  - b. CHINGEN 201. Proseminar
  - c. two upper-division or graduate-level courses in fields such as Chinese anthropology, art history, history, philosophy, politics, and religion, as approved by the graduate adviser in consultation with the student's individual adviser
  - d. a master's thesis; enroll in CHINLIT 299. Master's Thesis or Translation.

### REQUIREMENTS FOR THE M.A. IN JAPANESE

The M.A. program in Japanese is designed for students with strong academic records and an interest in pursuing postgraduate research in Japanese literature, cultural history, or linguistics, but who have not yet acquired the language skills or disciplinary foundation necessary to enter a Ph.D. program. (*Note:* Students who wish to pursue advanced language training in preparation for postgraduate research in other fields of Japanese studies are referred to the interdisciplinary M.A. program in the Center for East Asian Studies.)

The candidate must:

1. Complete third-year Japanese (JAPANLANG 117, 118, 119) plus one of the following for a letter grade of 'B' or higher:
  - a. fourth-year Japanese through JAPANLANG 213, or
  - b. classical Japanese through JAPANLIT 246 and 247.

(*Note:* qualified students may, upon consultation with the graduate adviser, be permitted to certify that they have attained the equivalent level of proficiency by passing examinations.)

2. Complete the following with a letter grade of 'B' or higher:

- a. four adviser-approved courses in Japanese literature, culture, or linguistics from among the offerings of the Department of East Asian Languages and Cultures, not including courses taken to fulfill the language requirement
- b. JAPANLIT 201. Proseminar: Introduction to Graduate Study in Japanese
- c. two upper-division or graduate-level courses in fields such as Japanese anthropology, art history, history, philosophy, politics, and religion, as approved by the graduate adviser in consultation with the student's individual adviser
- d. a master's thesis; enroll in JAPANLIT 299. Master's Thesis or Translation.

## DOCTOR OF PHILOSOPHY PROGRAMS IN EAST ASIAN LANGUAGES AND CULTURES

The Ph.D. degree is granted in Chinese and Japanese. Candidates for the degree are expected to acquire a thorough familiarity with Chinese or Japanese literature and linguistics, an adequate command of relevant languages, and a comprehensive knowledge of East Asian history, social institutions, and thought. The University's basic requirements for the Ph.D. are given in the "Graduate Degrees" section of this bulletin. Department requirements are set forth below.

### ADMISSION TO CANDIDACY

Students admitted with a B.A. only are evaluated by the graduate faculty during the Autumn Quarter of their second year at Stanford. The evaluation is based on written work and at least a portion of the M.A. thesis or translation. If the faculty have serious doubts about a student's ability to work for the Ph.D., they convey this to the student. During the subsequent Spring Quarter, the faculty formally decide whether a student should be admitted to candidacy for the Ph.D. or be terminated. In the case of a student who already has an M.A. in Chinese or Japanese when admitted to the department, the evaluation takes place in the Spring Quarter of the student's first year. If a student goes to the Inter-University Program for Chinese Language Studies (IUP) at Tsinghua University or the Inter-University Center (IUC) for Japanese Language Studies in Yokohama during the first two years of study, the department may consider an extension for admission to candidacy. The timing of the evaluation of a student admitted with an M.A. in East Asian Studies is decided on an individual basis.

Admission to candidacy does not mean that the student has fulfilled all requirements for the degree except the dissertation, but that the department faculty consider the student qualified to pursue a program of study leading to the Ph.D. and that, subject to continued satisfactory progress, the student's status in this department is secure.

### REQUIREMENTS FOR DOCTOR OF PHILOSOPHY IN CHINESE

The Ph.D. program in Chinese is designed to prepare students for a doctoral degree in Chinese literature, history (pre-modern), philosophy, or linguistics. Applicants must have a minimum of three years of Chinese language study at Stanford or the equivalent to be considered for admission. Students on the Ph.D. track will complete the M.A. as described above on the way to advancing to Ph.D. candidacy (see department guidelines for admission to candidacy above). The majority of required course work for Ph.D. students demands the ability to read primary and secondary materials in Chinese. Advanced standing may be considered for students entering the Ph.D. program who have already completed an M.A. in Chinese literature or linguistics elsewhere only in cases when the level of prior course work and research is deemed equivalent to departmental requirements for the Ph.D. track. All courses must be taken for a letter grade.

A candidate must fulfill the following requirements:

1. Complete advanced classical Chinese through CHINLIT 223 and the department's requirements for the M.A. in Chinese.
2. Demonstrate proficiency in at least one supporting language, to be chosen in consultation with the primary adviser according to the candidate's specific research goals. Reading proficiency must be certified through a written examination or an appropriate amount of course work, to be determined on a case-by-case basis. When deemed necessary by the student's adviser(s), working knowledge of a third language may also be required.
3. Complete CHINLIT 201 or CHINGEN 201.
4. Complete two relevant seminars at the 300 level. These seminars must be in different subjects.
5. Pass a set of three comprehensive written examinations, one of which tests the candidate's methodological competence in the relevant discipline. The remaining two fields are chosen, with the approval of the graduate adviser in consultation with the student's individual adviser, from the following: archaeology, anthropology, art, Chinese literature, history, Japanese literature, linguistics, philosophy, and religion. With the adviser's approval, a Ph.D. minor in a supporting field may be deemed equivalent to the completion of one of these three examinations.
6. Demonstrate pedagogical proficiency by serving as a teaching assistant for a minimum of one quarter, and taking DLCL 201, The Learning and Teaching of Second Languages.
7. Pass the University Oral Examination—General regulations governing the oral examination are found in the "Graduate Degrees" section of this Bulletin. The candidate is examined on questions related to the dissertation after acceptable parts of it have been completed in draft form.
8. Submit a dissertation demonstrating ability to undertake original research based on primary and secondary materials in Chinese.

### REQUIREMENTS FOR DOCTOR OF PHILOSOPHY IN JAPANESE

The Ph.D. program in Japanese is designed to prepare students for a doctoral degree in Japanese literature, cultural history, or linguistics. Applicants must have a minimum of three years of Japanese language study at Stanford or the equivalent to be considered for admission. Students on the Ph.D. track will complete an M.A. thesis on the way to advancing to Ph.D. candidacy (see department guidelines for admission to candidacy above). The majority of required course work for Ph.D. students demands the ability to read primary and secondary materials in Japanese. Advanced standing may be considered for students entering the Ph.D. program who have already completed an M.A. in Japanese literature or linguistics elsewhere only in cases when the level of prior course work and research is deemed equivalent to departmental requirements for the Ph.D. track. All courses must be taken for a letter grade.

A candidate must fulfill the following requirements:

1. Demonstrate proficiency in both modern and classical Japanese language by completing the following courses, or by demonstrating an equivalent level of linguistic attainment by passing the appropriate certifying examinations.
  - a. fourth-year Japanese through JAPANLANG 213
  - b. classical Japanese through JAPANLIT 246 and 247.
2. Demonstrate proficiency in at least one supporting language, to be chosen in consultation with the primary adviser according to the candidate's specific research goals. Reading proficiency must be certified through a written examination or an appropriate amount of course work, to be determined on a case-by-case basis. When deemed necessary by the student's adviser(s), working knowledge of a third language may also be required. Students concentrating in classical Japanese literature are normally expected to fulfill this requirement by completing
  - a. *kanbun* (JAPANLIT 248 and/or 249), and

- b. first-year classical Chinese (CHINLIT 205, 206, 207).
3. Complete eight adviser-approved courses numbered above 200 from among the offerings of the Department of East Asian Languages and Cultures. At least four of these eight courses must be advanced seminars numbered above 300. At least one of these eight courses must deal with Japanese linguistics. For students focusing on modern literature, at least two of these eight courses must deal with premodern material, and for students focusing on premodern literature, at least two of the eight courses must deal with modern material.
4. Complete two upper-division or graduate-level courses in two supporting fields, for a total of four courses outside of Japanese literature or linguistics. Supporting fields, to be determined in consultation with the student's primary adviser, may include Japanese anthropology, art, history, philosophy, politics, and religion, Chinese literature, comparative literature, etc.
5. Complete JAPANLIT 201, Introduction to Graduate Study in Japanese.
6. Pass a comprehensive qualifying examination that tests the candidate's breadth and depth in the primary field of research and methodological competence in the relevant discipline.
7. Demonstrate pedagogical proficiency by serving as a teaching assistant for a minimum of one quarter and taking DLCL 201, The Learning and Teaching of Second Languages.
8. Pass the University Oral Examination. General regulations governing the oral examination are found in the "Graduate Degrees" section of this Bulletin. The candidate is examined on questions related to the dissertation after acceptable parts of it have been completed in draft form.
9. Submit a dissertation demonstrating ability to undertake original research based on primary and secondary materials in Japanese.

### JAPANESE LINGUISTICS SPECIALIZATION

A candidate specializing in Japanese linguistics must fulfill the following requirements.

1. Demonstrate proficiency in both modern and classical Japanese language by completing the following courses, or by demonstrating an equivalent level of linguistic attainment by passing the appropriate certifying examinations.
  - a. fourth-year Japanese through JAPANLANG 213
  - b. classical Japanese through JAPANLIT 246 and 247
2. Demonstrate proficiency in at least one supporting language, to be chosen in consultation with the primary adviser according to the candidate's specific research goals. Reading proficiency must be certified through a written examination or an appropriate amount of course work, to be determined on a case-by-case basis. When deemed necessary by the student's adviser(s), working knowledge of a third language may also be required.
3. Complete six adviser-approved courses numbered above 200 from among the offerings of the Department of East Asian Languages and Cultures. At least one of these six courses must be advanced seminars numbered above 300. At least one of these six courses must deal with Japanese literature.
4. Complete five upper-division or graduate-level courses in linguistics and other supporting fields. Supporting fields, to be determined in consultation with the student's primary adviser, may include applied linguistics, Chinese linguistics, psychology, education, anthropology, sociology, etc.
5. Complete JAPANLIT 279, Research in Japanese Linguistics.
6. Submit two qualifying papers presenting substantial research in two different subfields of Japanese linguistics to be approved by a committee of the specific qualifying paper.
7. Submit an annotated bibliography pertaining to the topic of dissertation to the primary adviser.
8. Demonstrate pedagogical proficiency by serving as a teaching assistant for a minimum of one quarter and taking DLCL 201, The Learning and Teaching of Second Languages.

9. Pass the University Oral Examination. General regulations governing the oral examination are found in the "Graduate Degrees" section of this Bulletin. The candidate is examined on questions related to the dissertation after acceptable parts of it have been completed in draft form.
10. Submit a dissertation demonstrating ability to undertake original research based on primary and secondary materials in Japanese.

### PH.D. MINOR IN EAST ASIAN LANGUAGES AND CULTURES

A student taking a Ph.D. minor in Chinese or Japanese must complete at least 30 units of work within the department at the 200 and 300 level, chosen in consultation with a department adviser. The student must take either CHINGEN 201 or JAPANLIT 201 unless the department is satisfied that work done elsewhere has provided similar training. The student must also pass a written examination in the Chinese or Japanese language.

### OVERSEAS STUDIES IN EAST ASIAN LANGUAGES AND CULTURES

For course descriptions and additional offerings, see the listings in the *Stanford Bulletin's* ExploreCourses web site (<http://explorecourses.stanford.edu>) or the Bing Overseas Studies web site (<http://bossp.stanford.edu>). Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

### AUTUMN QUARTER

#### BEIJING

- OSPBEIJ 28. Chinese Language, Culture, and Society. 4 units, Sun, GER:DB:SocSci, EC:GlobCom
- OSPBEIJ 42. Chinese Media Studies. 4 units, Li, GER:DB:SocSci, EC:GlobCom
- OSPBEIJ 66. Essentials of China's Criminal Justice System. 5 units, Wang, GER:DB:SocSci, EC:GlobCom
- OSPBEIJ 67. China-Africa and Middle East Relations. 4 units, Li, Wang, GER:DB:SocSci, EC:GlobCom

### SPRING QUARTER

#### BEIJING

- OSPBEIJ 30. History of U.S.-China Relations. 5 units, Chang, GER:DB:Hum
- OSPBEIJ 32. Site, Memory, History: Beijing as Place. 5 units, Chang, GER:DB:Hum
- OSPBEIJ 41. Chinese Society and Business Culture. 4 units, Li, GER:DB:SocSci, EC:GlobCom
- OSPBEIJ 48. Chinese Literature: Tradition in Transformation. 4 units, Zhang, GER:DB:Hum
- OSPBER 14. Clausewitz and Sunzi. 3-5 units, Lewis
- OSPBER 50. Female Divinities in Europe and China. 3-5 units, Lewis

#### KYOTO

- OSPKYOTO 10. Gamelan to Kabuki: Musical Traditions of Far East Asia. 4 units, Kapuscinski, GER:DB:Hum, EC:GlobCom
- OSPKYOTO 17R. Religion and Japanese Culture. 4-5 units, Ludvik. GER:DB:Hum, EC:GlobCom
- OSPKYOTO 62. Japan and America: A Historical Survey, 5 units, Duus
- OSPKYOTO 215X. Political Economy of Japan. 4-5 units, Hayashi, GER:DB:SocSci

# EAST ASIAN STUDIES

*Director:* Gordon Chang

*Affiliated Faculty and Staff:*

*Anthropology:* Harumi Befu (emeritus), Lisa M. Curran, Miyako Inoue (on leave 2011-12), Matthew Kohrman (on leave Spring 2011-12), Sylvia Yanagisako

*Art and Art History:* Jean Ma, Melinda Takeuchi, Richard Vinograd, Xiaoze Xie

*Biology:* Marcus W. Feldman

*Business:* Hau Lee, Bruce R. McKern, William F. Miller (emeritus), John Roberts, Kenneth Singleton

*Center for International Security and Cooperation:* Undraa Agvaanluvsan, Chaim Braun

*Civil and Environmental Engineering:* David Freyberg, Renate Fruchter, Leonard Ortolano

*Communications:* James Fishkin

*Comparative Literature:* David Palumbo-Liu

*Earth Sciences:* Stephan Graham, Rosamond L. Naylor

*East Asian Languages and Cultures:* Thomas Bartlett, Steven Carter, Richard Dasher, Albert E. Dien (emeritus), Haiyan Lee, Indra Levy, Mark E. Lewis (on leave Spring 2011-12), Li Liu, Yoshiko Matsumoto (on leave Autumn 2011-12), James Reichert, Chao Fen Sun (on leave 2011-12), Melinda Takeuchi, Ban Wang (on leave Autumn 2011-12), John C. Y. Wang (emeritus), Yiqun Zhou (on leave 2011-12)

*East Asian Studies:* Karen Eggleston, Scott Rozelle (on leave), David Cheng Chang (postdoctoral fellow)

*Economics:* Ronald McKinnon (emeritus)

*Education:* Jennifer Adams, Anthony L. Antonio, Martin Carnoy, Francisco Ramirez, Christine M. Wotipka

*Electrical Engineering:* Richard Dasher

*Freeman Spogli Institute for International Studies:* Thomasingar  
*History:* Gordon Chang (on leave Spring 2011-12), Mark E. Lewis (on leave Spring 2011-12), Mark Mancall, Yumi Moon (on leave 2011-12), Thomas Mullaney, Matthew Sommer, Jun Uchida (on leave 2011-12), Lyman P. Van Slyke (emeritus), Kären Wigen

*Ho Center for Buddhist Studies:* Tenzin Tethong

*Hoover Institution:* Richard Allen, Larry Diamond, Thomas Henriksen, Alex Inkeles, Tai-Chun Kuo, Hsiao-ting Lin, Alice L. Miller, Robert Myers, Toshio Nishi, Mark Peattie, William Perry, Alvin Rabushka, William Ratliff, Henry Rowen, Charles Wolf Jr.

*Human Biology:* Arthur P. Wolf

*Law:* Eric Feldman, Thomas Heller, Erik Jenson

*Linguistics:* Dan Jurafsky

*Management Science and Engineering:* Siegfried S. Hecker, Edison Tse, Yinyu Ye

*Materials Science and Engineering:* Pamela Hinds, Robert Sinclair  
*Medicine:* Scott W. Atlas, Joseph Helms, David Katzenstein, Samuel LeBaron

*Music:* Jingdong Cai, Jaroslaw Kapuscinski, Stephen Sano, Linda Uyechi, Daisy You

*Political Science:* Masahiko Aoki (emeritus), Phillip Lipsky, Jean C. Oi

*Religious Studies:* Carl Bielefeldt, Megan Bryson, Robert Gimello, Paul Harrison, Irene Lin, Christian Luczanits

*Shorenstein APARC:* Michael Armacost, Rafiq Dossani, Karen N. Eggleston, Donald K. Emmerson, Scott Rozelle (on leave)

*Sociology:* Gi-Wook Shin, Andrew Walder, Xueguang Zhou

*Stanford Language Center:* Kazuko M. Busbin, Yin Chuang, Marina Chung, Robert Clark, Sik Lee Dennig, Michelle DiBello, Hee-sun Kim, Nina Lin, Hisayo O. Lipton, Momoyo Kubo Lowdermilk, Emiko Yasumoto Magnani, Kiyomi Nakamura, Hua Qian, Yu-hwa Liao Rozelle, Yoshiko Tomiyama, Huazhi Wang, Hong Zeng, Youping Zhang, Qi Zhu

*Center Offices:* 615 Crothers Way, 100 Encina Commons

*Mail Code:* 6023

*Phone:* (650) 736-1759, 723-3362; *fax:* (650) 725-3350

*Web Site:* <http://ceas.stanford.edu>

The Center for East Asian Studies (CEAS) coordinates University instructional, research, and special activities related to China, Japan, and Korea. Faculty and students who share a common interest in the study of East Asia are brought together by the center from a broad range of academic concerns covering nearly every discipline and historical period. CEAS is part of the Division of International Comparative and Area Studies in the School of Humanities and Sciences.

Courses offered by the Center for East Asian Studies are listed under the subject code EASTASN on the *Stanford Bulletin's* ExploreCourses web site.

The EASTASN courses listed on ExploreCourses deal primarily with China, Japan, and/or Korea. Literature courses are listed with the subject codes of CHINGEN, CHINLIT, JAPANGEN, and JAPANLIT on ExploreCourses. Many other theoretical and methodological courses within departments at Stanford are taught by faculty who are East Asian specialists; these courses often have a substantial East Asian component and a list of current applicable courses from outside departments may be found in the "Master of Arts in East Asian Studies" section of this bulletin. For courses in Chinese, Japanese, and Korean language instruction use the subject codes CHINLANG, JAPANLNG, and KORLANG. For courses in Classical Chinese, search under the subject code CHINLIT.

## UNDERGRADUATE PROGRAMS IN EAST ASIAN STUDIES

Undergraduates interested in East Asia can become involved by attending CEAS events, taking courses in the subject codes listed above, or earning a Minor or Bachelor of Arts degree in East Asian Studies. These undergraduate degrees in East Asian Studies are now administered by the Department of East Asian Languages and Cultures. The Bing Overseas Study Program also offers study abroad opportunities and internships in East Asia.

For language study, CEAS provides undergraduate fellowships for language study in China, Japan, or Korea; students must simultaneously apply to a pre-approved language program abroad. Applications are due in February each year. Deadlines and application information can be found on the CEAS web site. In addition, undergraduates can obtain a coterminal M.A. degree in East Asian Studies while concurrently working on their undergraduate major by applying during the regular admissions cycle no later than their senior year.

## GRADUATE PROGRAMS IN EAST ASIAN STUDIES

### MASTER'S PROGRAMS

The M.A. program in East Asian Studies is designed both for students who plan to complete a Ph.D. but who have not yet decided on the particular discipline in which they prefer to work, and for students who wish to gain a background in East Asian Studies in connection with a career in nonacademic fields such as business, law, education, journalism, or government service. Students interested in pursuing professional careers are encouraged to plan for additional training through internships or graduate professional programs, in conjunction with obtaining an M.A. in East Asian Studies.

### DOCTORAL PROGRAMS

Stanford does not offer a Ph.D. in East Asian Studies. However, there are more than 100 doctoral students with a specialization on China, Korea, or Japan within various departments and schools of the University. The departments that offer an East Asian concentration are Anthropology, Art and Art History, Comparative Literature, Earth Sciences, East Asian



Languages and Cultures, Economics, Education, History, Human Biology, Linguistics, Music, Political Science, Religious Studies, and Sociology. It is also possible to specialize in East Asia within some of the doctoral programs of the professional schools of Business, Education, and Law. Inquiries should be directed to the individual department or school concerned.

## POSTDOCTORAL PROGRAMS

The Center for East Asian Studies offers postdoctoral fellowships in Chinese Studies each year. Postdoctoral fellowships in other areas are also available from the Freeman-Spogli Institute of International Studies and the Walter H. Shorenstein Asia-Pacific Research Center.

## FINANCIAL AID

Students in graduate programs who plan to do work in Chinese, Japanese, or Korean language and area studies courses, may be eligible for Foreign Language and Area Studies (FLAS) fellowships and are encouraged to apply for them at the time of application to Stanford. Recipients of FLAS fellowships must be American citizens or permanent residents. For further information, see <http://ceas.stanford.edu/students/fellowships.php>.

## COTERMINAL BACHELOR'S AND MASTER'S PROGRAM IN EAST ASIAN STUDIES

The center admits a limited number of Stanford undergraduates to work for a coterminal M.A. degree in East Asian Studies. Applications are accepted once a year during the regular CEAS M.A. application cycle. The deadline for the 2012-13 academic year is January 10, 2012. Students may apply after completing 120 units, but no later than the quarter prior to the expected completion of the undergraduate degree. Applicants are expected to meet the same standards as those seeking admission to the M.A. program, and they must submit the following directly to the Center's office in 100 Encina Commons:

- a written statement of purpose
- an unofficial Stanford transcript
- three letters of recommendation, at least two of which should be from members of the department of concentration
- first 15 pages of a representative writing sample (seminar paper, term paper, honors thesis, journal article, etc.). Do not submit more than 15 pages.
- copy of scores from the General Test of the Graduate Record Exam (official score should be sent to Stanford's school code 4704)
- a list of courses the applicant intends to take to fulfill degree requirements.

Coterm applications are reviewed along with peer applications by the M.A. Admissions Committee of the Center for East Asian Studies (CEAS). See also <http://ceas.stanford.edu/admissions/apply.php>.

Students must meet all requirements for both B.A. and M.A. degrees. They must complete a total of 15 full-time quarters or the equivalent, or three full quarters after completing 180 units for a total of 225 units. Coterminals are not eligible for University financial aid, but are eligible to apply for Foreign Language and Area Studies (FLAS) Fellowships administered by CEAS.

University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees" section of this bulletin. For University coterminal degree program rules and University application forms, see <http://studentaffairs.stanford.edu/registrar/publications#Coterm>.

## MASTER OF ARTS IN EAST ASIAN STUDIES

University requirements for the master's degree are described in the "Graduate Degrees" section of this bulletin.

The master's degree program allows a great deal of flexibility in combining language training, interdisciplinary area studies, and a disciplinary concentration. The director of the center assigns preliminary faculty advisers to all students. Members of the staff and faculty are available for academic and career planning. The M.A. program is normally completed in two academic years, but students can shorten this time by receiving credit for prior language work or by attending summer sessions. Students are urged to complete the degree requirements within one year if their background makes it possible.

Applicants must submit scores for the General Test of the Graduate Record Examination. Foreign applicants are also required to take the Test of English as a Foreign Language (TOEFL). Applications for admission and financial aid should be made online; see <http://gradadmissions.stanford.edu>. The deadline for submitting applications for the 2012-2013 academic year is January 10, 2012.

The requirements for the M.A. in East Asian Studies are as follows:

*Language Requirement*—Students must complete the equivalent of Stanford's first three years of language training in Chinese, Japanese, or Korean. Students entering the program without any language preparation should complete first- and second-year Chinese, Japanese, or Korean within the first year of residence at Stanford. This necessitates completing a summer language program. Language courses taken at Stanford must be for letter grades.

The language requirement may be satisfied in part or in full by placing into an appropriate Stanford language class through the language proficiency exam given by the Language Center. Students who fulfill this minimum three-year language requirement before completing other requirements are encouraged to continue language study, or take courses in which Chinese, Japanese, or Korean are used, for as long as they are in the program. Language courses above the third-year level may be applied to the Area Studies requirement discussed below. Please note that the language used to meet the three year language proficiency requirement should match the student's country of focus. Students in the M.A. program are also eligible to apply for the Inter-University language programs in Beijing and Yokohama. Work completed in one of these programs may be counted toward the M.A. degree's language requirement. Language courses are listed in the bulletin under the following subject codes on the *Stanford Bulletin's* ExploreCourses web site: CHINLANG, JAPANLNG, and KORLANG.

*Area Studies Requirement*—Students must complete the 1-unit core course, EASTASN 330, and at least nine additional courses related to East Asia numbered 100 or above for a minimum total of 46 units (including the 1-unit core course). These nine courses must be 3 or more units each, and taken for a letter grade. At least 23 units must be designated primarily for graduate students, typically at the 200-300 levels. As training in research methodologies and demonstrated research ability in a specific discipline are integral parts of the program, students are required to build a concentration by either taking three of the nine courses within a single department, or taking three of the courses built around a specific theme across several departments. Some examples of courses built around a theme are as follows:

### Sample Theme 1

- ANTHRO 253A. Japan's Postwar Cultural History
- HISTORY 392D. Japan in Asia, Asia in Japan
- HISTORY 396D. Modern Japan

### Sample Theme 2

- EASTASN 289K. Topics in Korean Relations
- HISTORY 392. The Two Koreas
- SOC 211. State and Society in Korea

### Sample Theme 3

- IPS 246. China on the World Stage

- POLISCI 340L. China in World Politics
- POLISCI 443T. Approaches to Chinese Politics

At least one of the three concentration courses must be a graduate-level seminar, colloquium, or advanced course which requires a research paper on East Asia. The six additional area studies courses may be taken in departments of the student's choosing so long as the courses are focused on East Asia. Some theory-oriented or methodological courses may be used to meet part of these requirements provided they are demonstrably useful for understanding East Asian problems. Language courses numbered 100-199 do not count toward the nine courses required for the degree. Credit toward the area studies requirement is not given for courses taken before entering the M.A. program, however students may take courses for exchange credit at the University of California, Berkeley, with the approval of their adviser and the Office of the University Registrar.

*M.A. Thesis Requirement*—A master's thesis, representing a substantial piece of original research, should be filed with the center's program office as part of the graduation requirements. With the adviser's approval, the master's thesis requirement may be satisfied by expanding a research paper written for an advanced course.

Because East Asian Studies is an interdisciplinary major, the majority of the courses that apply towards the degree are listed under other departments. In addition to courses listed under the EASTASN subject code, students should check the list below, as well as on the *Stanford Bulletin's* ExploreCourses site for courses in other departments that will meet the degree requirements for East Asian Studies; such departments include Anthropology, East Asian Languages and Cultures, History, Political Science, Religious Studies, and Sociology.

To meet requirements for the master's degree, students must take courses at the 100 level or above, and at least 23 units at the 200 level or above. In general, M.A. students should register for classes with the higher course number (for example, graduate students should register for ANTHRO 282 and undergraduates should register for ANTHRO 82 if the class is open to both graduate students and undergraduates). Please note that some of the courses listed are intended for undergraduates only (courses below 100, and courses with "OSP" catalog numbers) and are meant to be applied to the East Asian Studies minor or B.A. degrees, not the East Asian Studies M.A. degree. Not all courses offered by other departments that have East Asia content may be listed below or on the CEAS web site. If there is a course not listed here that has East Asia content, check with the Center for East Asian Studies to verify whether or not it can be used to fulfill the degree requirements.

The following course list represents courses that may, with the adviser's approval be used to fulfill degree requirements (please see the Law School or GSB web sites for instructions on how to enroll in their courses):

- ANTHRO 147A. Folklore, Mythology, and Islam in Central Asia (Same as REES 247A)
- ANTHRO 248. Health, Politics, and Culture of Modern China
- ANTHRO 248A. Nomads of Eurasia: Culture in Transition
- ARCHLGY 111. Emergence of Chinese Civilization from Caves to Palaces (Same as CHINGEN 141, CHINGEN 241)
- ARTHIST 287A. The Japanese Tea Ceremony: The History, Aesthetics, and Politics Behind a National Pastime (Same as JAPANGEN 287A)
- ARTHIST 386. Theme and Style in Japanese Art (Same as JAPANGEN 286)
- ARTHIST 480. Cultures & Politics of Collecting in Late Ming Dynasty China
- ARTHIST 487. Chinese and Japanese Painting Discourse (Same as JAPANGEN 487)
- CHINGEN 217. Worship of Buddhist Images in Medieval China
- CHINGEN 218. Constructing National History in East Asian Archaeology
- CHINGEN 233. Literature in 20th-Century China
- CHINGEN 237. Tiananmen Square: History, Literature, Iconography
- CHINGEN 241. Emergence of Chinese Civilization from Caves to Palaces (Same as ARCHLGY 111)
- CHINGEN 250. Sex, Gender, and Power in Modern China
- CHINLIT 205. Beginning Classical Chinese, First Quarter
- CHINLIT 206. Beginning Classical Chinese, Second Quarter
- CHINLIT 207. Beginning Classical Chinese, Third Quarter
- CHINLIT 221. Advanced Classical Chinese: Philosophical Texts
- CHINLIT 222. Advanced Classical Chinese: Historical Narration
- CHINLIT 271. Traditional Chinese Fiction: Short Stories
- COMM 277Y: Specialized Writing and Reporting: Foreign Correspondence in the Middle East and Asia
- COMPLIT 110N. Du Fu: The Case for Chinese Poetry
- COMPLIT 123. Novels about China: Tradition and Modernity
- EASTASN 217. Health and Healthcare Systems in East Asia
- EASTASN 289K. Korea's Relations with Major Neighboring Countries and Its Growing Role on a Global Stage
- EASTASN 300. Graduate Directed Reading
- EASTASN 330. Core Seminar: Issues and Approaches in East Asian Studies
- ECON 268. International Finance and Exchange Rates
- EDUC 202. Introduction to Comparative and International Education
- EDUC 292A. Acquisition of Japanese as a Second Language (Same as JAPANLIT 292)
- EDUC 306B. Politics, Policy Making, and Schooling Around the World
- FILMSTUD. 336. Gender and Sexuality in Chinese Cinema
- GSBGEN 336: Business Models for Sustainable Energy
- HISTORY 106A. Global Human Geography: Asia and Africa
- HISTORY 195C. Modern Japanese History
- HISTORY 198B. The Construction of Modern China through Space and Time
- HISTORY 198G. Beijing, Shanghai, and the Structure of China
- HISTORY 302G. Peoples, Armies, and Governments of the Second World War
- HISTORY 390G. Dilemmas of Modernity in Twentieth Century Japan
- HISTORY 393. Frontier Expansion and Ethnic Statecraft in the Qing Empire
- HISTORY 393C. Late Imperial China
- HISTORY 395B. Early Modern Japan: Revisiting the Cultural Turn
- HISTORY 395F. Race and Ethnicity in East Asia
- HISTORY 398. History of Modern China
- HISTORY 398E. China-Taiwan-U.S. Triangular Relations from WW II though the Cold War
- HUMBIO 148. Kinship and Marriage
- IPS 244. U.S. Policy toward Northeast Asia
- IPS 246. China on the World Stage
- JAPANGEN 124. Manga as Literature
- JAPANGEN 221. Translating Japan, Translating the West
- JAPANGEN 238. Survey of Modern Japanese Literature in Translation
- JAPANGEN 241. Japanese Performance Traditions
- JAPANGEN 251. Japanese Business Culture
- JAPANGEN 286. Theme and Style in Japanese Art (Same as ARTHIST 386)

- JAPANGEN 287. Romance, Desire, and Sexuality in Modern Japanese Literature
- JAPANGEN 287A. The Japanese Tea Ceremony: The History Aesthetics, and Politics Behind a National Pastime (Same as ARTHIST 287A)
- JAPANGEN 487. Chinese and Japanese Painting Discourse (Same as ARTHIST 487)
- JAPANLIT 201. Proseminar: Introduction to Graduate Study in Japanese
- JAPANLIT 236. Academic Readings in Japanese II
- JAPANLIT 247. Readings in Premodern Japanese
- JAPANLIT 260. Japanese Poetry and Poetics
- JAPANLIT 266. Introduction to Sino-Japanese
- JAPANLIT 279. Research in Japanese Linguistics
- JAPANLIT 281. Japanese Pragmatics
- JAPANLIT 292. Acquisition of Japanese as a Second Language (Same as EDUC 22A)
- JAPANLIT 396. Love and Revolution in a Translated Modernity
- JAPANLIT 396. Modern Japanese Literature
- LAW 245. Chinese Law and Business
- LAW 433. Law and Society in International Perspective
- LAW 446. Dispute Resolution in China
- LAW 448. China and the New World Order
- LAW 466. Trade and Investment in China
- MS&E 249. Economic Growth and Development
- POLISCI 340L. China in World Politics
- POLISCI 348. Chinese Politics: The Transformation and the Era of Reform
- POLISCI 443S. Political Economy of Reform in China
- RELIGST 202A. Monsters, Ghosts, and Other Fantastic Beings: The Supernatural and the Mysterious in Japanese Culture
- RELIGST 248B. Buddhist Narratives and the Shaping of Medieval Chinese Religiosity
- RELIGST 248C. Buddhist Commentary Tradition in 4th Century China
- RELIGST 347. Chinese Buddhist Texts
- RELIGST 358. Japanese Buddhist Texts
- SOC 207. China After Mao
- SOC 211. State and Society in Korea
- SOC 214. Economic Sociology
- SOC 315. Topics in Economic Sociology
- SOC 217A. China Under Mao

## JOINT AND DUAL DEGREE PROGRAMS IN EAST ASIAN STUDIES

### EAST ASIAN STUDIES AND LAW

This joint degree program grants an M.A. degree in East Asian Studies and a Doctor of Jurisprudence (J.D.) degree. It is designed to train students interested in a career in teaching, research, or the practice of law related to East Asian legal affairs. Students must apply separately to the East Asian Studies M.A. program and to the Stanford School of Law and be accepted by both. Completing this combined course of study requires approximately four academic years, depending on the student's background and level of training in Chinese, Japanese, or Korean. Up to 45 units of approved courses may be counted towards both degrees. For more information, see the "Joint Degree Programs" section of this bulletin. Students who have been accepted by both programs should consult with the departments to determine which courses can be double-counted.

### EAST ASIAN STUDIES AND EDUCATION

This dual degree program grants an M.A. degree in East Asian Studies and a secondary school teaching credential in social studies. To be eligible for this program, students should apply to

the M.A. program in East Asian Studies and then apply to the Stanford Teacher Education Program during the first year at Stanford. Completing the dual program requires at least two years, including one summer session when beginning the education component of the program.

### EAST ASIAN STUDIES AND BUSINESS

This dual degree program grants an M.A. degree in East Asian Studies and a Master of Business Administration degree. Students must apply separately to the East Asian Studies M.A. program and the Graduate School of Business and be accepted by both. Completing this combined course of study requires approximately three academic years (perhaps including summer sessions), depending on the student's background and level of training in Chinese, Japanese, or Korean language.

## ECONOMICS

*Emeriti: (Professors)* Takeshi Amemiya, Theodore Anderson, Masahiko Aoki, Kenneth J. Arrow, Paul A. David, Victor R. Fuchs, John G. Gurley, Peter J. Hammond, Donald Harris, Bert G. Hickman, Mordecai Kurz, Lawrence J. Lau, Ronald I. McKinnon, Roger G. Noll, Nathan Rosenberg, Thomas Sargent, David A. Starrett, Joseph E. Stiglitz

*Honorary Emerita: (Professor)* Anne O. Krueger

*Chair:* Jonathan Levin

*Professors:* Kyle Bagwell, B. Douglas Bernheim, Michael J. Boskin, Timothy F. Bresnahan, Lawrence Goulder, Avner Greif, Robert E. Hall, Han Hong, Caroline Hoxby, Matthew O. Jackson, Peter Klenow, Jonathan Levin, Thomas E. MaCurdy, Paul R. Milgrom, John H. Pencavel, Luigi Pistaferri, Monika Piazzesi, Joseph Romano, K. Martin Schneider, Ilya Segal, John B. Shoven, John B. Taylor, Frank Wolak, Gavin Wright

*Associate Professors:* Nicholas A. Bloom, Liran Einav, Muriel Niederle

*Assistant Professors:* Ran Abramitzky, Manuel Amador, Giacomo DeGiorgi, Pascaline Dupas, Doireann Fitzgerald, Kyna Fong, Peter R. Hansen, Matthew Harding, Jakub Kastl, Fuhito Kojima, Pablo Kurlat, Aprajit Mahajan, Kalina Manova, Petra Moser, Florian Scheuer, Charles Sprenger

*Senior Lecturer:* Geoffrey Rothwell

*Lecturers:* Moussa Blimpo, Marcelo Clerici-Arias, Jeffrey Clemens, Gopi Shah Goda, Alexander Gould, Marc Hafstead, Kyle Handley, Hamilton Helmer, Koichiro Ito, Camille Landais, Scott M. McKeon, Nicholas Sanders, F. Victor Stanton, Faye Steiner, Mark Tendall

*Courtesy Professors:* Anat Admati, Lawrence Baker, David Baron, Jay Bhattacharya, Jeremy Bulow, Walter Falcon, John Ferejohn, Judith Goldstein, Ilan Guttman, Stephen Haber, Peter Blair Henry, Saumitra Jha, David Kreps, N. Grant Miller, Rosamond Naylor, Maria Ogneva, Bruce Owen, A. Mitchell Polinsky, Peter C. Reiss, D. John Roberts, Thomas Shanahan, James Strnad, Alan Sykes, Barry Weingast, Robert Wilson

*Visiting Assistant Professor:* Michael McMahon

*Mail Code:* 94305-6072

*Phone:* (650) 725-3266

*Web Site:* <http://economics.stanford.edu>

Courses offered by the Department of Economics are listed under the subject code ECON on the *Stanford Bulletin's* ExploreCourses web site.

The department's purpose is to acquaint students with the economic aspects of modern society, to familiarize them with techniques for the analysis of contemporary economic problems, and to develop in them an ability to exercise judgment in evaluating public policy. There is training for the general student as well as for those who plan careers as economists in civil service, private enterprise, teaching, or research.

The department's curriculum is an integral part of Stanford's programs in International Relations, Public Policy, and Urban Studies.

The faculty interests and research cover a wide spectrum of topics in most fields of economics, including behavioral economics, comparative institutional analysis, econometrics, economic development, economic history, experimental economics, industrial organization, international trade, labor, macro- and microeconomic theory, mathematical economics, environmental economics, and public finance.

## MISSION OF THE UNDERGRADUATE PROGRAM IN ECONOMICS

The mission of the undergraduate program in Economics is to acquaint students with the economic aspects of modern society, to familiarize them with techniques for the analysis of contemporary economic problems, and to develop in them an ability to exercise judgment in evaluating public policy. The program introduces students to macro- and microeconomic theory, teaches them to think and write clearly about economic problems and policy issues and to apply the basic tools of economic analysis. The undergraduate major provides an excellent background for those who plan careers in government and private enterprise as well as those pursuing graduate degrees in professional schools or in the field of economics.

## LEARNING OUTCOMES

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. understanding of core knowledge within Economics.
2. ability to analyze a problem and draw correct inferences using qualitative and/or quantitative analysis.
3. ability to write clearly and persuasively and communicate ideas clearly.
4. ability to evaluate theory and critique research within the discipline.

## GRADUATE PROGRAMS IN ECONOMICS

The primary objective of the graduate program is to educate students as research economists. In the process, students also acquire the background and skills necessary for careers as university teachers and as practitioners of economics. The curriculum includes a comprehensive treatment of modern theory and empirical techniques. Currently, 20 to 25 students are admitted each year.

Graduate programs in economics are designed to ensure that students receive a thorough grounding in the methodology of theoretical and empirical economics, while at the same time providing specialized training in a wide variety of subfields and a broad understanding of associated institutional structures. Toward these ends, the program is arranged so that the student has little choice in the curriculum at the outset but considerable latitude later on.

Students admitted to graduate standing in the department are expected to have a strong background in college-level economics, mathematics, and statistics. Preparation ordinarily consists of a college major in economics, a year-long calculus sequence that includes multivariate analysis, a course in linear algebra, and a rigorous course in probability and statistics.

## GRADUATE FIELDS

### A. ECONOMIC DEVELOPMENT

To receive credit for this field, students must complete two courses from 214, 216 and 217, and submit a paper from one of these courses. Students wishing to do research in the field are advised to take courses in international economics, such as 266, and in comparative institutional analysis.

### B. ECONOMIC HISTORY/INSTITUTIONS

The requirement for the field is one research paper on a subject approved by one of the faculty teaching any of the following courses: 224, 225, 226, 227, 228, 229.

### C. MONETARY THEORY AND ADVANCED MACROECONOMICS

Requirements for this field are completion of two courses from 233, 234, 235, and 236.

### D. PUBLIC FINANCE

To receive credit for the field, students must complete 241 and 242 by passing the final examinations, and submit an acceptable research paper on a topic approved by the instructor for either course. Students may take Public Finance as a field and still count 243 and/or 244 toward satisfying their distribution requirements.

### E. ECONOMICS OF LABOR

To receive credit for this field, students must complete two courses from 246, 247, and 248.

### F. ECONOMICS OF INDUSTRY

To receive credit for the field, students must complete 257 and 258 and submit one research paper, the subject of which has been approved in advance by one of the faculty teaching 257, 258, or 260.

### G. INTERNATIONAL ECONOMICS

To receive credit for this field, students must complete 265 and 266. Taking 267 and 268, is recommended. A research paper from any of these courses must also be submitted.

### H. ECONOMETRICS

A student may satisfy the requirements for the econometrics field by completing the requirements of one of two subfields:

1. *H-1*: Theoretical Econometrics: To receive credit in the theoretical econometrics subfield, students must complete 273 and 274.
2. *H-2*: Applied Econometrics: To receive credit in the applied econometrics subfield, students must complete 273 and either 275 or 276. Students must also complete a course or set of courses that is empirically oriented. The last requirements must be approved by the Director of Graduate Study in consultation with the instructor of 275 or 276.

### I. MICROECONOMIC THEORY

To receive credit for this field, students must complete two courses from the following: 280, 281, 282, 283, 284, 286, 287, 289, 291.

### J. ENVIRONMENTAL ECONOMICS

To receive credit for this field, students must complete 250 and 251. Students can petition to substitute another environment/natural resource course (e.g., MS&E 248) for either of these.

### K. POLITICAL ECONOMY

To receive credit for this field, students must complete 220 and 221.

## OTHER PROGRAMS

Other programs leading to dual degrees may be arranged. For example, the Ph.D. in Economics combines with one or two years of study in the School of Law, leading to the nonprofessional Master of Legal Studies (M.L.S.) degree. A dual degree program does not permit counting any courses toward both the Economics and the Law degrees. For more information, see <http://www.law.stanford.edu/program/degrees>.

## FELLOWSHIPS AND ASSISTANTSHIPS

The department awards a number of fellowships for graduate study. Many first-year and a few second- or third-year students are typically awarded full fellowships, including a stipend and tuition.

All students whose records justify continuation in the program may be assured support for the second through fourth years in the form of employment as a teaching or research assistant. These half-time appointments provide a stipend and tuition allowance. Entering students are not normally eligible for research or teaching assistantships.

## BACHELOR OF ARTS IN ECONOMICS

The total number of units required for the major is 80. Students are encouraged to complete the core courses 1-7 below, as early as possible. Ideally, students should complete the core during the sophomore year, before taking upper division courses. Courses may not be taken before the prerequisites are completed. The required number of field courses is four. There is great flexibility in the choice of electives, including upper-division math and statistics.

Of the 80 units required for the major, at least 55 must be taken at Stanford in California. Students cannot declare Economics as their major or minor until they have completed ECON 50 with a grade of 'B' or better. All courses required for the economics major must be taken for a letter grade.

### REQUIREMENTS FOR THE ECONOMICS MAJOR (80 UNITS)

1. ECON 1A (5 units): micro and elementary economics.
2. ECON 1B (5 units): macroeconomics. Prerequisite: ECON 1A.
3. ECON 102A (5 units): introduction to statistical methods. It is recommended that students satisfy this basic statistics requirement before proceeding with the rest of the program. Prerequisite: MATH 41 or equivalent.
4. ECON 50 (5 units, grade of 'B' or better): basic price theory. Prerequisites: ECON 1A and MATH 51 (letter grade required).
5. ECON 51 (5 units): intermediate microeconomics. Prerequisite: ECON 50.
6. ECON 52 (5 units): intermediate macroeconomics. Prerequisites: ECON 50 and 1B.
7. ECON 102B (5 units): econometrics. Prerequisites: ECON 50 and 102A. Material in ECON 102B is used in a number of field courses. Students are advised to design their program of study so that ECON 102B is not taken in their senior year but early in their program.

*Field Courses (must be taken at Stanford in California; 20 units)*—Four courses must be chosen from among ECON 111, 115, 118, 126, 137, 140,\* 141, 144, 145, 147, 149, 153, 157, 158, 160, 164, 165, 166, 169, 179 (5 units each).

*Writing in the Major Course (must be taken at Stanford in California; 5 units)*—This requirement is fulfilled by ECON 101. This course should be taken only after completing ECON 51 and 52, 102B, and at least two field courses.

*Electives (20 units)*—Choose from Economics courses numbered from 100 through 198, excluding 190 and 191. Up to 10 units may be satisfied by MATH 113, 114, 115, 136, 151, 171, 175; or STATS 200, 206, 207, 217, 218, 237.

A maximum of 10 units of transfer credit or of ECON 139D, Directed Reading, may be taken under this section. Suitable transfer credit must be approved in writing by the Associate Director of Undergraduate Studies. Advanced undergraduate majors with strong quantitative preparation may enroll in graduate (200-level) courses with permission of the Director of Undergraduate Studies and the course instructor. Some courses offered by Overseas Studies may be counted towards this requirement. The department does not give credit for internships.

\* Students may not count units from both ECON 135 and 140 towards their major as the courses are too similar in content.

### OTHER REQUIREMENTS

No courses receiving Department of Economics credit under the preceding requirements may be taken credit/no credit, and 55 of the 80 units required for the major must be taken at Stanford in California.

Students scoring a 5 on both the advanced placement microeconomics and advanced placement macroeconomics exam may petition the Director of Undergraduate Studies to have the ECON 1A (but not 1B) course requirement waived. Students do not receive units credit for placing out of ECON 1A.

A grade point average (GPA) of 2.0 (C) or better must be received for all units applied toward the preceding requirements.

To use transfer credit in partial satisfaction of the requirements, the student must obtain written consent from the department's Associate Director of Undergraduate Study, who establishes the amount of credit to be granted toward the department requirements (see the *Information Book for Economics Majors*). Students must have completed all Stanford prerequisites for approved transfer credit courses in order to use those courses towards the Economics major.

Course prerequisites are enforced. Students taking courses to satisfy prerequisites in another department or institution must petition for Stanford course substitution or transfer credit approval in order to satisfy course prerequisites.

The time limit for satisfactory completion of a course is one year from the date an incomplete is given, although instructors may set a shorter time limit. Students are responsible for seeing that all grades of 'incomplete' are cleared within the time limit.

### SAMPLE PROGRAMS

Sample listings of upper-division economics electives may be examined in the department's *Information Book for Economics Majors*, available at <http://economics.stanford.edu/undergraduate>. Sample programs are provided for the following areas of emphasis: (1) liberal arts, (2) pre-business, (3) quantitative, (4) international, (5) political economy and regulation, and (6) preparation for graduate school in economics.

### HONORS PROGRAM

The honors program offers an opportunity for independent research, creativity, and achievement. It is designed to encourage a more intensive study of economics than is required for the normal major, with course and research work of exceptional quality. Honors students may participate in an Honors Research Symposium during Spring Quarter, with those nominated for prizes making oral presentations. The honors program requires:

1. Completing all requirements for the major; plus five additional units, bringing the total to 85 units.
2. Achieving a grade point average (GPA) of at least 3.5 for the required courses of the Economics major (excluding ECON 139D and 199D). See details in the *Information Book for Economics Majors*.
3. Complete ECON 102B and at least two lecture courses most relevant for the proposed topic of the honors thesis by the end of the junior year. (These can be included in the basic 80 units.)
4. Candidates must write an honors thesis in their senior year for at least one unit and up to 10 units of credit (ECON 199D). The thesis must be of very high quality and written under the direction of a member of the department or its affiliated faculty. Units of 199D do not count toward the course work requirements for the basic economics major, or in the computation of the GPA requirement for honors. Students may apply 5 units of 199D to the Writing in the Major requirement (WIM). The WIM requirement (ECON 101 or 199D) must be completed in order for the degree to be conferred.

Juniors interested in the honors program should attend an informational meeting scheduled by the honors program director during the first week of each quarter. At this meeting, students receive information on organizing an honors project and are given details on honors programs. Prospective candidates for the honors program should submit an application to the director no later than the end of the first month of the third quarter before graduation (typically Autumn Quarter of the senior year). Also required, later in the same quarter, is a three-page thesis proposal that must be approved by the thesis adviser.

## MINOR IN ECONOMICS

The minor in Economics has two main goals: to acquaint students with the rudiments of micro- and macroeconomic theory that are required of all majors; and to allow students to build competence in the application of this theory to two fields of economics of their choosing, and the opportunity to specialize further in any one of these fields by taking one additional advanced course in the Department of Economics.

### COURSE WORK

1. ECON 1A (5 units): micro and elementary economics.
2. ECON 1B (5 units): macroeconomics. Prerequisite: ECON 1A.
3. ECON 50 (5 units, grade of 'B' or better): basic price theory. Prerequisites: ECON 1A and MATH 51 (letter grade required).
4. ECON 51 (5 units): intermediate microeconomics. Prerequisite: ECON 50.
5. ECON 52 (5 units): intermediate macroeconomics. Prerequisites: ECON 50 and 1B.
6. Two field courses (10 units; must be taken at Stanford in California) must be chosen from the following list: ECON 102A, 102B, 111, 115, 118, 126, 137, 140,\* 141, 144, 145, 147, 149, 153, 157, 158, 160, 164, 165, 166, 169, 179.

\*Students may not count units from both ECON 135 and 140 towards their minor as the courses are too similar in content.

### OTHER REQUIREMENTS

If the candidate's major requires basic Economics courses (1A, 1B, 50, 51, 52), then only half of the units from those courses apply toward the economics minor. To attain the overall 35 units required by the minor, the student must take additional Economics courses numbered from 100 through 198 (excluding ECON 190 and 191).

At least 20 out of the 35 units for the minor must be taken at Stanford. Students must have completed all Stanford prerequisites for approved transfer credit courses in order to use those courses towards the Economics minor.

No courses receiving Department of Economics credit under the preceding requirements may be taken credit/no credit. A grade point average (GPA) of 2.0 or better must be received for all units applied toward the minor.

Students must complete their declaration of the minor no later than the last day of the preceding quarter before their degree conferral.

## MASTER OF ARTS IN ECONOMICS

University requirements for the master's degree are described in the "Graduate Degrees" section of this bulletin.

The department does not admit students who plan to terminate their graduate study with the M.A. degree. Students may, but need not, elect to add this degree in addition to their current Ph.D. degree. A master's option is also available to Ph.D. candidates from other departments.

*Admission*—Prospective students must have completed the Stanford requirements for a B.A. in Economics or approximately equivalent training. Since students are required to take some of the same courses as Ph.D. candidates, similar preparation in mathematics and statistics generally is expected. Prospective applicants should submit their credentials together with a plan of study to the Director of Graduate Study for approval.

*Requirements*—A master's program must satisfy these criteria:

1. Completing, at Stanford, at least 45 units of credit beyond those required for the bachelor's degree, of which at least 40 units must be in the Department of Economics. Students must complete ECON 202 and at least three other 200-level courses. They must receive a grade of 'B-' or better in ECON 202. Undergraduate courses must be numbered 105 or higher (with the exception of the ECON 102A,B,C sequence listed below). No seminar courses numbered 300 or above can be counted.

2. Demonstrating competence in empirical methodology by receiving a grade of 'B-' or better in both ECON 270 and 271, or by receiving a grade of 'B-' or above in each of ECON 102A, B, and C.
3. Submitting two term papers (or a thesis of sufficient quality). At least one of these papers must be deemed to represent graduate-level work. Normally, this means that it is written in connection with a 200-level course. A maximum of 10 units of credit can be earned for a thesis toward the 45-unit degree requirement. In lieu of this paper requirement, students may elect to take two additional 200+ level Economics courses.
4. A grade point average (GPA) of 3.0 must be maintained for all master's level work. All courses must be taken for a letter grade.

## DOCTOR OF PHILOSOPHY IN ECONOMICS

University requirements for the Ph.D. are described in the "Graduate Degrees" section of this bulletin.

Admitted students must be adequately prepared in calculus, linear algebra, and statistics (see above). When deemed appropriate, a student may be required to complete the necessary background preparation at Stanford. All students take a common core curriculum at the outset and later branch out into the desired fields of specialization. Well-prepared students should anticipate spending, with some overlap, approximately two years in course work and another two years in seminars, independent study, and dissertation research. The goal is to complete the program in four years, although some types of research programs may require at least five years to complete. The department has a strong commitment to guiding students through the program expeditiously.

Questions and petitions concerning the program and the admissions process should be addressed to the Director of Graduate Study, who has responsibility for administering the graduate program.

Specific requirements are best discussed in two stages, the first consisting of requirements for admission to candidacy and the second involving further requirements for earning the degree.

*Admission to Candidacy for Ph.D.*—A student may apply for admission to candidacy when the following minimal requirements are met:

1. Successful results on comprehensive examinations in core economics (the examinations based on material from ECON 202, 203, 204; and 210, 211, 212), and econometrics (the examination based on material from ECON 270, 271, 272).
2. Completing the requirements in two additional fields of specialization from the list below or, if approved in advance by the Director of Graduate Study, in one such field together with a substantial amount of work toward a second field taught in a related department. Advanced fields include econometrics, economic development, economic history, industrial organization, international economics, labor economics, microeconomic theory, monetary theory and advanced macroeconomics, environmental economics, political economy, and public finance. Each field listed above can be satisfied by completing two courses, although students in some fields may be advised to add a third course, which can then be counted toward the distribution requirement discussed later. All courses (or comprehensive exams, when offered) must be passed with a grade of 'B' or better.
3. Completing a candidacy paper, normally written in conjunction with one of the special fields selected above. Satisfactory presentation of this paper or another research paper is required in Autumn Quarter of the third year, along with an additional presentation of an expanded research paper in Spring Quarter is also required for admission to candidacy. It is expected that the student meet, and indeed exceed, the above standards by the end of the third year of residency. When

this is not possible for any reason, the Director of Graduate Study should be consulted as early as possible during the third year. Once it is deemed that the above standards have been met, the student should complete the Application for Candidacy for Degree of Doctor of Philosophy. After approval, candidacy remains valid for five years (although it can be terminated earlier by the department if progress is deficient); it can be renewed or extended beyond this period only under unusual circumstances.

*Further Requirements for the Ph.D. Degree—*

1. *Distribution Requirement:* Students must complete four other graduate-level courses meeting the following requirements:
  - a. at least one course from the area of economic history, unless history is one of the two fields of specialization.
  - b. courses in at least two fields other than the two fields of specialization. Distribution courses cannot be crosslisted in those fields.
  - c. with advance approval of the Director of Graduate Study, some of these distribution courses may be drawn from related fields taught in other departments. However, including courses taken to meet either the specialization or distribution requirements, no more than two courses in total may be taken outside the Economics department.
2. *Teaching Experience:* Each student must serve as a teaching assistant for at least one quarter. It is strongly recommended that this requirement be satisfied before the final year of residence.
3. *Seminar Participation:* Each student is expected to participate in at least two all-year research seminars by the end of the fourth year of residence. Normally, participation in a seminar requires one or more oral presentations and the submission of a research paper (which, however, need not be completely separate from dissertation research).
4. *Ph.D. Dissertation:* The process involves selecting a topic, choosing an appropriate adviser, submitting a prospectus (signed by the adviser) outlining the proposed research, selecting a three-member reading committee (usually all from the Department of Economics, although exceptions can be made under certain circumstances), passing the University oral examination at which these three faculty (and two other members of the Academic Council) ask questions about the completed research, and submitting a final draft of the work signed by all members of the reading committee. The student is advised to initiate this process as early as possible.

## PH.D. MINOR IN ECONOMICS

### PH.D. MINOR

To be recommended for the Ph.D. degree with Economics as a minor subject, a student must qualify in three fields of economics, at least one of which must be in the core economics sequence. The standard of achievement in these fields is the same for minor as for major candidates, including the department's comprehensive examinations where appropriate.

## JOINT DEGREE PROGRAM IN PH.D. IN ECONOMICS AND MASTER OF PUBLIC POLICY

The Ph.D./M.P.P. joint degree is designed for students who wish to prepare themselves for careers in areas relating to both policy and economics. Students interested in this degree first apply to the Economics Department, indicating an interest in the joint program. There is one admissions application and one fee. If the decision is made by the department to admit the applicant, the file is then forwarded to the M.P.P. program. An admission decision, based on the information in the Ph.D. application, is made promptly, and the department informs the student of the decision.

Students may also apply to the M.P.P. after having commenced study in the Economics Department at Stanford, by first receiving the consent of the Director of Graduate Studies in Economics and

then applying to the Public Policy program.

Students must have a faculty adviser from the Economics Department to assist with the planning and supervising of the joint program. The adviser is usually chosen from among the department's Public Policy-affiliated faculty.

Tuition and financial aid arrangements are made through the Economics Department.

Requirements for the M.P.P./Ph.D. in Economics: Core M.P.P. curriculum of 45 units: PUBLPOL 301B (4 units), 302A (2 units), 302B (4 units), 304A (4 units), 304B (4 units), 305A (4 units), 305B (4 units), 306 (4 units), 307 (4 units), 309 (10 units), 311 (1 unit)

## JOINT DEGREE PROGRAMS IN ECONOMICS WITH THE SCHOOL OF LAW

### J.D./M.A. AND J.D./PH.D.

The Department of Economics and the School of Law offer a joint program leading to either a J.D. degree combined with an M.A. degree in Economics, or to a J.D. degree combined with a Ph.D. in Economics.

The J.D./M.A. and J.D./Ph.D. degree programs are designed for students who wish to prepare themselves for careers in areas relating to both law and economics. Students interested in either joint degree program must apply and gain entrance separately to the School of Law and the Department of Economics and, as an additional step, must secure permission from both academic units to pursue degrees in those units as part of a joint degree program. Interest in either joint degree program should be noted on the student's admission applications and may be considered by the admission committee of each program. Alternatively, an enrolled student in either the Law School or the Economics department may apply for admission to the other program and for joint degree status in both academic units after commencing study in either program.

Joint degree students may elect to begin their course of study in either the School of Law or the Department of Economics. Faculty advisers from each academic unit participate in the planning and supervising of the student's joint program. Students must be enrolled full time in the Law School for the first year of law school, and, at some point during the joint program, may be required to devote one or more quarters largely or exclusively to studies in the Economics program regardless of whether enrollment at that time is in the Law School or in the Department of Economics. At all other times, enrollment may be in the graduate school or the Law School, and students may choose courses from either program regardless of where enrolled. Students must satisfy the requirements for both the J.D. and the M.A. or Ph.D. degrees as specified in this bulletin or by the School of Law.

The Law School approves courses from the Economics Department that may count toward the J.D. degree, and the Economics department approves courses from the Law School that may count toward the M.A. or Ph.D. degree in Economics. In either case, approval may consist of a list applicable to all joint degree students or may be tailored to each individual student's program. The list may differ depending on whether the student is pursuing an M.A. or a Ph.D. in Economics.

In the case of a J.D./M.A. program, no more than 45 quarter hours of approved courses may be counted toward both degrees. In the case of a J.D./Ph.D. program, no more than 54 quarter hours of approved courses may be counted toward both degrees. In either case, no more than 36 quarter hours of courses that originate outside the Law School may count toward the Law degree. To the extent that courses under this joint degree program originate outside the Law School but count toward the Law degree, the Law School credits permitted under Section 17(1) of the Law School Regulations shall be reduced on a unit-per-unit basis, but not below zero. The maximum number of Law School credits that may

be counted toward the M.A. or the Ph.D. in Economics is the greater of: (a) 5 quarter hours in the case of the M.A. and 10 quarter hours in the case of the Ph.D.; or (b) the maximum number of hours from courses outside of the department that M.A. or Ph.D. candidates in Economics are permitted to count toward the applicable degree under general departmental guidelines or in the case of a particular student's individual program.

Tuition and financial aid arrangements are normally made through the school in which the student is then enrolled.

For more information, see <http://www.law.stanford.edu/program/degrees>.

## OVERSEAS STUDIES COURSES IN ECONOMICS

For course descriptions and additional offerings, see the listings in the *Stanford Bulletin's* ExploreCourses web site (<http://explorecourses.stanford.edu>) or the Bing Overseas Studies web site (<http://bosp.stanford.edu>). Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

### AUTUMN QUARTER

#### BERLIN

- OSPBER 115X. German Economy: Past and Present. 4-5 units, Ingo Klein, GER:DB:SocSci, EC:GlobalCom

#### MADRID

- OSPMADR 54. Contemporary Spanish Economy and the European Union. 5 units, Miguel Buñuel, GER:DB:SocSci

#### MOSCOW

- OSPMOSC 62. Economic Reform and Economic Policy in Modern Russia. 5 units, Vladimir Mau, GER:DB:SocSci, EC:GlobalCom

#### OXFORD

- OSPOXFRD 45. British Economic Policy since World War II. 5 units, James Forder, GER:DB:SocSci

#### PARIS

- OSPPARIS 124X. Building the European Economy: Economic Policies and the Challenges Ahead. 5 units, Eloi Laurent, Jacques Le Cacheux, GER:DB:SocSci

### WINTER QUARTER

#### BERLIN

- OSPBER 161X. The German Economy in the Age of Globalization. 4-5 units, Ingo Klein, GER:DB:SocSci, EC:GlobalCom

#### PARIS

- OSPPARIS 91. Globalization and its Effect on France and the European Union. 5 units, Eloi Laurent, Jacques Le Cacheux, GER:DB:SocSci, EC:GlobalCom

### SPRING QUARTER

#### BEIJING

- OSPBEIJ 55. Chinese Economy in Transition. 5 units, Li-an Zhou, GER:DB:SocSci, EC:GlobalCom

#### FLORENCE

- OSPFLOR 35. European Economic and Monetary Integration. 5 units, Pompeo Della Posta, GER:DB:SocSci, EC:GlobalCom

#### KYOTO

- OSPKYOTO 215X. Political Economy of Japan. 4-5 units, Toshihiko Hayashi, GER:DB:SocSci

### PARIS

- OSPPARIS 33. The Economics of Climate Change: Policies in Theory and in Practice in the EU and the US. 5 units, Christian de Perthuis, GER:DB:SocSci, EC:GlobalCom

## ENGLISH

*Emeriti:* (Professors) George H. Brown, W. B. Carnochan, W. S. Di Piero, John Felstiner, Charles N. Fifer, Albert J. Gelpi, Barbara C. Gelpi, David Halliburton, Shirley Heath, John L'Heureux, Herbert Lindenberger, John Loftis, Thomas C. Moser, Nancy H. Packer, Marjorie G. Perloff, Robert M. Polhemus, Arnold Rampersad, Ronald A. Rebholz, David R. Riggs, Lawrence V. Ryan, Wilfred H. Stone, Elizabeth C. Traugott, Wesley Trimpf; (Associate Professor) Sandra Drake; (Professor, Teaching) Larry Friedlander; (Senior Lecturer) Helen B. Brooks

*Chair:* Gavin Jones

*Director of Creative Writing Program:* Eavan Boland

*Director of Program in Writing and Rhetoric:* Nicholas Jenkins

*Professors:* John B. Bender (English, Comparative Literature, on leave Spring), Eavan Boland, Terry Castle, Michele Elam, J. Martin Evans, Kenneth W. Fields, Shelley Fisher Fishkin, Denise Gigante, Roland Greene (English, Comparative Literature), Ursula Heise (on leave), Gavin Jones, Andrea A. Lunsford (on leave Winter), Mark McGurl, Franco Moretti (English, Comparative Literature, on leave Autumn), Sianne Ngai, Stephen Orgel, Patricia A. Parker (English, Comparative Literature), Peggy Phelan (English, Drama, on leave), Nancy Ruttenburg (on leave), Ramón Saldivar (English, Comparative Literature), Jennifer Summit (on leave Spring), Elizabeth Tallent, Blakey Vermeule, Tobias Wolff

*Associate Professors:* Blair Hoxby, Nicholas Jenkins, Adam Johnson, Paula Moya, Alex Woloch

*Assistant Professors:* Claire Jarvis, Michelle Karnes, Saikat Majumdar (on leave), G. Vaughn Raspberry, Stephen Sohn (on leave), Hannah Sullivan (Autumn only)

*Senior Lecturers:* Judith Richardson, Christopher Rovee

*Courtesy Professors:* David Palumbo-Liu, Bryan Wolf

*Courtesy Associate Professor:* Joshua Landy

*Lecturers:* Molly Antopol-Johnson, Harriet Clark, Marvin Diogenes, Jennifer DuBois, Josh Edwards, Keith Ekiss, John Evans, Sarah Frisch, Skip Horack, Maria Hummel, Scott Hutchins, Matthew Jockers, Tom Kealey, Ammi Keller, Peter Kline, David MacDonald, Hilton Obenzinger, Brittany Perham, Phoebe Putnam, Kirstin Quade, Bruce Snider, Stephanie Soileau, Alice Staveley (on leave), Shimon Tanaka

*Consulting Professor:* Valerie Miner

*Visiting Professors:* Louise Gluck, Abraham Verghese

*Visiting Associate Professor:* Elizabeth DeLoughrey

*Department Offices:* Building 460, Room 201

*Mail Code:* 94305-2087

*Phone:* (650) 723-2635

*Web Site:* <http://english.stanford.edu>

Courses offered by the Department of English are listed under the subject code ENGLISH on the *Stanford Bulletin's* ExploreCourses web site.

## MISSION OF THE DEPARTMENT OF ENGLISH

To study English at Stanford is to explore -- deeply and rewardingly -- the rich legacy of literature written in English, past and present. We offer a wealth of courses on individual authors, the history of literary genres, literary theory, new media, and creative writing. Given the emphasis on critical thinking and interpretation, the English major is in turn an excellent preparation for many professional fields, including teaching, journalism, law, publishing, medicine, and business. The graduate program features rigorous training in the research and analysis of British, American,



and Anglophone literary histories and texts, preparing students to produce scholarship of originality and importance, and to teach literature at the highest levels.

## LEARNING OUTCOMES

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. an understanding of major theories, methods, and concepts of literary study and critical analysis.
2. an awareness of how authors and texts develop in relation to their historical contexts.
3. a comprehension of the formal qualities of key literary genres, forms, and styles. Alternatively, students pursuing the creative writing emphasis can offer a writing sample that develops particular literary genres or forms.
4. a critical ability to evaluate and appreciate the aesthetic and cultural achievement of literary texts.
5. an effective style of writing and a powerful use of language.

## BACHELOR OF ARTS IN ENGLISH

In the undergraduate program, students explore the traditions of literature in English. Courses emphasize interpretive thinking and creative writing, examining the dynamics of literary and cultural history, the structures of literary form and genre, and the practices of reading, writing, and critical analysis.

## GRADUATE PROGRAM IN ENGLISH

The graduate program features rigorous training in the research and analysis of British, American and Anglophone literary histories and texts, preparing students to produce scholarship of originality and importance, and to teach literature at advanced levels.

## OTHER PROGRAMS IN ENGLISH

*Ph.D. in English and Humanities*—The department participated in the Graduate Program in Humanities leading to a Ph.D. degree in English and Humanities. At this time, the option is available only to students already enrolled in the Graduate Program in Humanities; no new students are being accepted. The University remains committed to a broad-based graduate education in the humanities; the courses, colloquium, and symposium continue to be offered, and the Division of Literatures, Cultures, and Languages provides advising for students already enrolled who may contact DLCL Student Affairs at 650-724-1333 or dlcl@stanford.edu for further information. Courses are listed under the subject code HUMNTIES and may be viewed on the Stanford Bulletin's ExploreCourses web site.

*Ph.D. in Modern Thought and Literature*—Stanford also offers a Ph.D. degree in Modern Thought and Literature. Under this program, students devote approximately half of their time to a modern literature from the Enlightenment to the present, and the other half to interdisciplinary studies. Interested students should see the "Modern Thought and Literature" section of this bulletin and consult the director of the program.

*Creative Writing Fellowships*—The Creative Writing Program each year offers five two-year fellowships in poetry and five two-year fellowships in fiction. These are not degree-granting fellowships. Information is available in the Creative Writing office, (650) 725-1208.

## BACHELOR OF ARTS IN ENGLISH

The English major is designed to provide students with both an understanding of the development of literatures in English and an appreciation of the variety and richness of literary texts. It offers a rigorous training in interpretive thinking and precise expression.

## SUGGESTED PREPARATION FOR THE MAJOR

Prospective English majors are advised to consider IHUM 34A,B. A Life of Contemplation or Action: Debates in Western Literature and Philosophy, to satisfy their IHUM-2,3 requirements. Also recommended is any introductory seminar taught by English department faculty through Stanford Introductory Studies.

## FIELDS OF STUDY OR DEGREE OPTIONS

Because the Department of English recognizes that the needs and interests of literature students vary, it has approved several major programs of study. Each of these has different objectives and requirements; students should consider carefully which program of study corresponds most closely to their personal and intellectual objectives. The department offers the following fields of study for degrees in English:

- Literature
- Literature with Creative Writing Emphasis
- Literature with Interdisciplinary Emphasis
- Literature and Foreign Language Literature
- Literature and Philosophy

See below for further information on these fields of study.

## DEGREE REQUIREMENTS

Students interested in majoring in English are encouraged to declare during their sophomore year, but no later than the beginning of their junior year. They are urged to discuss their plans with the undergraduate student services specialist as early as possible, and to take recommended preparatory courses for the major in their freshman and sophomore years. To declare the major, a student must fill out the Declaration of Major in Axxess; choose a faculty adviser; and submit a completed program proposal form approved by the adviser. It is recommended that a student meet with the adviser at least once per quarter to discuss progress towards degree completion. Students who declared prior to September 2010 should refer to previous guidelines and requirements for the major.

With the exception of the required courses listed below, which must be taken for a letter grade, any two of the elective courses may be taken on a credit/no credit basis at the discretion of the instructor. Students may apply as many as four literature courses taken at approved universities towards the English major electives. Approval of such courses towards the major is at the discretion of the Director of Undergraduate Studies. Requests for transfer credit, including course syllabi and official transcript, should be submitted to the undergraduate student services coordinator, and to the Office of the University Registrar's external credit evaluation section.

The total number of units required to graduate for each degree option is specified in the relevant section following. All courses should be taken for 5 units. Irrespective of field of study or degree option, all English majors must complete the following requirements:

### *Required Courses (40 units)*—

1. Three Methodology courses
  - a. ENGLISH 160. Poetry and Poetics (5 units)
  - b. ENGLISH 161. Narrative and Narrative Theory (5 units)
  - c. ENGLISH 162. Critical Methods (5 units)
2. Four Historical courses
  - a. ENGLISH 100A. Literary History I (5 units)
  - b. ENGLISH 100B. Literary History II (5 units)
  - c. ENGLISH 100C. Literary History III (5 units)
  - d. One additional history of literature course (5 units, denoted by H-suffix). This can be fulfilled with IHUM 34A,B. A Life of Contemplation or Action: Debates in Western Literature and Philosophy, or IHUM 64. Journeys. This requirement may also be filled by completing the SLE sequence SLE 91. Structured Liberal Education, SLE 92. Structured Liberal Education, and SLE 93. Structured Liberal Education.

3. ENGLISH 164. Senior Seminar (5 units, WIM). For those students accepted into the Honors program this can be fulfilled with ENGLISH 196A. Honors Seminar.

*Rules that apply to all English majors irrespective of field of study or degree option—*

1. Courses can only be counted once, i.e. can only satisfy one requirement.
2. Two of the elective courses may be taken on a credit/no credit basis at the discretion of the instructor.

### FIELD OF STUDY I. LITERATURE

This field of study is declared in Axess. It does not appear on either the official transcript or the diploma. This program provides for the interests of students who wish to understand the range and historical development of British, American and Anglophone literatures and a variety of critical methods by which their texts can be interpreted. The major emphasizes the study of literary forms and genres and theories of textual analysis. In addition to the degree requirements required of all majors and listed above, students must complete at least 30 additional units of courses consisting of:

1. Six to eight additional approved elective courses, only one of which may be a creative writing course, chosen from among those offered by the Department of English. In place of one of these six to eight elective courses, students may choose one upper-division course in a foreign literature read in the original language.

### FIELD OF STUDY II. LITERATURE WITH CREATIVE WRITING EMPHASIS

This field of study is declared in Axess. It appears on the official transcript, but not on the diploma. This program is designed for students who want a sound basic knowledge of the English literary tradition as a whole and at the same time want to develop skills in writing poetry or prose. In addition to the degree requirements required of all majors and listed above, students must complete at least 35 additional units of approved courses, in either the prose or poetry concentration:

#### *Prose Concentration-*

1. One beginning prose course: ENGLISH 90. Fiction Writing *or* ENGLISH 91. Creative Nonfiction
2. ENGLISH 146. Development of the Short Story
3. One intermediate prose course: any ENGLISH 190 series or 191 series
4. One beginning poetry course: ENGLISH 92. Reading and Writing Poetry (Can be fulfilled with a poetry literature seminar)
5. Three elective literature courses (One of the courses may be fulfilled with a creative writing workshop)

#### *Poetry Concentration-*

1. One beginning poetry course: ENGLISH 92. Reading and Writing Poetry
2. One literature course in poetry approved by a Creative Writing Professor
3. One intermediate poetry course: any ENGLISH 192 series
4. One beginning prose course: ENGLISH 90. Fiction Writing *or* ENGLISH 91. Creative Nonfiction (Can be fulfilled with a prose literature seminar)
5. Three elective literature courses (One of the courses may be fulfilled with a creative writing workshop)

### FIELD OF STUDY III. LITERATURE WITH INTERDISCIPLINARY EMPHASIS

This field of study is declared in Axess. It appears on the official transcript, but not on the diploma. This program is intended for students who wish to combine the study of one broadly defined literary topic, period, genre, theme or problem with an interdisciplinary program of courses relevant to that inquiry. In addition to the degree requirements required of all majors and listed above, students must complete at least 35

additional units of approved courses including:

1. Four elective literature courses chosen from among those offered by the Department of English. Students must select two of these courses in relation to their interdisciplinary focus.
2. Three courses related to the area of inquiry. These courses may be chosen from disciplines such as anthropology, the arts (including the practice of one of the arts), classics, comparative literature, European or other literature, feminist studies, history, modern thought and literature, political science, and African American studies. These courses should form a coherent program and must be relevant to the focus of the courses chosen by the student to meet the requirement. Each of these courses must be approved in advance by the interdisciplinary program director. In addition, students in this program must write at least one interdisciplinary paper. This may be ENGLISH 197, Senior Honors Essay; ENGLISH 199, Senior Independent Essay; ENGLISH 194 or 198, Individual Research; or a paper integrating the material in two courses the student is taking in two different disciplines.

### FIELD OF STUDY IV. LITERATURE AND FOREIGN LANGUAGE LITERATURE

This major provides a focus in British and American literature with additional work in French literature; German literature; Italian literature; Spanish or Spanish American literature. These are interdepartmental majors declared in Axess. The interdepartmental major appears both on the official transcript and the diploma. In addition to the degree requirements required of all majors and listed above, students must complete at least 35 additional units of approved courses including:

1. Three elective courses chosen from among those offered by the Department of English, one of which may be a creative writing course.
2. A coherent program of four courses in the foreign language literature, read in the original language, approved by the Director of Undergraduate Studies in English and by the relevant foreign language department.

### FIELD OF STUDY V. LITERATURE AND PHILOSOPHY

This field of study is declared in Axess. It appears on the official transcript, but not on the diploma. Students should meet with the undergraduate director concerning the Literature and Philosophy focus. This track is for students who wish to explore interdisciplinary studies at the intersection of literature and philosophy while acquiring knowledge of the English language literary tradition as a whole. In addition to the degree requirements required of all majors and listed above, students must complete at least 35-45 additional units of approved courses including:

1. PHIL 80. Mind, Matter, and Meaning (WIM): Prerequisite: introductory philosophy course.
2. Gateway course: ENGLISH 81. Philosophy and Literature (same as PHIL 81, CLASSGEN 81, COMPLIT 181, FRENGEN 181 and ITALGEN 181). This course should be taken as early as possible in the student's career, normally in the sophomore year.
3. Aesthetics, Ethics, Political Philosophy: one course from PHIL 170 series.
4. Language, Mind, Metaphysics, and Epistemology: one course from PHIL 180 series.
5. History of Philosophy: one course in the history of Philosophy, numbered above PHIL 100.
6. Two upper division courses of special relevance to the study of Philosophy and Literature. Both of these courses must be in the English department. A list of approved courses is available from the Director of Undergraduate Studies in English.
7. One additional elective course in the English department.
8. Capstone seminar of relevance to the study of Philosophy and Literature.

## HONORS PROGRAM

Students wishing to undertake a formal program of advanced literary criticism and scholarship, including the honors seminar and independent research, are invited to apply for the honors program in the Winter Quarter of the junior year. Any outstanding student is encouraged to engage in an honors thesis project.

Admission is selective. Provisional admission is announced in March. Permission to continue in the program is contingent upon submission, by May 15 of the junior year, of a senior honors essay proposal with a bibliography. Honors students are encouraged to complete before the start of their senior year the three methodology courses that are English major requirements: ENGLISH 160, 161, and 162.

In September before the senior year, students are encouraged to participate in the Bing Honors College. In Autumn Quarter of the senior year, students take a 3-unit honors seminar on critical approaches to literature. The senior-year seminar is designed to introduce students to the analysis and production of advanced literary scholarship. In addition, in Autumn Quarter of the senior year, honors students take a 2-unit essay workshop focused on the process of researching and writing the essay. Students who are studying at Oxford or at other institutions may be exempted from these requirements on request and with the approval of the director of the honors program.

In Winter and Spring quarters of the senior year, honors students complete the senior honors essay for 10 units under supervision of a faculty adviser.

The deadline for submitting the honors essay is May 15. Essays that receive a grade of 'A-' or above are awarded honors.

Students in the honors program complete the requirements of the major and the following:

### *Required Courses—*

ENGLISH 196A. Honors Seminar (3 units WIM)  
ENGLISH 196B. Honors Essay Workshop (2 units)  
ENGLISH 197. Senior Honors Essay (10 units)

## MODULES

*Advanced Individual Research*—Students taking 100- or 200-level courses may, with the consent of the instructor, write a follow-up 5-unit paper based on the course material and due no later than the end of the succeeding quarter (register for ENGLISH 194). The research paper is written under the direct supervision of the professor; it must be submitted first in a preliminary draft and subsequently in a final version.

*Senior Independent Essay*—The senior independent essay gives senior English majors the opportunity to work throughout the year on a sustained piece of critical or scholarly work of around 10,000 words on a topic of their choice, with the close guidance of a faculty adviser. Each student is responsible for finding an adviser, who must approve the proposed topic before the end of the third quarter prior to expected graduation. The senior essay is read and graded by the adviser and one other member of the English faculty. Senior independent essay students register for ENGLISH 199.

## OVERSEAS STUDIES OR STUDY ABROAD

The flexibility of the English major permits students to attend an overseas campus in any quarter, but it is advisable, and in some cases essential, that students spend their senior year at Stanford if they wish to participate in the Honors Program or in a special in-depth reading course. For more information on Stanford overseas programs, see the "Overseas Studies" section of this bulletin.

Students should consult their advisers and the undergraduate program officer to make sure that they can fulfill the requirements before graduation. The Stanford Program in Oxford usually offers courses which apply toward both University requirements and area requirements for the English major. In either case, students should save the syllabi from their courses if they wish to apply to use them to fulfill an English major requirement.

## MINOR IN ENGLISH OR IN CREATIVE WRITING

Both the Department of English and the Creative Writing program offer a distinct minor.

### MINOR IN ENGLISH LITERATURE

The minor in English Literature offers some flexibility for those students who want to pursue specific interests within British and American literature, while still requiring certain courses that ensure coverage of a variety of periods, genres, and methods of studying literature.

*Requirements*—In order to graduate with a minor in English, students must complete the following program of seven 5-unit courses, at least one of which must be a seminar, for a total of 35 units:

#### *Required Courses for the Minor—*

- Two of the three Methodology courses
  - ENGLISH 160. Poetry and Poetics (5 units)
  - ENGLISH 161. Narrative and Narrative Theory (5 units)
  - ENGLISH 162. Critical Methods (5 units)
- Two of the three Historical courses
  - ENGLISH 100A. Literary History I (5 units)
  - ENGLISH 100B. Literary History II (5 units)
  - ENGLISH 100C. Literary History III (5 units)

#### *Elective Courses for the Minor—*

- Three elective courses from those offered in the English department, only one of which may be a course in Creative Writing.

### MINOR IN CREATIVE WRITING

The minor in Creative Writing offers a structured environment in which students interested in writing prose or poetry develop their skills while receiving an introduction to literary forms. Students choose a concentration in either prose or poetry.

*Requirements*—In order to graduate with a minor in Creative Writing, students must complete the following program of six 5-unit courses for a total of 30 units. All courses must be taken for a letter grade. Courses taken abroad or at other institutions may not be counted towards the minor.

#### *Required Courses for the Minor—*

- ENGLISH 94. Writing Across Genres
- One beginning prose course: ENGLISH 90. Fiction Writing *or* ENGLISH 91. Creative Nonfiction
- One beginning poetry course: ENGLISH 92. Reading and Writing Poetry
- Three courses specifically designed for either the prose OR poetry concentration

#### Prose concentration:

- ENGLISH 146. Development of the Short Story
- Two intermediate or advanced prose classes: any ENGLISH 190 series, 191 series, 198L, or 290

#### Poetry concentration:

- ENGLISH 160. Poetry and Poetics
- Two intermediate or advanced poetry classes: any ENGLISH 192 series, 198L, or 292

## MASTER OF ARTS IN ENGLISH

University requirements for the M.A. are described in the "Graduate Degrees" section of this bulletin.

### COTERMINAL BACHELOR'S AND MASTER'S DEGREES IN ENGLISH LITERATURE

Students in the major who are interested in further postgraduate work in English may apply for Stanford's coterminal master's program. Candidates for a coterminal master's degree must fulfill all requirements for the M.A. in English (including the graduate language requirement), as well as general and major requirements for the B.A. in English. A minimum GPA of 3.7 in the major is required of those applying for the coterminal master's degree.

Students must also take the general GRE exam in the year in which they apply. No courses used to satisfy the B.A. requirements (either as General Education Requirements or department requirements) may be applied toward the M.A. No courses taken more than two quarters prior to admission to the coterminal master's program may be used to meet the 45-unit University minimum requirement for the master's degree. For University coterminal degree program rules and University application forms, see [http://ual.stanford.edu/AP/choosing\\_coterm/Coterm.html](http://ual.stanford.edu/AP/choosing_coterm/Coterm.html). University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees" section of this bulletin.

M.A. candidates must complete with a 3.0 (B) grade point average (GPA) at least nine courses (a minimum of 45 units), at least two of which must be 300-level courses. Ordinarily, graduate students enroll in courses numbered 200 and above. They may take no more than two courses numbered 101-199 without the consent of the Director of Graduate Studies, and no more than two courses outside the department. The master's student may take no more than 10 units of directed reading and research (ENGLISH 398). No creative writing courses may be used to fulfill the requirements. M.A. candidates must also demonstrate a reading knowledge of one foreign language. (For ways of fulfilling this requirement, see the section below on language requirements for the Ph.D.) Interested students should consult their faculty adviser or the graduate program adviser for further details.

### DEGREE REQUIREMENTS

#### *Required Courses*—

1. Two courses in literature before 1800 (5 units each)
2. Two courses in literature after 1800 (5 units each)

*Elective Courses*—Five courses (5 units each) which should represent a mixture of survey and specialized courses chosen to guarantee familiarity with a majority of the works on the qualifying exam reading list for doctoral candidates. Candidates who can demonstrate unusually strong preparation in the history of English literature may undertake a 40 to 60 page master's thesis. Each student is responsible for finding an adviser, who must approve the proposed topic before the end of Winter Quarter prior to anticipated graduation. Candidates register for up to 10 units of ENGLISH 399 with the faculty member who supervises the thesis work. The thesis is read and graded by the adviser and one other member of the English faculty.

Candidates who write a master's thesis may petition to be excused from up to 10 units of the electives described above. The additional 35 units normally consist of the four required courses and three elective courses. These courses are chosen by the student and approved by the adviser and the Director of Graduate Studies.

### COTERMINAL PROGRAM WITH SCHOOL OF EDUCATION

Students interested in becoming middle school and high school teachers of English may apply for admission to the coterminal teaching program (CTP) of the Stanford Teacher Education Program (STEP) in the School of Education. CTP students complete a special curriculum in English language, composition, and literature that combines a full English major with supplemental course work in subjects commonly taught in California public schools and a core program of foundational courses in educational theory and practice. They are then admitted to STEP for a fifth year of pedagogical study and practice teaching. Students who complete the curriculum requirements are able to enter STEP without the necessity of taking either the GRE or the usual subject matter assessment tests. At the end of five years, CTP students receive a B.A. in English, an M.A. in Education, and a California Secondary Teaching Credential. Students normally apply to the coterminal teaching program at the end of their sophomore year or at the beginning of their junior year. For complete program details and for information on how to apply, consult the Director of Undergraduate Studies in English or the CTP coordinator in the School of Education.

## DOCTOR OF PHILOSOPHY IN ENGLISH

### ADMISSION

Students with a bachelor's degree in English or a closely related field may apply to pursue graduate work toward an advanced degree in English at Stanford. Applicants for admission to graduate work must take the General Test of the Graduate Record Examination and the Subject Test in Literature. International students whose first language is not English are also required to take the TOEFL examination (with certain exceptions: see <http://gradadmissions.stanford.edu>).

### DEGREE REQUIREMENTS

University requirements for the Ph.D. are described in the "Graduate Degrees" section of this bulletin.

*Tracks*—Doctoral students may follow one of two tracks: English and American Literature or English and Comparative Literature.

*Requirements*—The following department requirements, dealing with such matters as residence, dissertation, and examinations, are in addition to the University's basic requirements for the doctorate. Students should consult the most recent edition of *The Ph.D. Handbook*; copies are available in the English graduate studies office.

A candidate for the Ph.D. degree must complete three years (nine quarters) of full-time work, or the equivalent, in graduate study beyond the bachelor's degree. Candidates are required to complete at least 135 units of graduate work in addition to the doctoral dissertation. At least three consecutive quarters of graduate work, and the final course work in the doctoral program, must be taken at Stanford.

A student may count no more than 65 units of non-graded courses toward the 135 course units required for the Ph.D., without the written consent of the Director of Graduate Studies. A student takes at least 70 graded units (normally fourteen courses) of the 135 required total units. 5 of these 70 units may be fulfilled with ENGLISH 398 or 398R. ENGLISH 396L, ENGLISH 397A, and ENGLISH 399 do not count toward the 70 graded units. No more than 10 units (normally two courses) may come from 100-level courses.

This program is designed to be completed in five years. Five quarters of supervised teaching, two as a teaching assistant in a literature course, one as a teaching apprentice, and two as the instructor of a Program in Writing and Rhetoric (PWR) course, are a requirement of the Ph.D. program.

In the first quarter of their first year, students take a 2-unit seminar in pedagogy as preparation for their initial teaching assistantship. In the first quarter of their second year, students take a pedagogy seminar and an apprentice teaching program. The seminar and apprentice teaching constitute a 50-percent teaching appointment. Apprentice teachers attend the classes and conferences of a senior mentor/instructor for two to three weeks. While teaching during the second and third quarters of the second year, students continue to participate in a series of PWR pedagogy workshops and visit one another's classrooms.

I. *English and American Literature*—Students are expected to do course work across the full range of English and American literature. Students are required to fulfill the following requirements. Note: fulfillment of requirements 1, 2, and 3 must be through Stanford courses; students will not be excused from these three requirements or granted credit for course work done elsewhere.

1. ENGLISH 396. Introduction to Graduate Study for Ph.D. Students (5 units) -- introduces students to the methods of literary study, and ENGLISH 396L. Pedagogy Seminar I, for first year students (2 units).
2. Graduate-level (at least 200-level) course work in English literature before 1700, and English and American literature after 1700 (at least 5 units of each).

3. Graduate-level (at least 200-level) course work in some aspect of literary theory such as courses in literary theory itself, narrative theory, poetics, rhetoric, cultural studies, gender studies (at least 5 units).
4. Students concentrating in British literature are expected to take at least one course (5 units) in American literature; students concentrating in American literature are expected to take at least one course (5 units) in British literature.
5. Of all courses taken, a minimum of six courses for a letter grade must be graduate colloquia and seminars, of which at least three must be graduate seminars. The colloquia and seminars should be from different genres and periods, as approved by the adviser.
6. Completion, in Autumn Quarter of the second year, of a pedagogy seminar which includes the apprentice teaching program described above, and a series of pedagogy workshops during Winter and Spring Quarters. There are no units associated with this work.
7. The remaining units of graded, graduate-level courses and seminars should be distributed according to the adviser's judgment and the candidate's needs. A student may receive graduate credit for no more than two 100-level courses in the Department of English.
8. Consent of the adviser if courses taken outside the Department of English are to count toward the requirement of 70 graded units of course work.
9. An oral qualifying examination based on a reading guide, to be taken at the end of the summer after the first year of graduate work. The final decision as to qualification is made by the graduate studies committee in consideration of the student's overall record for the first year's work in conjunction with performance on the examination. Note: A student coming to the doctoral program who has done graduate work at another university must petition in the first year at Stanford for transfer credit for course work completed elsewhere. The petition should list the courses and grades, and describe the nature and scope of course work, as well as the content, contact hours, and writing requirements. A syllabus must be included. The Director of Graduate Studies considers the petition in conjunction with the student's overall performance.
10. *University Oral Examinations*—A University oral examination covering the field of concentration (as defined by the student and the student's adviser). This examination, based on a reading list established by the candidate in consultation with his or her adviser, is normally taken no later than the Spring Quarter of the third year of graduate study.
11. *Dissertation*—As early as possible during graduate study, a Ph.D. candidate is expected to find a topic requiring extensive original research and to seek out a member of the department as his or her adviser. The adviser works with the student to select a committee to supervise the dissertation. Candidates should take this crucial step as early in their graduate careers as possible. The committee may well advise extra preparation within or outside the department, and time should be allowed for such work. After the dissertation topic has been approved, the candidate should file a formal reading committee form as prescribed by the University. The dissertation must be submitted to the adviser as a rough draft, but in substantially final form, at least four weeks before the University deadline in the quarter during which the candidate expects to receive the Ph.D. degree.
12. *Committee*—The doctoral dissertation reading committee consists of the principal dissertation adviser and two other readers. At least one of these three must be from the English department. Normally, all members are on the Stanford Academic Council.

II. *English and Comparative Literature*—The Ph.D. program in English and Comparative Literature is designed for students wishing an extensive knowledge of the literature, thought, and history of England and of at least one foreign country, for one

period. Approximately half of the student's course work and reading is devoted to this period, with the remainder of the time given to other periods of English and American literature since 1350.

This degree, administered by the Department of English, is to be distinguished from the Ph.D. in Comparative Literature. The latter program is intended for students unusually well prepared in foreign languages and involves advanced work in three literatures, one of which may be English. Interested students should consult a Department of English adviser, but faculty from Comparative Literature may also provide useful supplementary information.

The requirements are as follows:

1. Knowledge of the basic structure of the English language and of Chaucer. This requirement may be met by examination, or by taking 10 units of courses chosen from among those offered in linguistics, English philology, and early and middle English literature including Chaucer. No particular courses are required of all students.
2. A 5-unit course, ENGLISH 396. Introduction to Graduate Study, and a 2-unit course, ENGLISH 396L. Seminar in Pedagogy I.
3. Completion, in Autumn Quarter of the second year, of a pedagogy seminar, which includes the Apprentice Teaching Program described above, and a series of pedagogy workshops during winter and spring quarter. There are no units associated with this work.
4. A knowledge of one foreign language sufficient to take graduate-level literature courses in a foreign-language department and an advanced reading knowledge of a second language.
5. A minimum of 45 units in the history, thought, and literature of one period, in two or more languages, one of which must be English and one foreign. Students normally include at least two courses in a foreign literature read in the original language and two courses listed under Comparative Literature or Modern Thought and Literature. As many as 20 units of this requirement may be satisfied through courses in reading and research. A student may receive graduate credit for no more than two 100-level courses in the Department of English.
6. A minimum of six courses for a letter grade from graduate colloquia and graduate seminars, of which three must be graduate seminars and of which at least four must be in the Department of English. Among these courses, students should take one in literary theory or criticism. These colloquia and seminars should be in different genres and periods as approved by the adviser.
7. An oral qualifying examination: see item 9 under requirements of the Ph.D. program in English Literature. For qualifications in the doctoral program in English and Comparative Literature, candidates are not held responsible for literature before 1350, but instead include on their reading list a selection of works from a foreign literature read in the original language.
8. *University Oral Examinations*—A University oral examination covering the field of concentration (as defined by the student and the student's adviser). This examination, based on a reading list established by the candidate in consultation with his or her adviser, is normally taken no later than the Spring Quarter of the third year of graduate study.
9. *Dissertation*—As early as possible during graduate study, a Ph.D. candidate is expected to find a topic requiring extensive original research and to seek out a member of the department as his or her adviser. The adviser works with the student to select a committee to supervise the dissertation. Candidates should take this crucial step as early in their graduate careers as possible. The committee may well advise extra preparation within or outside the department, and time should be allowed for such work. After the dissertation topic has been approved, the candidate should file a formal reading committee form as prescribed by the University. The dissertation must be submitted to the adviser as a rough draft, but in substantially final form, at least four weeks before the University deadline

in the quarter during which the candidate expects to receive the Ph.D. degree.

10. *Committee*—The doctoral dissertation reading committee consists of the principal dissertation adviser and two other readers. At least one of these three must be from the English department. Normally, all members are on the Stanford Academic Council.

### LANGUAGE REQUIREMENTS

Candidates for the Ph.D. degree (except those in English and Comparative Literature, for whom special language requirements prevail) must demonstrate a reading knowledge of two foreign languages. Candidates in the earlier periods must offer Latin and one of the following languages: French, German, Greek, Italian, or Spanish. In some instances, they may be required to offer a third language. Candidates in the later period (that is, after the Renaissance) must offer either French, German, or Latin as one language and may choose the second language from the following: Greek, Latin, French, German, Italian, Spanish, Russian, or another language relevant to the student's field of study. In all cases, the choice of languages offered must have the approval of the candidate's adviser. Any substitution of another language must be approved by the Director of Graduate Studies.

The graduate studies committee does not accept courses taken as an undergraduate in satisfaction of the language requirement for doctoral candidates. For students coming to doctoral work at Stanford from graduate work done elsewhere, satisfaction of a foreign language requirement is determined by the Director of Graduate Studies based on the contact hours, syllabus, reading list, etc. Transfer is not automatic.

The candidate must satisfy one language requirement by the end of the first year (that is, before the qualifying examination), and the other by the end of the third year.

Foreign language requirements for the Ph.D. may be fulfilled in any of the following ways:

1. A reading examination given each quarter by the various language departments, except for Latin and Greek.
2. For Latin and Greek, an examination given by one of the Department of English faculty.
3. Passage with a grade of 'B' or higher of a course in literature numbered 100 or higher in a foreign language department at Stanford. As an alternative for Latin, French, Italian, German, and Spanish, passage of CLASSLAT 51 and 52 or CLASSLAT 10, FRENLANG 50, ITALLANG 50, GERLANG 52, and SPANLANG 50, respectively, with a grade of 'B' or higher.

### OVERSEAS STUDIES COURSES IN ENGLISH

For course descriptions and additional offerings, see the listings in the *Stanford Bulletin's* ExploreCourses web site (<http://explorecourses.stanford.edu>) or the Bing Overseas Studies web site (<http://bosp.stanford.edu>). Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

### AUTUMN QUARTER

#### OXFORD

- OSPOXFRD 163X. Shakespeare: Critical Commentary. 5 units, Richard Rowley, GER:DB:Hum

### WINTER QUARTER

#### OXFORD

- OSPOXFRD 17. The Novel of Sensation: Gothic, Detective, Prohibition and Transgression in Victorian Fiction. 5 units, Emma Plaskitt, GER:DB:Hum
- OSPOXFRD 23. William Blake: Poet and Painter. 5 units, Denise Gigante, GER:DB:Hum

- OSPOXFRD 39. Romantic Poetry. 5 units, Denise Gigante, GER:DB:Hum

### SPRING QUARTER

#### OXFORD

- OSPOXFRD 57. The Rise of the Woman Writer, 1660-1860. 4-5 units, Emma Plaskitt, GER:DB:Hum

## ETHICS IN SOCIETY PROGRAM

*Faculty Director:* Rob Reich (on leave)

*Interim Faculty Director:* Brent Sockness (Religious Studies)

*Affiliated Faculty:* Kenneth Arrow (Economics, emeritus), Donald Barr (Pediatrics), Barton Bernstein (History), Michael Bratman (Philosophy), Eamonn Callan (Education), Albert Camarillo (History), Joshua Cohen (Philosophy, Political Science, Law), Barbara Fried (Law), Leah Gordon (Education), Nadeem Hussain (Philosophy), Allyson Hobbs (History), Aishwary Kumar (History), Scotty McLennan (Dean of Religious Life), Benoît Monin (Psychology/Graduate School of Business), Josiah Ober (Classics, Political Science), Eric Roberts (Computer Science), Debra Satz (Philosophy), Tamar Schapiro (Philosophy, on leave), Mitchell Stevens (Education), David K. Stevenson (Pediatrics), Allen Wood (Philosophy, emeritus), Sylvia Yanagisako (Anthropology), Lee Yearley (Religious Studies)

*Program Office:* Stanford Law School, Third Floor

*Mail Code:* 94305-8610

*Email:* [brdinh@stanford.edu](mailto:brdinh@stanford.edu)

*Phone:* (650) 736-2629

*Web Site:* <http://ethicsinsociety.stanford.edu>

Courses offered by the Program in Ethics in Society are listed under the subject code ETHICSOC on the *Stanford Bulletin's* ExploreCourses web site. There are many course offerings at Stanford that address moral and political questions only some of which are crosslisted by the Program in Ethics in Society.

The Program in Ethics in Society, which operates under the umbrella of the Bowen H. McCoy Family Center for Ethics in Society, is designed to foster scholarship, teaching, and moral reflection on fundamental issues in personal and public life. The program is grounded in moral and political philosophy, but it extends its concerns across a broad range of traditional disciplinary domains. The program is guided by the idea that ethical thought has application to current social questions and conflicts, and it seeks to encourage moral reflection and practice in areas such as business, international relations, law, medicine, politics, science, and public service.

### HONORS IN ETHICS IN SOCIETY

The Program in Ethics in Society offers undergraduates the opportunity to write a senior honors thesis within a community of interdisciplinary scholars. The course of study combines the analytical rigor of moral and political philosophy with the subject matter of each student's self-chosen major to develop a sophisticated understanding of problems of social concern. Such problems include: the nature and implications of treating people with equal dignity and respect; the scope of liberty; the legitimacy of government; and the meaning of responsibility. The program poses these issues and others in the context of debates which arise in our common public life. It thus extends moral concern and reflection across disciplines such as medicine, law, economics, political science, sociology, international relations, and public policy.

Students in the program write honors theses on topics which use moral and political philosophy to address practical problems. Previous theses have considered questions such as the just distribution of health care, obligations to future generations, the role of moral values in education, the moral implications of genetic

engineering, and the relationship between gender inequality and the structures of work and family. Students in the program have won scholarships to graduate study including Marshall, Rhodes, and Fulbright fellowships. Others have taken the step from moral analysis to moral commitment, pursuing careers of public service.

The honors program in Ethics in Society is open to majors in every field and must be taken in addition to a department major. Students should apply for entry at the end of Spring Quarter of the sophomore year or at the beginning of Autumn Quarter of the junior year. Applicants should have a cumulative grade point average (GPA) of 3.3 (B+) or higher. They should also maintain this minimum average in the courses taken to satisfy the requirements. Required courses must be taken for a letter grade. Students interested in pursuing honors in Ethics in Society should contact the program coordinator for more information and to begin the application process.

## REQUIREMENTS

1. ETHICSOC 20. Introduction to Moral Theory (same as PHIL 2); *or* ETHICSOC 170. Ethical Theory (same as PHIL 170)
2. ETHICSOC 171. Justice (same as IPS 208, PHIL 171, POLISCI 136S, PUBLPOL 103C/307)
3. Two 4- or 5-unit undergraduate courses on a subject approved by the faculty director, designed to support research conducted for or connected to the honors thesis.
4. ETHICSOC 190. Honors Seminar
5. ETHICSOC 200 A and B. Honors Thesis. Thesis subject must be approved by the honors adviser and students must receive a grade of 'B+' or higher on their thesis to receive honors in Ethics in Society.

Typically, ETHICSOC 20 or 170 and ETHICSOC 171 (requirements 1 and 2) are completed before the Winter Quarter of the junior year. ETHICSOC 190 (requirement 4) is only offered in Winter Quarter and should be taken in the junior year. Specialization courses (requirement 3) can be completed at any time. Courses taken prior to acceptance in the Program can be used to fulfill this requirement. The honors thesis is written during Autumn and Winter quarters of the senior year and is generally due the first Monday in May. Students also complete preliminary and final thesis presentations in the senior year and an oral examination after submission of the thesis. To receive honors in Ethics in Society, students must fulfill all requirements and receive a grade of B+ or higher on their thesis. Courses taken to fulfill the Ethics in Society honors requirements may be double-counted for any major. Exceptions to this must be approved by the faculty director.

## COURSES

### ETHICS IN SOCIETY

- ETHICSOC 10. Ethics in Theory and Practice (same as PHIL 22)
- ETHICSOC 20. Introduction to Moral Philosophy (same as PHIL 2)
- ETHICSOC 133. Ethics and Politics of Public Service (same as CSRE 178, HUMBIO 178, PHIL 175A/275A, POLISCI 133, PUBLPOL 103D)
- ETHICSOC 136R. Introduction to Global Justice (same as INTNLREL 136R, PHIL 76, POLISCI 136R/336)
- ETHICSOC 157/257. Moral Foundations of Capitalism
- ETHICSOC 170. Ethical Theory (same as PHIL 170/270)
- ETHICSOC 171. Justice (same as IPS 208, PHIL 171/271, POLISCI 136S/336S, PUBLPOL 103C/307)
- ETHICSOC 174L/274L. Betrayal and Loyalty, Treason and Trust (same as LAW 520, PHIL 174L/274L)
- ETHICSOC 177M/277M. Human Rights and Moral Questions (same as PHIL 177M/277M)
- ETHICSOC 178M/278M. Justice and the Environment (same as PHIL 178M/278M, POLISCI 134L)
- ETHICSOC 185M. Contemporary Moral Problems (same as PHIL 72)

- ETHICSOC 190. Honors Seminar
- ETHICSOC 199. Independent Studies in Ethics in Society
- ETHICSOC 200 A and B. Honors thesis credits
- ETHICSOC 232T. Theories of Civil Society, Philanthropy, and the Nonprofit Sector (same as POLISCI 236)
- ETHICSOC 280. Transitional Justice, International Criminal Tribunals, and the International Criminal Court (same as IPS 280)

### COGNATE COURSES

This is a partial list of courses that may be used to fulfill requirement 3. Courses not on this list can be submitted to the faculty director for approval.

- ANTHRO 90B. Theory of Cultural and Social Anthropology
- ANTHRO 179. Cultures of Disease: Cancer
- BIOMEDIN 109Q. Genomics: A Technical and Cultural Revolution (same as GENE 109Q)
- CLASSGEN 81. Philosophy and Literature (same as PHIL 81)
- COMM 131/231. Media Ethics and Responsibility
- COMPLIT 226. Narrative and Ethics (same as GERLIT 242)
- CS 181. Computers, Ethics, and Public Policy
- EDUC 165/265. History of Higher Education in the U.S. (same as HISTORY 158C)
- EDUC 167. Educating for Equity and Democracy
- EDUC 201. History of Education in the United States (same as HISTORY 158B)
- EDUC 216X. Education, Race, and Inequality in African American History (same as HISTORY 255E)
- EDUC 220C. Education and Society (same as SOC 130/230)
- EDUC 247. Moral Education
- HISTORY 209C. Liberalism and Violence: A Conceptual History
- HUMBIO 122S. Social Class, Race, Ethnicity, Health
- HUMBIO 174. Foundations of Bioethics
- IPS 241. International Security in a Changing World (same as POLISCI 114S)
- MED 83Q. Ethical, Legal, and Social Dimensions of Stem Cell Research
- MS&E 254. The Ethical Analyst
- POLISCI 1. Introduction to International Relations
- POLISCI 123. Politics and Public Policy (same as PUBLPOL 101/201)
- PUBLPOL 183. Philanthropy and Social Innovation
- URBANST 131. Social Innovation and the Social Entrepreneur

### MINOR IN ETHICS IN SOCIETY

The Ethics in Society minor is open to students in any department who wish to explore moral issues in personal and public life.

Students must declare the minor in Axxess no later than the last day of Autumn quarter of their senior year, although they are advised to declare sooner. The student should discuss the minor with an adviser and prepare a proposal that includes a list of courses planned to fulfill the requirements, theme of minor study, and the name of the faculty adviser. The faculty director approves this proposal. Students interested in pursuing a minor in Ethics in Society should contact the program coordinator for more information and to begin the planning process.

A minor in Ethics in Society requires six courses for a minimum of 25 and a maximum of 30 units. Required courses must be taken for a letter grade.

### REQUIREMENTS

1. ETHICSOC 20. Introduction to Moral Theory (same as PHIL 2) *or* ETHICSOC 170. Ethical Theory (same as PHIL 170)
2. ETHICSOC 171. Justice (same as IPS 208, PHIL 171, POLISCI 136S, PUBLPOL 103C/307)

3. Three courses at the 100 level or above that address some dimension of moral or political theory or practice.
4. One course at the 200 level or above that addresses a moral or political problem, in either theory or practice.

See the course list in the "Honors in Ethics and Society" section of this bulletin for courses that fulfill requirements 3 and 4. The faculty director may approve additional courses.

The 100- and 200-level courses should be focused around a central theme such as biomedical ethics, ethics and economics, ethics and politics, or environmental ethics. The courses at the 100 and 200 level are normally taken after completion of requirements 1 and 2.

Subject to the approval of the faculty director of the Ethics in Society Program, a course covering similar subject matter in another department or program may be substituted for ETHICSOC 20, 170, or 171. No course credited to the Ethics in Society minor may be double-counted toward major requirements.

## FEMINIST STUDIES

*Director:* Heather Hadlock

*Program Committee:* Heather Hadlock (Music), Shelley Correll (Sociology), Estelle Freedman (History), Helen Longino (Philosophy), Valerie Miner (Feminist Studies), Elizabeth Tallent (English), Christine Min Wotipka (Education)

### **Resource Faculty:**

*American Studies:* Shelley Fisher Fishkin

*Anthropology:* Melissa Brown, Paulla Ebron, Miyako Inoue, Sarah Jain, Matthew Kohrman, Barbara Voss, Sylvia Yanagisako

*Art and Art History:* Terry Berlier, Wanda Corn (emerita), Pamela Lee, Melinda Takeuchi

*Asian Languages:* James R. Reichert, Yoshiko Matsumoto

*Biology:* Joan Roughgarden (emerita)

*Business:* Joanne Martin (emerita)

*Classics:* Maud Gleason, Susan Stephens

*Comparative Literature:* Petra Dierkes-Thrun, Patricia Parker

*Developmental Biology:* Ellen Porzig

*Drama:* William Eddelman (emeritus), Harry J. Elam, Cherríe Moraga, Peggy Phelan

*East Asian Languages and Cultures:* Yoshiko Matsumoto, James Reichert

*Education:* Susanna Loeb, Myra Strober (emerita), Christine Min Wotipka

*English:* Eavan Boland, Helen Brooks, Terry Castle, Michele Elam, Barbara Gelpi (emerita), Claire Jarvis, Andrea Lunsford, Paula Moya, Stephen Orgel, Ramón Saldivar, Stephen Hong Sohn, Jennifer Summit, Elizabeth Tallent

*Feminist Studies:* Nicole Baran, Kathleen Coll, Andrea Rees Davies, Shana Goldin-Perschbacher, Patricia Karlin-Neumann, Susan Krieger, Valerie Miner

*French and Italian:* Cecile Alduy, Marisa Galvez, Carolyn Springer

*German Studies:* Russell Berman, Kathryn Strachota

*History:* Philippe Buc, Paula Findlen, Estelle Freedman, Allyson Hobbs, Katherine Jolluck, Nancy Kollmann, Carolyn Lougee Chappell, Paul Robinson (emeritus), Londa Schiebinger, Matthew Somner, Laura Stokes, Kären Wigen

*Human Biology:* Anne Firth-Murray

*Iberian and Latin American Cultures:* Yvonne Yarbro-Bejarano

*Law:* Deborah Rhode

*Linguistics:* Penelope Eckert, Arnold Zwicky

*Medical School:* Ann Arvin, Helen Blau, Roy King, Cheryl Koopman, Iris Litt (emerita)

*Music:* Heather Hadlock

*Philosophy:* Helen Longino, Debra Satz

*Political Science:* Lisa Blaydes, Terry Karl

*Psychology:* Albert Bandura, Laura Carstensen, Hazel Markus

*Religious Studies:* Charlotte Fonrobert, Hester Gelber, Linda Hess

*Slavic Languages and Literatures:* Monika Greenleaf

*Sociology:* Shelley Correll, Cecilia Ridgeway

*Program Office:* Serra House, 589 Capistrano Way

*Mail Code:* 94305-8640

*Phone:* (650) 723-2412

*Email:* zamoram@stanford.edu

*Web Site:* <http://feminist.stanford.edu>

Courses offered by the Program in Feminist Studies are listed under the subject code FEMST on the *Stanford Bulletin's* ExploreCourses web site.

Each Feminist Studies student builds an individual program of study around a self-defined thematic focus, integrating courses from multiple departments. The Program offers an undergraduate major and minor, and an interdisciplinary honors program that is open to students in all majors. The program encourages work in the arts and supports creative honors theses.

Feminist Studies awards the annual Michelle Z. Rosaldo Prizes and Francisco Lopez Prizes for the best undergraduate scholarship on women, feminism, gender, or sexuality. The Rosaldo Prizes are awarded for the best essay and honors thesis or master's paper in the social sciences, and the Lopez Prizes for the best essay and honors thesis or master's paper in the humanities. See <http://stanford.edu/dept/femstudies/opportunities> for details.

Curriculum guidelines and forms for the major, minor, and honors are available at the Feminist Studies office or at <http://feminist.stanford.edu>. Students interested in Feminist Studies should consult the program mentor.

## MISSION OF THE UNDERGRADUATE PROGRAM IN FEMINIST STUDIES

The interdepartmental Program in Feminist Studies provides students with the background and skills to investigate the significance of gender and sexuality in all arenas in human life. The program coordinates courses offered across the University into a curriculum in feminist and queer/LGBT studies, with an emphasis on diversity and transnationality. Feminist Studies majors examine how societies structure gender roles, relations, and identities, and how these intersect with other relations of power, such as class, race, ethnicity, sexuality, and age. Students employ feminist theories and methodologies to expand and reevaluate the assumptions about gender and sexuality that inform the study of individuals, cultures, social institutions, policy, and other areas of scholarly inquiry. The program prepares majors for graduate study in humanities and social sciences, and for professional schools.

## LEARNING OUTCOMES

The program expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the program's undergraduate program. Students are expected to demonstrate:

1. knowledge of the histories of feminist and/or queer social movements and their intersections with other social justice movements.
2. understanding of how the interdisciplinary field of Feminist Studies relates to feminist and/or queer social movements.
3. knowledge and comprehension of feminist and/or queer theories and methods for social and cultural-literary analysis.
4. skill in making and communicating feminist/queer analyses of data, texts, and arguments.

## BACHELOR OF ARTS IN FEMINIST STUDIES

The major in Feminist Studies requires 63 units and may be taken as a single major, as one of multiple majors, or as a secondary major. If taken as one of multiple majors, none of the 63 units counted toward the major in Feminist Studies may overlap with units counted toward the major in another department or program. If taken as a secondary major, up to 30 of the units counted toward the Feminist Studies major may also be counted as fulfilling the major requirements in another department or program



if that department or program consents. A maximum of 10 of the 63 units for the major may be taken on a credit/no credit or satisfactory/no credit basis; a maximum of 10 units may be taken as independent study or directed reading. FEMST core courses must be taken for a letter grade.

The major should be declared before the beginning of the junior year. Students declare the major by developing a proposal with the help of the program mentor and a faculty adviser from the list of resource faculty. The proposal describes the student's thematic focus and outlines a course of study. The proposal must be approved by the student's adviser and the Program Director.

## CURRICULUM

The major in Feminist Studies includes a total of at least 12 courses at the 100 level or above for 63 units. The courses are divided among the core, the focus, and electives to reach the total course requirement.

### THE CORE

1. FEMST 101. Introduction to Feminist Studies. This course must be taken before FEMST 103.
2. Designated feminist theory course. The Feminist Studies web site lists courses that fulfill the theory requirement this year.
3. FEMST 103. Feminist Theories and Methods Across the Disciplines. Prerequisite: FEMST 101.
4. FEMST 104A,B. Practicum.
5. One Feminist Studies or cognate course in the social sciences. (e.g. Anthropology, Communication, Education, History, Human Biology, Law, Medicine, Political Science, Psychology, or Sociology).
6. One Feminist Studies or cognate course in the humanities (e.g. English, Linguistics, Philosophy, Religious Studies, the arts, and languages).

### PRACTICUM

The practicum (FEMST 104A, B) brings together theory and practical experience. The practicum should involve field research, community service, or other relevant experience such as a public service internship. Students plan their practicum during Winter Quarter of the junior year in FEMST 104A, Junior Seminar and Practicum (1 unit). The practicum is normally done over the summer between junior and senior year, and may be taken for additional units. It is followed by FEMST 104B, Senior Seminar and Practicum (2 units), in Autumn Quarter of the senior year.

### THE FOCUS

Every student designs a thematic focus consisting of at least five courses in addition to the core. The thematic focus is not declared on Axess; it does not appear on the transcript or diploma.

1. The focus should be designed in consultation with the student's advisers. The following are examples, and students are encouraged to develop new ones:
  - Chicana Feminisms
  - Crosscultural Perspectives on Gender
  - Feminist Perspectives on Science and Technologies
  - Gender and Education
  - Gender, Race, and Nation/Transnational Feminisms
  - Gender Justice and Human Rights
  - Masculinities
  - Queer/LGBT Studies
  - Race, Class and Gender
  - Women, Creativity, and the Arts
  - Gender, Health and Medicine
  - Gender, Spirituality and Religion
2. At least three of the focus courses should be Feminist Studies or cognate courses.
3. At least one course should be a major survey, methodology, or theory course offered by a department or interdepartmental program as an initiation into the practice of study in the field.
4. At least one course within the thematic focus should address race/ethnicity and/or global perspectives.

## ELECTIVES

Students are encouraged to take electives that provide intellectual breadth and contribute to the 63-unit requirement.

## WRITING IN THE MAJOR (WIM)

Majors in Feminist Studies may satisfy the Writing in the Major (WIM) requirement by taking FEMST 153, Women and the Creative Imagination, or one of the approved WIM cognate courses. Honors students satisfy the WIM requirement through their honors work.

## HONORS CERTIFICATION

### FEMINIST STUDIES MAJORS/MINORS

*Admission*—The honors program offers an opportunity to do independent research for a senior thesis. It is open to students with a grade point average (GPA) of 3.3 or better in course work in Feminist Studies. Students must begin the application process for honors certification by meeting with the program mentor by May 1 of their junior year, but are encouraged to apply earlier. During the application process, students will design a project in consultation with their proposed thesis adviser and the Feminist Studies staff. A proposal describing the project and the number of units to be taken toward the honors directed project must be submitted to the director of the program for final approval. All projects must have a primary focus on gender or sexuality. See the Feminist Studies web site for details.

#### *Requirements*—

1. In addition to the normal requirements for the major, students enroll in FEMST 105 with their honors thesis adviser for 10-15 units towards the preparation of the honors thesis. These units may be distributed throughout the academic year.
2. Throughout the senior year, students work with faculty advisers and meet quarterly as a group. The final thesis must be submitted by the last day of classes in the Spring of their senior year. The completed thesis must carry the adviser's signature of approval. Creative projects must include a section of critical analysis. For guidelines, see <http://feminist.stanford.edu>.

### MAJORS IN OTHER DEPARTMENTS

Honors certification in Feminist Studies for majors in other departments or programs, as distinguished from honors for students pursuing a major in Feminist Studies, is intended to complement study in any major.

*Admission*—Honors certification is open to students majoring in any field with a GPA of 3.3 or better.

As a prerequisite, students must complete the following courses with a grade of (B+) or better:

1. FEMST 101 and a designated feminist theory course
2. or three Feminist Studies courses and/or cognate courses related to the topic of their proposed honors research.

Students must begin the application process for honors by meeting with the program staff by May 1st of their junior year, but are encouraged to begin earlier. During the application process, students outline a plan for course work and design an honors project in consultation with their proposed thesis adviser. The final proposal describing the project and the number of units to be taken toward the honors directed project must be submitted to the Director of the program for final approval. See the Feminist Studies web site for more details.

#### *Requirements*—

1. Students enroll in FEMST 105 with their honors thesis adviser for 10-15 units towards the preparation of the honors thesis. These units may be distributed throughout the academic year.
2. Throughout the senior year, students work with faculty advisers and meet quarterly as a group. The final thesis must be submitted by the last day of classes in the Spring of their senior year. The completed thesis must carry the adviser's signature of approval. Creative projects must include a section of critical analysis. For more information, see <http://feminist.stanford.edu>.

## COGNATE COURSES

The following is a partial list of cognate courses for Feminist Studies. Please refer to the program web site for updated lists throughout the year. See department listings for course descriptions and General Education Requirements (GER) information. See degree requirements above or the program mentor for applicability of these courses to a major or minor program.

- AFRICAAM 144. African Women Writers
- AFRICAAM 255. Racial Identity in the American Imagination
- AMSTUD 156H. History of Women and Medicine in the United States
- ANTHRO 111. Archaeology of Sex, Sexuality, and Gender
- ANTHRO 151. Women, Fertility, and Work
- ANTHRO 180. Science, Technology, and Gender
- ANTHRO 218. Literature, Politics, and Gender in Africa
- BIO 185. Evolution of Reproductive Social Behavior
- CHICANST 122. Introduction to Latina Literature
- CHICANST 160N. Salt of the Earth: Docudrama in America
- CHICANST 165A. Chicana/o History
- CHICANST 197. The Rite to Remember: Performance and Chicana Indigenous Thought
- CHINGEN 235. Chinese Bodies, Chinese Selves
- CLASSGEN 119. Gender and Power in Ancient Rome
- COMPLIT 141. Literature and Society in Africa and the Caribbean
- CSRE 145A. Poetics and Politics of Caribbean Women's Literature
- CSRE 177. Writing for Performance: The Fundamentals
- CSRE 183. Border Crossings and American Identities
- DANCE 160. Performance, Dance, and History: The Ballerina
- DRAMA 163. Performance and America
- DRAMA 177. Writing for Performance: The Fundamentals
- DRAMA 189Q. Mapping and Wrapping the Body
- ECON 144. Family Economics
- EDUC 113X. Gender and Sexuality in Schools
- EDUC 197. Education, Gender, and Development
- EDUC 201. History of Education in the United States
- EDUC 201B. Education for Liberation
- EDUC 273. Gender and Higher Education: National and International Perspectives
- ENGLISH 139B. American Women Writers, 1850-1920
- ENGLISH 145. Another Way to be: Writings by Women of Color
- FRENLIT 133. Literature and Society in Africa and the Caribbean
- HISTORY 134A. The European Witch Hunts
- HISTORY 161. U.S. Women's History, 1890s-1990s
- HISTORY 208. Private Lives, Public Stories: Autobiography in Women's History
- HISTORY 208B. Women Activists' Response to War
- HISTORY 221B. The Woman Question in Modern Russia
- HISTORY 227. East European Women and War in the 20th Century
- HISTORY 233B. Early Modern Sexualities
- HISTORY 244C. The History of the Body in Science, Medicine, and Culture
- HISTORY 255D. Racial Identity in the American Imagination
- HISTORY 258. History of Sexuality in the U.S.
- HISTORY 261. Race, Gender, and Class in Jim Crow America
- HISTORY 293B. Homosexuality in Historical and Comparative Perspective
- HISTORY 295J. Chinese Women's History
- HUMBIO 125. Current Controversies in Women's Health
- HUMBIO 129. Critical Issues in International Women's Health
- ILAC 117N. Film, Nation, Latinidad
- ILAC 193. The Cinema of Pedro Almodóvar

- ILAC 272E. Clarice Lispector: the Style of Ecstasy
- ILAC 280. Latina/o Literature
- ILAC 326. Philosophies of Otherness: Aesthetics of Difference
- ILAC 380E. Critical Concepts in Chicana/o Literature
- ILAC 389E. Race, Gender and Sexuality in Cultural Representations
- INDE 245. Women and Health Care
- LINGUIST 156. Language and Gender
- MED 108Q. Human Rights and Health
- MED 240. Sex Differences in Human Physiology and Disease
- OBGYN 240. Sex Differences in Human Physiology and Disease
- OBGYN 256. Current Controversies in Women's Health
- POLISCI 141. The Global Politics of Human Rights
- RELIGST 112. Handmaids and Harlots: Biblical Women in Jewish and Christian Traditions
- RELIGST 156. Goddesses and Gender in Hinduism
- RELIGST 172. Sex, Body, and Gender in Medieval Religion
- RELIGST 263. Judaism and the Body
- SOC 123. Sex and Love in Modern Society
- SOC 134. Education, Gender, and Development
- SOC 142. Sociology of Gender
- SOC 273. Gender and Higher Education: National and International Perspectives
- SOC 323. Sociology of the Family
- SOC 339. Gender Meanings and Processes

## MINOR IN FEMINIST STUDIES

Students interested in minoring in Feminist Studies should consult the program mentor. The minor proposal should be drafted in discussion with a faculty adviser selected from the Feminist Studies resource faculty list.

The minor in Feminist Studies consists of at least six courses at the 100 level or above for a minimum of 30 and a maximum of 36 units. None of the units for the minor may count towards the student's major. The minor in Feminist Studies should be declared by Winter Quarter of a student's junior year.

### Requirements—

1. FEMST 101. Introduction to Feminist Studies. This must be taken before FEMST 103.
2. Designated feminist theory course, or FEMST 103, Feminist Theories and Methods Across the Disciplines.

### Focus—

A four-course thematic focus may be designed by the student or may follow one of the suggested clusters listed in the "Bachelor of Arts in Feminist Studies" section of this bulletin. One course within the thematic focus should address race/ethnicity and/or global perspectives.

## OVERSEAS STUDIES COURSES IN FEMINIST STUDIES

For course descriptions and additional offerings, see the listings in the *Stanford Bulletin's* ExploreCourses web site (<http://explorecourses.stanford.edu>) or the Bing Overseas Studies web site (<http://bosp.stanford.edu>). Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

## SPRING QUARTER

### FLORENCE

OSPFLOR 67. Women in Italian Cinema: Maternity, Sexuality and the Image. 4 units, Ermelinda Campani, GER:DB:Hum, EC:Gender

# FINANCIAL MATHEMATICS

*Director:* Tze Leung Lai

*Steering Committee:* Amir Dembo, Kay Giesecke, Tze Leung Lai, Art Owen, George Papanicolaou, James Primbs, Kenneth Singleton

**Core Faculty:**

*Business:* Darrell Duffie, J. Michael Harrison, Kenneth Singleton  
*Economics:* Peter Hansen, Mordecai Kurz, Monika Piazzesi, John Shoven

*Electrical Engineering:* Thomas Cover

*Management Science and Engineering:* Kay Giesecke, Peter Glynn, David Luenberger, James Primbs

*Mathematics:* Simon Brendle, Isabelle Camilier, Amir Dembo, Persi Diaconis, George Papanicolaou

*Statistics:* Thomas Cover, Amir Dembo, Persi Diaconis, David Donoho, Tze Leung Lai, Art Owen, Bala Rajaratnam

The departments of Mathematics and Statistics, in close cooperation with the departments of Economics and Management, Science, and Engineering, and the Graduate School of Business, offer an interdisciplinary Master of Science degree in Financial Mathematics. The Financial Mathematics program provides a master's-level education in applied and computational mathematics, statistics, and financial applications.

## GRADUATE PROGRAM IN FINANCIAL MATHEMATICS

The department offers a Master of Science in Financial Mathematics. University requirements for the M.S. are described in the "Graduate Degrees" section of this bulletin.

## MASTER OF SCIENCE IN FINANCIAL MATHEMATICS

*Admission*—To be eligible for admission, students are expected to have excelled in the following courses or their equivalent:

1. Linear algebra at the level of MATH 104.
2. Real analysis (Advanced Calculus) at the level of MATH 115.
3. Basic ordinary and partial differential equations at the level of MATH 131 and 132.
4. Probability at the level of STATS 116; theory of statistics at the level of STATS 200; and stochastic processes at the level of STATS 217 or, preferably, MATH 136/STATS 219.
5. Computer programming at the level of CS 106A,B or X.

Some of these courses (e.g. STATS 116) are usually offered during the Summer Quarter so candidates lacking the required background may take them then.

Candidates for admission must take the general Graduate Record Examination and may take the subject test in Mathematics as well. Information about these exams can be found at <http://www.gre.org>.

*Requirements*—The program requires completion of 45 units of course work. Ordinarily, four quarters are needed to complete all requirements. Students who do not complete all requirements within three years of admission are terminated from the program.

Of these 45 units, six courses must be taken from the list of required courses and six must be taken from the list of elective courses, available below and on the program web site at <http://finmath.stanford.edu/academics/required.html> and <http://finmath.stanford.edu/academics/electives.html>. These courses must be taken for letter grades, but students may elect to take one of the 12 courses CR/NC. An overall grade point average (GPA) of 2.75 is required. There is no thesis requirement.

Any remaining units required to complete the 45 total must be taken from the following options, and may be taken for letter grades or CR/NC:

1. from the approved list of electives with emphasis on computation, information technology or finance

2. STATS 200, STATS 217, STATS 218, MATH 131, MATH 132, MATH 202 or ECON 140
3. additional (practical) CS courses
4. in the form of an industrial internship in the Bay Area or elsewhere, with the approval and supervision of a faculty member. A written report must be submitted upon completion of the internship. Students who choose to take credit for practical training must sign up for STATS 297 (1-3 units).

*Required Courses*—In partial fulfillment of the M.S. degree in Financial Mathematics, students must fulfill six required courses, with two from each of the following three core areas:

1. Stochastic Processes and Statistics
2. Differential Equations, Modeling, Simulation and Computing
3. Finance

The selection of these courses is to be done in consultation with the Program Director. The following courses can be counted toward the six required courses:

**Mathematics:**

MATH 227. Partial Differential Equations and Diffusion Processes

MATH 236. Introduction to Stochastic Differential Equations

MATH 238. Mathematical Finance (same as STATS 250)

MATH 239. Computation and Simulation in Finance

**Statistics:**

STATS 240. Statistical Methods in Finance

STATS 241. Financial Modeling Methodology and Applications

STATS 242. Algorithmic Trading and Quantitative Strategies

STATS 243. Statistical Methods and Models for Risk Management and Surveillance

STATS 315B. Modern Applied Statistics: Data Mining

STATS 362. Monte Carlo

**Management Science & Engineering:**

MS&E 347. Credit Risk: Modeling and Management

**Graduate School of Business:**

FINANCE 622. Dynamic Asset Pricing Theory

At the Program Director's discretion, courses taken previously that are equivalent to the above may be waived; in which case they must be replaced by elective courses in the same subject area.

*Elective Courses*—Each candidate must take at least six approved elective courses from the list below, with two from each of the three core areas:

1. Stochastic Processes and Statistics
2. Differential Equations, Modeling, Simulation and Computing
3. Finance

Other elective courses may be authorized by the Program Director if they provide skills relevant to financial mathematics and do not overlap with courses in the candidate's program.

**Mathematics:**

MATH 136. Stochastic Processes (same as STATS 219)

MATH 180. Introduction to Financial Mathematics

MATH 205A/B. Real Analysis

MATH 220. PDE of Applied Mathematics

MATH 222A. Computational Methods for Fronts, Interfaces, and Waves

MATH 227. Partial Differential Equations and Diffusion Processes

MATH 237. Stochastic Equations and Random Media

MATH 256A/B. Partial Differential Equations

MATH 261A/B. Functional Analysis

MATH 266. Time Frequency Analysis and Wavelets

**Statistics:**

STATS 202. Data Mining and Analysis

STATS 206. Applied Multivariate Analysis

STATS 207. Introduction to Time Series Analysis

STATS 212. Applied Statistics with SAS

STATS 219. Stochastic Processes (same as MATH 136)

STATS 220. Continuous Time Stochastic Control

STATS 227. Statistical Computing

STATS 235. Decision Making in Financial Services  
 STATS 237. Time Series Modeling and Forecasting  
 STATS 252. Data Mining and Electronic Business  
 STATS 254. Correspondence Analysis and Related Methods  
 (one time offering Aut 08-09)  
 STATS 305. Introduction to Statistical Modeling  
 STATS 306A. Methods for Applied Statistics  
 STATS 310A/B/C. Theory of Probability  
 STATS 315A/B/C. Modern Applied Statistics  
 STATS 317. Stochastic Processes  
 STATS 318. Modern Markov Chains  
 STATS 322. Function Estimation in White Noise  
 STATS 324. Multivariate and Random Matrix Theory  
 STATS 343. Time Series Analysis  
 STATS 376A. Information Theory

**Computer Science:**  
 CS 106B. Programming Abstractions  
 CS 106X. Programming Abstractions (Accelerated)  
 CS 193D. C++  
 CS 224M. Multi-Agent Systems  
 CS 295. Software Engineering  
 CS 229. Machine Learning  
 CS 249A. Object-Oriented Programming: A Modeling and  
 Simulation Perspective  
 CS 261. Optimization and Algorithmic Paradigms  
 CS 339. Topics in Numerical Analysis  
 CS 365. Randomized Algorithms

**Economics:**  
 ECON 190. Introduction to Financial Accounting  
 ECON 202N-203N. Core Economics: Modules 1 and 2, 5 and 6  
 - For Non-Economics Ph.D. Students  
 ECON 210. Core Economics: Modules 3 and 7  
 ECON 211. Core Economics: Modules 11 and 12  
 ECON 269. International Financial Markets and Monetary  
 Institutions  
 ECON 275. Time Series Econometrics  
 ECON 281. Economics of Uncertainty  
 ECON 284. Topics in Dynamic Economics

**Management Science & Engineering:**  
 MS&E 242H. Investment Science Honors  
 MS&E 247G. International Financial Management (same as  
 GSB F323)\*  
 MS&G 247S. International Investments  
 MS&G 272. Entrepreneurial Finance  
 MS&E 310. Linear Programming  
 MS&E 311. Optimization  
 MS&E 312. Advanced Methods in Numerical Optimization  
 MS&E 313. Vector Space Optimization  
 MS&E 322. Stochastic Calculus and Control  
 MS&E 323. Stochastic Simulation  
 MS&E 339. Approximate Dynamic Programming  
 MS&E 341. Advanced Economic Analysis  
 MS&E 342. Advanced Investment Science  
 MS&E 345. Advanced Topics in Financial Engineering  
 MS&E 348. Optimization of Uncertainty and Applications in  
 Finance  
 MS&E 349. Capital Deployment  
 MS&E 351. Dynamic Programming and Stochastic Control  
 MS&E 444. Investment Practice  
 MS&E445. Projects in Wealth Management

**Computational & Mathematical Engineering:**  
 CME 340. Computational Methods in Data Mining

**Graduate School of Business (GSB), Finance:**  
 FINANCE 320\*. Debt Markets  
 FINANCE 326\*. Derivative Securities  
 FINANCE 328\* Portfolio Management  
 FINANCE 620\*. Financial Markets I  
 FINANCE 621\*. Financial Markets II  
 FINANCE 622\*. Dynamic Asset Pricing Theory  
 FINANCE 629\*. Tax and Finance Seminar

### Graduate School of Business (GSB), Economic Analysis and Policy:

MGTECON 600. Microeconomic Analysis I\*  
 MGTECON 604. Econometric Methods II\*  
 MGTECON 609. Applied Econometric and Economics  
 Research\*

### Graduate School of Business (GSB), Operations, Information, and Technology:

OIT 667. Revenue Management\*

\*Indicates courses of limited enrollment and/or that instructor consent is required for registration.

## FRENCH AND ITALIAN

*Emeriti: (Professors)* John G. Barson, Marc Bertrand, Robert G. Cohn, John Freccero, René Girard, Ralph M. Hester, Elisabeth Mudimbe-Boyi, Roberto B. Sangiorgi

*Director:* Carolyn Springer

*Chairs of Graduate Studies:* Cécile Alduy (French), Carolyn Springer (Italian)

*Chairs of Undergraduate Studies:* Dan Edelstein (French), Laura Wittman (Italian)

*Professors:* Jean-Marie Apostolidès, Jean-Pierre Dupuy, Hans U. Gumbrecht, Robert Harrison (on leave Autumn), Michel Serres, Carolyn Springer

*Associate Professors:* Cécile Alduy, Dan Edelstein, Joshua Landy (on leave)

*Assistant Professors:* Marisa Galvez (on leave Spring), Laura Wittman

*Lecturers:* Sarah Carey (Humanities Fellow), Yann Robert (Humanities Fellow)

*Courtesy Professors:* Keith Baker, Margaret Cohen, Paula Findlen, Michael Marrinan

*Visiting Professor:* Remo Ceserani (Winter)

*Visiting Associate Professors:* Ewa Domanska (Spring), Mia Fuller (Autumn), Nicholas Paige (Spring)

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Courses offered by the Department of French and Italian are listed on the Stanford Bulletin's ExploreCourses web site under the subject codes FRENGEN (French General), FRENLIT (French Literature), ITALGEN (Italian General), and ITALLIT (Italian Literature). For courses in French or Italian language instruction with the subject code FRENLANG or ITALLANG, see the "Language Center" section of this bulletin.

### FRENCH SECTION

The French section provides students with the opportunity to pursue course work at all levels in French language, literature, cultural and intellectual history, theory, film, and Francophone studies. It understands the domain of French Studies as encompassing the complex of cultural, political, social, scientific, commercial, and intellectual phenomena associated with French-speaking parts of the world, from France and Belgium to Canada, Africa, and the Caribbean.

Three degree programs are available in French: a B.A., a terminal M.A., and a Ph.D. A Ph.D. in French and Italian is also available.

Visiting faculty and instructors contribute regularly to the life of the French section. The section maintains contacts with the Ecole Normale Supérieure, the Institut d'Etudes Politiques, and the Ecole Polytechnique.

A curator for Romance languages oversees the extensive French collection at Green Library. The Hoover Institute on War, Revolution, and Peace also includes materials on 20th-century France and French social and political movements.

*France-Stanford Center for Interdisciplinary Studies*—The center, founded in partnership with the French Ministry of Foreign Affairs, aims to bridge the disciplines of the humanities, social sciences, sciences, engineering, business, and law, to address historical and contemporary issues. Its programs bring faculty and students from across Stanford's departments and schools in contact with colleagues in France to explore issues of common intellectual concern. The center invites French-speaking scholars to offer courses or give lectures or seminars on campus. It facilitates internships for Stanford students in computer science and engineering in Sophia-Antipolis, France's new high-tech center near Nice.

*La Maison Française*—La Maison Française, 610 Mayfield, is an undergraduate residence that serves as a campus French cultural center, hosting in-house seminars as well as social events, film series, readings, and lectures by distinguished representatives of French and Francophone intellectual, artistic, and political life. Assignment is made through the regular housing draw.

*Stanford in Paris*—The Bing Overseas Studies Program in Paris offers undergraduates the opportunity to study in France during Autumn, Winter, and Spring quarters. It provides a wide range of academic options, including course work at the Stanford center and at the University of Paris, independent study projects, and internships. In addition, the program promotes interaction with the local community through volunteer employment, homestays, and internships. The minimum language requirement for admission into Stanford in Paris is one year of French at the college level.

Courses offered in Paris may count toward fulfillment of the requirements of the French major or minor. Students should consult with the Chair of Undergraduate Studies before and after attending the program, in order to ensure that course work and skills acquired abroad can be coordinated appropriately with their degree program. Detailed information, including program requirements and curricular offerings, may be obtained from the "Overseas Studies" section of this bulletin, the Stanford in Paris web site <http://osp.stanford.edu/program/paris>, or the Overseas Studies Program Office in Sweet Hall.

## MISSION OF THE UNDERGRADUATE PROGRAM IN FRENCH

The mission of the undergraduate program in French is to expose students to a variety of perspectives in French language, culture, and history by providing majors with training in writing and communication as well as cultural, textual, and historical analysis in order to develop students into critical and global thinkers prepared for careers in business, social service, and government, or for graduate study in French.

## LEARNING OUTCOMES

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. the ability to develop effective and nuanced lines of interpretation.
2. improved critical thinking skills using French literary materials.
3. facility with the methodologies and presuppositions underlying interpretive positions in secondary literature and in their own work.
4. improvement in analytical writing skills and close reading skills.
5. skills in active listening and productive intellectual discussion in class.
6. proficiency in the French language.

7. familiarity with the French literary canon and its historical and cultural context.

## ITALIAN SECTION

The Italian section offers graduate and undergraduate programs in Italian language, literature, culture, and intellectual history. Course offerings range from small, specialized graduate seminars to general courses open to all students on authors such as Dante, Boccaccio, and Machiavelli.

Two degree programs are available in Italian: a B.A., and a Ph.D. A Ph.D. in French and Italian is also available.

Collections in Green Research Library are strong in the medieval, Renaissance, and contemporary periods; the Italian section is one of the larger constituents of the western European collection at the Hoover Institution for the Study of War, Revolution, and Peace; and the Music Library has excellent holdings in Italian opera.

*La Casa Italiana*—La Casa Italiana, 562 Mayfield, is an undergraduate residence devoted to developing an awareness of Italian language and culture. It works closely with the Italian Cultural Institute in San Francisco and with other local cultural organizations. It hosts visiting representatives of Italian intellectual, artistic, and political life. A number of departmental courses are taught at the Casa, which also offers in-house seminars. Assignment is made through the regular undergraduate housing draw.

*Stanford in Florence*—The Bing Overseas Studies Program in Florence affords undergraduates with at least three quarters of Italian language the opportunity to take advantage of the unique intellectual and visual resources of the city and to focus on two areas: Renaissance history and art, and contemporary Italian and European studies. The program is structured to help integrate students into Italian culture through homestays, Florence University courses, the Language Partners Program, research, internship and public service opportunities, and by conducting some of the program's classes in Italian. Many courses offered in Florence may count toward the fulfillment of requirements for the Italian major or minor. Students are encouraged to consult with the Italian undergraduate adviser before and after a sojourn in Florence to ensure that their course selections meet Italian section requirements. Information on the Florence program is available in the "Overseas Studies" section of this bulletin, the Stanford in Florence web site <http://osp.stanford.edu/program/florence>, or at the Overseas Studies office in Sweet Hall.

## MISSION OF THE UNDERGRADUATE PROGRAM IN ITALIAN

The mission of the undergraduate program in Italian is to expose students to a variety of perspectives in Italian language, culture, and history by providing majors with training in writing and communication as well as cultural, textual, and historical analysis in order to develop students into critical and global thinkers prepared for careers in business, social service, and government, or for graduate study in Italian.

## LEARNING OUTCOMES

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. the ability to develop effective and nuanced lines of interpretation.
2. improved critical thinking skills using Italian literary materials.
3. facility with the methodologies and presuppositions underlying interpretive positions in secondary literature and in their own work.
4. improvement in analytical writing skills and close reading skills.

- skills in active listening and productive intellectual discussion in class.
- proficiency in the Italian language.
- familiarity with the Italian literary canon and its historical and cultural context.

## GRADUATE PROGRAMS IN FRENCH AND ITALIAN

The department offers a Ph.D. and terminal M.A. in French, a Ph.D. in Italian, and a Ph.D. in French and Italian.

## BACHELOR OF ARTS IN FRENCH

The French section offers a major and a minor in French. Students are encouraged to pursue a course of study tailored to their individual needs and interests. A degree in French serves as a stepping stone to entering international business, law, translation, and teaching, or as preparation for graduate studies in French, history, or comparative literature.

The French major allows students to combine their work in French with work from another field such as African studies, linguistics, art history, music, economics, history, education, medicine, international relations, political science, or other foreign languages and literatures. The literature and philosophy specialization offers students the opportunity to pursue interdisciplinary studies at the intersection of literature and philosophy in a structured manner and alongside similarly interested students from a variety of humanistic disciplines.

## REQUIREMENTS

### FRENCH

To graduate with a major in French, students must complete a minimum of 56 units of course work in the major. These 56 units may not be used towards any other major or minor. Courses applied to the major must be taken for a letter grade, and a grade point average (GPA) of 2.0 or better must be achieved in each course. Relevant courses from other departments or programs may also earn credit toward the major with the prior consent of the Chair of Undergraduate Studies. To enroll in all FRENLIT courses at or above 130, students must have successfully completed FRENLANG 124 or successfully tested above this level through the Language Center.

- Gateway Courses—Students are recommended to take two courses in the FRENLIT 120 sequence (8 units).
  - FRENLIT 120. Coffee and Cigarettes: The Making of French Intellectual Culture
  - FRENLIT 122. Nation in Motion: Film, Race and Immigration in Contemporary French Cinema
  - FRENLIT 124. Constructing the French
- Introductory Culture and Literature Courses—Students must take a minimum of three of the following core courses (12 units). Any one of these courses fulfills the Writing in the Major (WIM) requirement.
  - FRENLIT 130. Introduction to Medieval and Renaissance French Literature
  - FRENLIT 131. Absolutism, Enlightenment, and Revolution (17th and 18th c.)
  - FRENLIT 132. Literature, Revolutions, and Changes (19th and 20th c.)
  - FRENLIT 133. Literature and Society in Africa and the Caribbean
- Medieval/Early Modern Courses—Students must take two courses that concern the period before 1800 (8 units). Courses from the department must be at or above the 140 level. Courses chosen from outside the department must be pre-approved by the Chair of Undergraduate Studies.
- Capstone Course—Students must take at least one course of FRENLIT/GEN at or above the 200 level (4 units).

- Electives—A maximum of 28 elective units may be applied to the major. Prior approval from the Chair of Undergraduate Studies is required. The following courses have been pre-approved as electives:
  - FRENLANG 21C, 22C, 23C, 50, 120 and 124. French Language courses at the second year level and above (maximum of 15 units)
  - IHUM 2 and IHUM 3. Epic Journeys, Modern Quests (8-10 units)
  - OSPPARIS courses. Courses taken at the Bing Overseas Studies in Paris program (regardless of the language of instruction)
  - SLE 91, 92, and 93. Structured Liberal Education (10 units)

## FRENCH AND PHILOSOPHY

The French and Philosophy major specialization requires a minimum of 16 courses, for a minimum total of 65 units, distributed as follows:

- Advanced Language* (4 units)—All students must take FRENLANG 124. Advanced French Grammar.
- Introductory Series on French and Francophone Literature and Culture* (12 units)—Three courses must be taken from the FRENLIT 130 sequence.
- Philosophy Writing in the Major* (5 units)—PHIL 80. Prerequisite: introductory philosophy class.
- Philosophy and Literature Gateway Course* (4 units)—FRENGEN 181 (same as PHIL 81). This course should be taken as early as possible in the student's career, normally in the sophomore year.
- Aesthetics, Ethics, Political Philosophy* (ca. 4 units)—One course from the PHIL 170 series.
- Language, Mind, Metaphysics, and Epistemology* (ca. 4 units)—One course from the PHIL 180 series.
- History of Philosophy* (ca. 8 units)—Two courses in the history of philosophy, numbered above PHIL 100.
- Upper Division French Courses* (ca. 12 units)—At least three courses numbered FRENLIT/FRENGEN 140 or higher.
- Related Courses* (ca. 8 units)—Two upper division courses relevant to the student's chosen area of specialization. One course (4 units) may be FRENLIT 199, Individual Work.
- Capstone Seminar* (ca. 4 units)—This year's capstone seminars are:
  - PHIL 194L. Montaigne
  - COMPLIT 199. Narrative and Ethics

One of these courses must be taken in the student's senior year.

The capstone seminar and the two related courses must be approved by both the undergraduate advisor of French and the undergraduate advisor of the initiative in philosophical and literary thought administered through the DLCL. Substitutions, including transfer credit, are not normally permitted for items 5, 6, and 7, and are not permitted under any circumstances for items 3, 4, and 10. Up to 10 units of courses taken in the Philosophy department may be taken CR/NC or S/NC; the remainder must be taken for a letter grade.

## EXTENDED MAJORS

Requirements for both extended majors are essentially identical to those of the French major with a concentration in French literature.

*French and English Literatures*—In addition to the requirements for the B.A. in French, candidates complete four English literature courses numbered 100 and above related to their French program.

*French and Italian Literatures*—In addition to the requirements for the B.A. in French, students complete four Italian courses numbered 200 and above related to their concentration in French.

## FRENCH AND LINGUISTICS

Linguistics majors may elect to specialize in the French language. In addition to 50 units in Linguistics, of which two

courses (LINGUIST 110 and 160) may be replaced by comparable courses in French, students opting for a French Language specialization must take three courses in the introductory series devoted to French and Francophone literature and culture (FRENLIT 130-133). For details, contact the Department of Linguistics.

## MINOR IN FRENCH

To earn a minor in French, students must complete a minimum of 24 units of course work in the department. These 24 units may not be used towards any other major or minor. Courses applied to the minor must be taken for a letter grade, and a grade point average (GPA) of 2.0 or better must be achieved in each course. Before enrolling in all FRENLIT courses at or above 130, students must have successfully completed FRENLANG 124 or successfully tested above this level through the Language Center.

1. Core French Courses—Students must take a minimum of three FRENLIT or FRENGEN courses. Two must be from the FRENLIT 130 sequence (8 units):
  - FRENLIT 130. Introduction to Medieval and Renaissance French Literature
  - FRENLIT 131. Absolutism, Enlightenment, and Revolution (17th and 18th c.)
  - FRENLIT 132. Literature, Revolutions, and Changes (19th and 20th c.)
  - FRENLIT 133. Literature and Society in Africa and the Caribbean
2. Electives—A maximum of 12 elective units may be applied to the minor. Prior approval from the Chair of Undergraduate Studies is required. The following courses have been pre-approved as electives:
  - FRENLANG 21C, 22C, 23C, 50, 120 and 124. French Language courses at the second year level and above (maximum of 12 units)
  - IHUM 2 and IHUM 3. Epic Journeys, Modern Quests (4 units)
  - OSPPARIS courses taught in French at Bing Overseas Studies in Paris program
  - SLE 91, 92, and 93. Structured Liberal Education (5 units)

## HONORS PROGRAM

Majors are eligible to apply to the honors program if they have maintained an average grade point average (GPA) of 3.5 in all French courses. The honors program candidate must fulfill all regular requirements for the major, as well as the writing of a research paper no shorter than 50 pages in length, written in French or English, on a specialized topic.

No later than the end of Spring Quarter of the junior year, the student must submit to the Chair of Undergraduate Studies an Application for Honors, the central portion of which must contain an outline of the proposed honors essay. If it is in need of revisions, the Chair of Undergraduate Studies helps the student through the revision process until the proposal is granted his or her approval. The Chair of Undergraduate Studies also helps the student identify an appropriate advisor for the essay.

Students may enroll for 2 units of credit in FRENLIT 189B for the drafting or revision of the thesis proposal in Spring Quarter of the junior year. In Autumn Quarter of the senior year, honors students must enroll in DLCL 189, a 5-unit seminar that focuses on researching and writing the honors thesis. Students then enroll for 5 units of credit in FRENLIT 189A while composing the thesis during Winter Quarter. Students who did not enroll in a 189B course in the junior year may enroll in FRENLIT 189B in Spring Quarter of the senior year while revising the thesis, if approved by the thesis advisor.

A total of 10-12 units are awarded for completion of honors course work, independent study, and the finished thesis. Honors essays are due to the thesis advisor no later than 5:00 p.m. on May 15 of the terminal year. If an essay is found deserving of a grade of

'A-' or better by the thesis advisor, honors are granted at the time of graduation.

*Honors College*—The Department of French and Italian encourages honors students to enroll in the honors college run by the Division of Literatures, Cultures, and Languages (DLCL). The college meets at the end of every summer, during the weeks directly preceding the start of the academic year, and is designed to help students develop their honors thesis projects. Applications must be submitted by Spring Quarter of the same calendar year. For more information, contact the undergraduate student services officer in the DLCL.

## BACHELOR OF ARTS IN ITALIAN REQUIREMENTS

### ITALIAN

To graduate with a major in Italian, students must complete a minimum of 60 units of course work in the major. These 60 units may not be used towards any other major or minor. Courses applied to the major must be taken for a letter grade, and a grade point average (GPA) of 2.0 or better must be achieved in each course. Relevant courses from other departments or programs may also earn credit toward the major with the prior consent of the Chair of Undergraduate Studies. To enroll in all ITALLIT courses at or above 127, students must have successfully completed ITALLANG 113 or above, or successfully tested above this level through the Language Center.

1. Second Year Language—Students must enroll in all second-year language courses (9-12 units)
  - ITALLANG 21. Second-Year Italian, First Quarter
  - ITALLANG 22. Second-Year Italian, Second Quarter
  - ITALLANG 23. Second-Year Italian, Third Quarter
2. Advanced Language—Students must enroll in at least one of the following advanced language courses (4 units)
  - ITALLANG 113. Italian Cultural Studies
  - ITALLANG 114. Advanced Stylistics and Composition
  - ITALLANG 115. Academic and Creative Writing
3. Introductory Culture and Literature Courses—Students must take all three of the following core courses at Stanford (12 units). Any one of these courses fulfills the Writing in the Major (WIM) requirement.
  - ITALLIT 127. Inventing Italian Literature
  - ITALLIT 128. The Italian Renaissance
  - ITALLIT 129. Modern Italian Literature
4. Core Literature Courses—Students must complete one course on each of the following topics (12 units)
  - Dante
  - The Middle Ages (14th - 16th c.)
  - Early Modern (16th - 18th c.)
  - Modern (18th c. to the present)
5. Electives—A maximum of 24 elective units dealing with Italy above the 100 level may be applied to the major. Prior approval from the Chair of Undergraduate Studies is required. The following courses have been pre-approved as electives:
  - IHUM 2 and IHUM 3. Epic Journeys, Modern Quests (8-10 units)
  - OSPFLOR courses. Courses taken at the Bing Overseas Studies in Florence program (regardless of the language of instruction).
  - SLE 91, 92, and 93. Structured Liberal Education (10 units)

### ITALIAN AND PHILOSOPHY

The Italian and Philosophy major track requires a minimum of 16 courses, for a minimum total of 65 units, distributed as follows:

1. *Italian Survey Sequence* (12 units): ITALLIT 127, 128, 129.
2. *Advanced Language Course* (ca. 4 units): ITALLANG 113 and above.
3. *Philosophy Writing in the Major* (5 units): PHIL 80. Prerequisite: introductory philosophy class.

4. *Philosophy and Literature Gateway Course* (4 units): ITALGEN 181 (same as PHIL 81). This course should be taken as early as possible in the student's career, normally in the sophomore year.
5. *Aesthetics, Ethics, Political Philosophy* (ca. 4 units): one course from the PHIL 170 series.
6. *Language, Mind, Metaphysics, and Epistemology* (ca. 4 units): one course from the PHIL 180 series.
7. *History of Philosophy* (ca. 8 units): two courses in the history of philosophy, numbered above PHIL 100.
8. *Upper Division Italian Courses* (ca. 12 units): at least three courses numbered ITALLIT/ITALGEN 100 or higher.
9. *Related Courses* (ca. 8 units): two upper division courses relevant to the student's chosen area of specialization.
10. *Capstone Seminar* (ca. 4 units): this year's capstone seminars are:
  - PHIL 194L. Montaigne
  - COMPLIT 199. Narrative and Ethics

One of these courses must be taken in the student's senior year.

The capstone seminar and the two related courses must be approved by both the undergraduate advisor of Italian and the undergraduate advisor of the program in philosophical and literary thought administered through the DLCL. No more than 24 units may be drawn from courses offered overseas. Substitutions, including transfer credit, are not normally permitted for items 5, 6, and 7, and are not permitted under any circumstances for items 3, 4, and 10. Up to 10 units of courses taken in the Philosophy department may be taken CR/NC or S/NC; the remainder must be taken for a letter grade.

### EXTENDED MAJORS

Requirements for both extended majors are essentially identical to those of the Italian major with a concentration in Italian literature.

*Italian and English Literatures*—In addition to the 32 departmental units required for the B.A. in Italian, candidates must complete four English literature courses numbered 100 and above related to the field of concentration in Italian Studies.

*Italian and French Literatures*—In addition to the 32 departmental units required for the B.A. in Italian, candidates must complete four French literature courses numbered 100 and above related to the field of concentration in Italian Studies.

### MINOR IN ITALIAN

To earn a minor in Italian, students must complete a minimum of 24 units of course work in the department. These 24 units may not be used towards any other major or minor. Courses applied to the minor must be taken for a letter grade, and a grade point average (GPA) of 2.0 or better must be achieved in each course. To enroll in all ITALLIT courses at or above 127, students must have successfully completed ITALLANG 113 or above, or successfully tested above this level through the Language Center.

1. *Language*—Students may earn 12 units in second-year and above language courses (maximum 12 units)
  - ITALLANG 21-23. Second-year Italian Language
  - ITALLANG 113. Italian Cultural Studies
  - ITALLANG 114. Advanced Stylistics and Composition
  - ITALLANG 115. Academic and Creative Writing
2. *Introductory Culture and Literature Courses*—Students must take two of the following core courses at Stanford (8 units)
  - ITALLIT 127. Inventing Italian Literature
  - ITALLIT 128. The Italian Renaissance
  - ITALLIT 129. Modern Italian Literature
3. *Electives*—A maximum of 8 elective units may be applied to the minor. Prior approval from the Chair of Undergraduate Studies is required. The following courses have been pre-approved as electives:
  - IHUM 2 and IHUM 3. Epic Journeys, Modern Quests (4 units)

- OSPFLOR courses. Courses taken in Italian at the Bing Overseas Studies in Florence program.
- SLE 91, 92, and 93. Structured Liberal Education (5 units)

### HONORS PROGRAM

Italian majors with a grade point average (GPA) of 3.3 (B+) or better in all Italian courses are eligible for department honors. Students interested in the honors program should consult the Italian undergraduate advisor early in their junior year. In addition to the requirements listed above, the student must submit to the Italian faculty a proposal for the honors essay by the end of Spring Quarter of the junior year. During the quarter, students may enroll in ITALLIT 189B while drafting and revising the proposal and conducting preliminary research. In Autumn Quarter of the senior year, honors students must enroll in DLCL 189, a 5-unit seminar that focuses on researching and writing the honors thesis. Students then enroll for 5 units of credit in ITALLIT 189A while composing the thesis during Winter Quarter. Students who did not enroll in a 189B course in the junior year may enroll in ITALLIT 189B in Spring quarter of the senior year while revising the thesis, if approved by the thesis advisor. A total of 10-12 units are awarded for successful completion of honors course work, independent study, and the finished thesis. Honors essays are due to the thesis advisor no later than 5:00 p.m. on May 15 of the terminal year. If an essay is found deserving of a grade of 'A-' or better by the thesis advisor, honors are granted at the time of graduation.

*Honors College*—The Department of French and Italian encourages honors students to enroll in the honors college run by the Division of Literatures, Cultures, and Languages (DLCL). The college meets at the end of every summer, during the weeks directly preceding the start of the academic year, and is designed to help students develop their honors thesis projects. Applications must be submitted by Spring Quarter of the same calendar year. For more information, contact the undergraduate student services officer in the DLCL.

### MINOR IN MODERN LANGUAGES

The Division of Literatures, Cultures, and Languages offers a minor in Modern Languages. This minor draws on literature and language courses offered through this and other literature departments. See the "Literatures, Cultures, and Languages" section of this bulletin for further details about the minor and its requirements.

### COTERMINAL BACHELOR'S AND MASTER'S PROGRAM IN FRENCH OR ITALIAN

University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees" section of this bulletin.

Each year the department admits a small number of undergraduates to the coterminal B.A. and M.A. degree in French or in Italian. Applications must be submitted by January 31 of the senior year to the Director of the Department and must include:

- a written statement of purpose
- two letters of recommendation from faculty at Stanford
- a transcript.

Students accepted into the coterminal program must have been undergraduate majors in the relevant language and must meet all requirements both for the B.A. and the M.A.

### MASTER OF ARTS IN FRENCH

University regulations pertaining to the M.A. are listed in the "Graduate Degrees" section of this bulletin.

The terminal M.A. in French provides a flexible combination of language, literature, cultural history, and methodology course work



designed to enhance the preparation of secondary school, junior college, or college teachers.

Candidates must complete a minimum of 45 units of graduate work, all courses being taken for a letter grade, with a minimum grade point average (GPA) of 3.3, as well as pass the master's examination at the end of their studies. To fulfill the requirements in a single year, enrollment must be for an average of 15 units per quarter.

Candidates must take one cultural history course (to be taken either inside or outside the Department of French and Italian). All remaining units are to be taken in advanced French literature courses (200 level or above), three of which must be concerned with the pre-revolutionary period of French cultural history.

Applicants should consult Graduate Admissions for information related to the application process. Candidates for this degree are not eligible for financial aid or for teaching assistantships.

## EXAMINATION

The terminal M.A. examination is administered the fourth week of Spring Quarter by a three-member committee, selected each year by the Chair of Graduate Studies. It consists of two parts:

1. **Written Exam**—The two-hour written exam tests the candidate's general knowledge of French literature and is based on the French Ph.D. reading list which may be obtained from the chair of Graduate Studies, Student Affairs Officer, or by referencing the French and Italian Graduate Student Handbook.

The exam requires that the candidate answer two questions (out of three) in a manner that demonstrates his/her ability to synthesize and draw parallels between periods, genres, and systems of representation on the basis of the standard reading list. One question must be answered in French. Use of a dictionary is allowed.

If the student's performance on the exam is deemed a 'pass' by two out of three of the members of the examining committee, the student is then permitted to go on to the oral examination (taken later the same week). Should the candidate fail the M.A. written exam, he/she is given a second chance at the end of Spring Quarter.

2. **Oral Exam**—The 90-minute oral exam is based upon the student's answers on the written exam. It examines the candidate's knowledge and understanding of French literary history on the basis of the standard reading list.

At the conclusion of the oral exam, the examination committee meets in closed session and discusses the student's performance on the written and the oral portions of the examination. If it is judged adequate, the M.A. degree is granted. In no event may the master's written and oral exams be taken more than twice.

## DOCTOR OF PHILOSOPHY IN FRENCH

University regulations pertaining to the Ph.D. are listed in the "Graduate Degrees" section of this bulletin.

### REQUIREMENTS

1. **Course Work**—A candidate for the Ph.D. degree must complete at least 135 units of graduate-level study. 72 of the 135 units must be taken within the department. All course work should be selected in consultation with the Chair of Graduate Studies.

*Required Courses*—

- FRENGEN 369: Introduction to Graduate Studies: Criticism as Profession. This course must be taken in the first quarter of study.
- FRENGEN 301E: New Methods and Sources in French and Italian Studies. This course must be taken no later than the end of the third year of study.
- DLCL 201: The Learning and Teaching of Second Languages. This course must be taken in Spring Quarter of the first year of study.

- A minimum of five courses taught in French (FRENLIT) at the graduate level with instruction in French. Three of the required five courses must be taken within the first year.

*Elective Courses*— Apart from the required courses above, students are granted considerable freedom in structuring a course of study appropriate to their individual needs. During the first year, most course work is done within the department, in order to ensure an adequate preparation for the qualifying examination. Students are encouraged to take a variety of courses in order to be exposed to different periods and issues. Students are not allowed to take Independent Study during their first year. In the second and third years, however, the program of study is tailored to the specific interests of the student.

2. **Examinations**—Successful completion of all department and University examinations.
3. **Dissertation**—Submission and approval of a dissertation.
4. **Teaching**—Ph.D. students are required to teach minimum of five courses within their five years of funding.
5. **Language Requirements**—Attaining a native or near-native fluency in French is a requirement to qualify for the Ph.D. degree. Upon entering the program, candidates must contact the Language Center and arrange to take the OPI (Oral Proficiency Interview) to determine their fluency in French. An advanced level or above must have been reached by the time candidates take their qualifying exam in Autumn Quarter of the second year of study. If a student fails to score in the advanced bracket of the OPI test upon entering, he/she is tested again at the beginning of the second year. It is the responsibility of the candidates to design a course of study to improve his or her proficiency in French. Candidates who do not meet the minimum language requirement must discuss their plans to meet this requirement with the Chair of Graduate Studies. In addition, candidates are required to achieve a high level of proficiency in one additional foreign language, with the language in question to be determined by the student and adviser as a function of the student's area of specialization. Such proficiency may be demonstrated either by completing a graduate seminar in the language in question, or by passing an exam that establishes a third-year or above level of competence in writing, reading, and speaking. In the case of ancient Greek and Latin, a high level of proficiency means a level superior to a second-year collegiate level of proficiency in reading and writing. The second foreign language requirement must be completed by the end of the third year.
6. **Candidacy**—At the end of the second year of residency, students who are performing well, as indicated by their course work, performance on the Qualifying Exam, and teaching and research assistantship performance, are advanced to candidacy. This step implies that the student has demonstrated the relevant qualities required for successful completion of the Ph.D. Future evaluations are based on the satisfactory completion of specific remaining department and University requirements. Students who are not advanced to candidacy will normally be terminated from the program and awarded an M.A. degree. In some cases, the department may require that a student complete outstanding work or complete unmet requirements before admission to candidacy. The university requires that all students must be admitted to candidacy by the beginning of the third year in residence in order to continue in the Ph.D. program. Therefore all requirements stipulated by the department must be met before registration for Autumn Quarter of the student's third year. At any point during the degree program, evidence that a student is performing at a less than satisfactory level may be cause for a formal academic review of that student.
7. **TGR Status**—Doctoral students who have been admitted to candidacy, completed all required courses and degree requirements other than the dissertation, completed 135 units,

and submitted a Doctoral Dissertation Reading Committee form, must request Terminal Graduate Registration status to complete their dissertations. Each quarter, all TGR students must enroll in FRENCH 802 for zero units, in the appropriate section for their adviser.

## GRADING

Doctoral students in the department must take required courses for a letter grade if available and are expected to earn a grade of 'B+' or better in each course. Any grade of 'B' or below is considered to be less than satisfactory. Grades of 'B' or below are reviewed by faculty while the grade will stand, the student may be required to revise and resubmit the work associated with that course.

## EXAMINATIONS

There are three examinations: the Qualifying Examination, the Field Examination, and the University Oral Examination. All course work must be current prior to taking any scheduled exams.

*Qualifying Examination*—The first oral examination, which takes place in the first two weeks of October of the second year of study, tests the student's knowledge of language and literature and his/her aptitude for critical thinking. The examining committee, determined by the Director of French and Italian, schedules the precise exam date and time.

The exam is based on a standard reading list covering major works from all periods of literature in the language(s) of study, from the Middle Ages to present day. The list may be expanded to reflect a student's particular interests, but not abridged. The reading list may be obtained from the Chair of Graduate Studies, the Graduate Student Affairs Officer, or by referencing the French and Italian student handbook.

The exam is 90 minutes in length and consists of two parts:

1. A 20-minute presentation by the candidate on a topic to be determined by the student. This presentation may be given in English or in the language of study and should engage, in a succinct manner, an issue or set of issues of broad relevance to the literary history of the language(s) of study. The presentation must not simply be a text read aloud, but rather must be given from notes. It is meant to be suggesting and not exhaustive, so as to provoke further discussion.
2. A 70-minute question and answer period in which the examining committee follows up on the candidate's presentation and discusses the reading list with the student. At least part of this portion of the exam takes place in the language(s) of study. The student is expected to demonstrate a solid knowledge of the texts on the reading list and of the basic issues which they raise, as well as a broader sense of the cultural/literary context into which they fit and demonstrate the ability to formulate an original point of view on such texts and contexts.

Students who do not pass the Qualifying Exam their first time may be placed on probation with limited enrollment and be allowed to retake the exam at the end of Autumn Quarter. Should the student not pass the retake exam, his or her studies in the Ph.D. program will be concluded.

Students already holding an advanced degree in the relevant area may request to be excused from the Qualifying Exam. However, the student must present a formal request for a waiver to the Chair of Graduate Studies upon arrival at Stanford. Such a request must document the course work completed elsewhere and include all relevant reading lists. Only in cases where taking the Qualifying Exam would involve considerable repetition of already completed work is such a waiver likely to be granted.

*Field Examination*—The second oral examination takes place in the Autumn Quarter of the third year of study. The exam is 120 minutes in length and consists of two parts:

1. A 20-minute presentation by the student on a topic (a particular literary genre or a broad theoretical, historical, or interdisciplinary question) freely chosen and developed by the individual student working in collaboration with his/her

adviser and the Chair of Graduate Studies. The student should design this research project so that it has the breadth and focus of a book he/she might write or a seminar he/she might teach. The student should discuss the proposed topic with the Chair of Graduate Studies before the end of the quarter preceding the quarter in which he/she plans to take the exam; together they choose a committee of two faculty members with interests close to the proposed topic. (In most cases, one of these committee members is the student's adviser.) In addition to these two members, the examination committee includes the Chair of Graduate Studies, who serves in an ex officio capacity as the third member of the examination committee. This presentation is followed by a 20-minute discussion.

2. An 80-minute discussion of a reading list, assembled by the student, which covers about a century of writing. The reading list should include works in all genres relevant to the period covered and should be around two single-spaced pages in length. The list may well include critical and scholarly works or texts from outside the traditional domain of literary studies in the chosen tradition (such as film, philosophy, other literary traditions), but such coverage should be regarded as supplemental except in rare instances where the chair and faculty advisers have agreed to define these materials as the student's field. Students are required to discuss the reading list for the examination with the Chair of Graduate Studies and with members of their committee during the quarter preceding the examination. A final reading list must be submitted to the committee no later than two weeks preceding the examination. Each member of the committee is assigned a 20-minute period to question the candidate on the reading list and its intellectual-historical implications. The aim of these questions is to establish the student's credentials as a specialist in the period of his/her choosing, so the core of the reading list must be made up of texts that are essential to any specialist. It follows that reading lists must not focus on the narrow area of the student's research interest. The tendency to bias reading lists towards the dissertation topic, be it an author or a genre, does not cancel the obligation to cover the major figures and genres. It is understandable that some students, by their third year, have become so deeply committed to their work toward the dissertation that they wish to use the preparation period for the examination as part of their dissertation research. Certainly, some of the exam work may prove relevant, but students should also remember that the examination is the central means of certifying their expertise in a literary period.

*The University Oral Examination*—This examination takes the form of a dissertation proposal defense. It is to be taken no later than Autumn Quarter of the student's fourth year. Students must have completed all course work and language requirements before the quarter in which they take the University Oral examination. One quarter prior to the University Oral examination, students must schedule the exam date and time as well as work with their primary adviser to obtain an outside chair for the examination.

Two weeks before the exam, the student must submit to the committee a 25-35 page proposal, which must contain the following parts:

1. a clear presentation of the student's central thesis
2. a synthetic overview of the dissertation
3. a description of the methodology that is used in the dissertation
4. an in-depth discussion of current secondary sources on the topic.

The student must also append a bibliography, but this does not take the place of number 4. The proposal must be prepared in close consultation with the dissertation director during the months preceding the exam.

The exam committee consists of four members, in addition to a committee chair from outside the Division of Literatures, Cultures, and Languages, whose principal functions are to keep track of time and to call on the four members of the committee who question the candidate on the talk and on the reading list.

After a 20-minute presentation on the part of the candidate, each member of the committee (apart from the committee chair) questions the student for 20 minutes. At the end of the hour and forty minutes, the faculty readers vote on the outcome of the exam. If the outcome is favorable, (four out of five votes in favor of the student passing), the student is free to proceed with work on the dissertation. If the proposal is found to be unsatisfactory, the dissertation readers may ask the student to revise and resubmit the dissertation prospectus and to schedule a second exam. A student who fails a second time will be released from the Ph.D. program and awarded a terminal M.A. degree.

## ADVISING

Given the interdisciplinary nature of the Ph.D. programs and the opportunity they afford each student to create an individualized program of study, regular consultation with an adviser is of the utmost importance. The adviser for all entering graduate students is the Chair of Graduate Studies, whose responsibility it is to assist students with their course planning and to keep a running check on progress in completing the course, teaching, and language requirements. By the end of the second year of study, each student should have chosen a faculty adviser whose expertise is appropriate to his/her own area of research and interests.

*Yearly Review*—The faculty provide students with timely and constructive feedback on their progress toward the Ph.D. In order to evaluate students' progress and to identify potential problem areas, the department's faculty reviews the academic progress of each student at the end of the academic year. The yearly reviews are primarily intended to identify developing problems that could impede progress. In most cases, students are simply given constructive feedback, but if more serious concerns warrant, a student may be placed on probation with specific guidelines for addressing the problems detected. Possible outcomes of the yearly review include (1) continuation of the student in good standing, or (2) placing the student on probation, with specific guidelines for the period on probation and the steps to be taken in order to be returned to good standing. For students on probation at this point (or at any other subsequent points), possible outcomes of a review include: (1) restoration to good standing; (2) continued probation, again with guidelines for necessary remedial steps; or (3) termination from the program. Students leaving the program at the end of the first or second year are usually allowed to complete the requirements to receive an M.A. degree, if this does not involve additional residency or financial support.

## DOCTOR OF PHILOSOPHY IN ITALIAN

University regulations pertaining to the Ph.D. are listed in the "Graduate Degrees" section of this bulletin.

## REQUIREMENTS

1. *Course Work*—A candidate for the Ph.D. degree must complete at least 135 units of graduate-level study. 72 of the 135 units must be taken within the department. All course work should be selected in consultation with the Chair of Graduate Studies.

### *Required Courses*—

- ITALGEN 369: Introduction to Graduate Studies: Criticism as Profession. This course must be taken in the first quarter of study.
- ITALGEN 301E: New Methods and Sources in French and Italian Studies. This course must be taken no later than the end of the third year of study.
- DLCL 201: The Learning and Teaching of Second Languages. This course must be taken in the Spring quarter of the first year of study.
- A minimum of five courses taught in Italian (ITALLIT) at the graduate level with instruction in Italian. Three of the required five courses must be taken within the first year.

*Elective Courses*— Apart from the required courses above, students are granted considerable freedom in structuring a course of study appropriate to their individual needs. During the first year, most course work is done within the department, in order to ensure an adequate preparation for the qualifying examination. Students are encouraged to take a variety of courses in order to be exposed to different periods and issues. Students are not allowed to take Independent Study during their first year. In the second and third years, however, the program of study is tailored to the specific interests of the student.

2. *Examinations*—Successful completion of all department and University examinations.
3. *Dissertation*—Submission and approval of a dissertation.
4. *Teaching*—Ph.D. students are required to teach minimum of five courses within their five years of funding.
5. *Language Requirements*—Attaining a native or near-native fluency in Italian is a requirement to qualify for the Ph.D. degree. Upon entering the program, candidates must contact the Language Center and arrange to take the OPI (Oral Proficiency Interview) to determine their fluency in Italian. An advanced level or above must have been reached by the time candidates take their qualifying exam in the Autumn Quarter of the second year of study. If a student fails to score in the advanced bracket of the OPI test upon entering, he/she is tested again at the beginning of the second year. It is the responsibility of the candidates to design a course of study to improve their proficiency in Italian. Candidates who do not meet the minimum language requirement must discuss their plans to meet this requirement with the Chair of Graduate Studies. By the end of the third year, students must have passed reading examinations in two additional foreign languages. If the candidate's period of concentration is earlier than the Romantic period, one of these must be Latin; if Romantic or later, French.
6. *Candidacy*—At the end of the second year of residency, students who are performing well, as indicated by their course work, performance on the Qualifying Exam, and teaching and research assistantship performance, are advanced to candidacy. This step implies that the student has demonstrated the relevant qualities required for successful completion of the Ph.D. Future evaluations are based on the satisfactory completion of specific remaining department and University requirements. Students who are not advanced to candidacy will normally be terminated from the program and awarded an M.A. degree. In some cases, the department may require that a student complete outstanding work or complete unmet requirements before admission to candidacy. The university requires that all students must be admitted to candidacy by the beginning of the third year in residence in order to continue in the Ph.D. program. Therefore all requirements stipulated by the department must be met before registration for the autumn quarter of the student's third year. At any point during the degree program, evidence that a student is performing at a less than satisfactory level may be cause for a formal academic review of that student.
7. *TGR Status*—Doctoral students who have been admitted to candidacy, completed all required courses and degree requirements other than the dissertation, completed 135 units, and submitted a Doctoral Dissertation Reading Committee form, must request Terminal Graduate Registration status to complete their dissertations. Each quarter, all TGR students must enroll in ITALGEN 802 for zero units, in the appropriate section for their adviser.

## GRADING

Doctoral students in the department must take required courses for a letter grade if available and are expected to earn a grade of 'B+' or better in each course. Any grade of 'B' or below is considered to be less than satisfactory. Grades of 'B' or below are reviewed by faculty: while the grade will stand, the student may be

required to revise and resubmit the work associated with that course.

## EXAMINATIONS

There are three examinations: the Qualifying Examination, the Field Examination, and the University Oral Examination. All course work must be current prior to taking any scheduled exams.

*Qualifying Examination*—The first oral examination, which takes place in the first two weeks of October of the second year of study, tests the student's knowledge of language and literature and his/her aptitude for critical thinking. The examining committee, determined by the Director of French and Italian, schedules the precise exam date and time.

The exam is based on a standard reading list covering major works from all periods of literature in the language(s) of study, from the Middle Ages to present day. The list may be expanded to reflect a student's particular interests, but not abridged. The reading list may be obtained from the Chair of Graduate Studies, the Graduate Student Affairs Officer, or by referencing the French and Italian student handbook.

The exam is 90 minutes in length and consists of two parts:

1. A 20-minute presentation by the candidate on a topic to be determined by the student. This presentation may be given in English or in the language of study and should engage, in a succinct manner, an issue or set of issues of broad relevance to the literary history of the language(s) of study. The presentation must not simply be a text read aloud, but rather must be given from notes. It is meant to be suggesting and not exhaustive, so as to provoke further discussion.
2. A 70-minute question and answer period in which the examining committee follows up on the candidate's presentation and discusses the reading list with the student. At least part of this portion of the exam takes place in the language(s) of study. The student is expected to demonstrate a solid knowledge of the texts on the reading list and of the basic issues which they raise, as well as a broader sense of the cultural/literary context into which they fit and demonstrate the ability to formulate an original point of view on such texts and contexts.

Students who do not pass the Qualifying Exam their first time may be placed on probation with limited enrollment and be allowed to retake the exam at the end of Autumn Quarter. Should the student not pass the retake exam, his/her studies in the Ph.D. program will be concluded.

Students already holding an advanced degree in the relevant area may request to be excused from the Qualifying Exam. However, the student must present a formal request for a waiver to the Chair of Graduate Studies upon arrival at Stanford. Such a request must document the course work completed elsewhere and include all relevant reading lists. Only in cases where taking the Qualifying Exam would involve considerable repetition of already completed work is such a waiver likely to be granted.

*Field Examination*—The second oral examination takes place in the Autumn Quarter of the third year of study. The exam is 120 minutes in length and consists of two parts:

1. A 20-minute presentation by the student on a topic (a particular literary genre or a broad theoretical, historical, or interdisciplinary question) freely chosen and developed by the individual student working in collaboration with his/her adviser and the Chair of Graduate Studies. The student should design this research project so that it has the breadth and focus of a book he/she might write or a seminar he/she might teach. The student should discuss the proposed topic with the Chair of Graduate Studies before the end of the quarter preceding the quarter in which he/she plans to take the exam; together they choose a committee of two faculty members with interests close to the proposed topic. (In most cases, one of these committee members is the student's adviser.) In addition to these two members, the examination committee includes the Chair of Graduate Studies, who serves in an ex officio capacity

as the third member of the examination committee. This presentation is followed by a 20-minute discussion.

2. An 80-minute discussion of a reading list, assembled by the student, which covers about a century of writing. The reading list should include works in all genres relevant to the period covered and should be around two single-spaced pages in length. The list may well include critical and scholarly works or texts from outside the traditional domain of literary studies in the chosen tradition (such as film, philosophy, other literary traditions), but such coverage should be regarded as supplemental except in rare instances where the chair and faculty advisers have agreed to define these materials as the student's field. Students are required to discuss the reading list for the examination with the Chair of Graduate Studies and with members of their committee during the quarter preceding the examination. A final reading list must be submitted to the committee no later than two weeks preceding the examination. Each member of the committee is assigned a 20-minute period to question the candidate on the reading list and its intellectual-historical implications. The aim of these questions is to establish the student's credentials as a specialist in the period of his/her choosing, so the core of the reading list must be made up of texts that are essential to any specialist. It follows that reading lists must not focus on the narrow area of the student's research interest. The tendency to bias reading lists towards the dissertation topic, be it an author or a genre, does not cancel the obligation to cover the major figures and genres. It is understandable that some students, by their third year, have become so deeply committed to their work toward the dissertation that they wish to use the preparation period for the examination as part of their dissertation research. Certainly, some of the exam work may prove relevant, but students should also remember that the examination is the central means of certifying their expertise in a literary period.

*The University Oral Examination*—This examination takes the form of a dissertation proposal defense. It is to be taken no later than Autumn Quarter of the student's fourth year. Students must have completed all course work and language requirements before the quarter in which they take the University Oral examination. One quarter prior to the University Oral examination, students must schedule the exam date and time as well as work with their primary adviser to obtain an outside chair for the examination.

Two weeks before the exam, the student must submit to the committee a 25-35 page proposal, which must contain the following parts:

1. a clear presentation of the student's central thesis
2. a synthetic overview of the dissertation
3. a description of the methodology that is used in the dissertation
4. an in-depth discussion of current secondary sources on the topic.

The student must also append a bibliography, but this does not take the place of number 4. The proposal must be prepared in close consultation with the dissertation director during the months preceding the exam.

The exam committee consists of four members, in addition to a committee chair from outside the Division of Literatures, Cultures, and Languages, whose principal functions are to keep track of time and to call on the four members of the committee who question the candidate on the talk and on the reading list.

After a 20-minute presentation on the part of the candidate, each member of the committee (apart from the committee chair) questions the student for 20 minutes. At the end of the hour and forty minutes, the faculty readers vote on the outcome of the exam. If the outcome is favorable, (four out of five votes in favor of the student passing), the student is free to proceed with work on the dissertation. If the proposal is found to be unsatisfactory, the dissertation readers may ask the student to revise and resubmit the dissertation prospectus and to schedule a second exam. A student who fails a second time will be released from the Ph.D. program and awarded a terminal M.A. degree.

## ADVISING

Given the interdisciplinary nature of the Ph.D. programs and the opportunity they afford each student to create an individualized program of study, regular consultation with an adviser is of the utmost importance. The adviser for all entering graduate students is the Chair of Graduate Studies, whose responsibility it is to assist students with their course planning and to keep a running check on progress in completing the course, teaching, and language requirements. By the end of the second year of study, each student should have chosen a faculty adviser whose expertise is appropriate to his/her own area of research and interests.

*Yearly Review*—The faculty provide students with timely and constructive feedback on their progress toward the Ph.D. In order to evaluate students' progress and to identify potential problem areas, the department's faculty reviews the academic progress of each student at the end of the academic year. The yearly reviews are primarily intended to identify developing problems that could impede progress. In most cases, students are simply given constructive feedback, but if more serious concerns warrant, a student may be placed on probation with specific guidelines for addressing the problems detected. Possible outcomes of the yearly review include (1) continuation of the student in good standing, or (2) placing the student on probation, with specific guidelines for the period on probation and the steps to be taken in order to be returned to good standing. For students on probation at this point (or at any other subsequent points), possible outcomes of a review include: (1) restoration to good standing; or (2) continued probation, again with guidelines for necessary remedial steps; or (3) termination from the program. Students leaving the program at the end of the first or second year are usually allowed to complete the requirements to receive an M.A. degree, if this does not involve additional residency or financial support.

## DOCTOR OF PHILOSOPHY IN FRENCH AND ITALIAN

University regulations pertaining to the Ph.D. are listed in the "Graduate Degrees" section of this bulletin.

### REQUIREMENTS

1. *Course work*—A candidate for the Ph.D. degree must complete at least 135 units of graduate-level study. 72 of the 135 units must be taken within the department. All course work should be selected in consultation with the Chair of Graduate Studies.

#### *Required Courses*—

- FRENGEN/ITALGEN 369. Introduction to Graduate Studies: Criticism as Profession. This course must be taken in the first quarter of study.
- FRENGEN/ITALGEN 301E. New Methods and Sources in French and Italian Studies. This course must be taken no later than the end of the third year of study.
- DLCL 201. The Learning and Teaching of Second Languages. This course must be taken in Spring Quarter of the first year of study.
- A minimum of four advanced courses on French literature and culture, and four advanced courses on Italian literature and culture. Four of the required eight courses must be taken within the first year.

*Elective Courses*— Apart from the required courses above, students are granted considerable freedom in structuring a course of study appropriate to their individual needs. During the first year, most course work is done within the department, in order to ensure an adequate preparation for the qualifying examination. Students are encouraged to take a variety of courses in order to be exposed to different historical periods and issues. Students are not allowed to take Independent Study during their first year. In the second and third years, however, the program of study is tailored to the specific interests of the student.

2. *Examinations*—Successful completion of all department and University examinations.
3. *Dissertation*—Submission and approval of a dissertation. The dissertation topic must include a substantial quotient of material from both the French and Italian tradition, and the dissertation must include either (1) at least one chapter on French materials and one chapter on Italian materials, or (2) at least two chapters focusing on a comparison between French and Italian materials.
4. *Teaching*—Ph.D. students are required to teach a minimum of five courses within their five years of funding. Of these five courses the student is required to teach at least one French language course and one Italian language course.
5. *Language Requirements*—Attaining a native or near-native fluency in both French and Italian is the individual responsibility of all candidates in the Ph.D. program, and remedial course work needed to achieve such fluency cannot count towards the Ph.D. degree.
 

For students specializing in areas (a) medieval and renaissance and (b) renaissance and early modern, proficiency in Latin equivalent to a second year collegiate level of proficiency (the equivalent of CLASSLAT 101, 102, and 103) in reading is also required. Such proficiency may be demonstrated by successfully completing a course in the language in question (at least second-year level, but preferably a graduate seminar); or by passing an exam that establishes a second-year or above level of competence. In no case is passage of a standard reading competence exam considered sufficient.

For students specializing in area (c) modern and contemporary, proficiency in a third language (beyond French and Italian) is not required; students are, however, encouraged to acquire competency in a third language or area that is relevant to their research (e.g. German).

The language requirements should be completed as soon as possible, but in any case not later than the end of the third year.
6. *Candidacy*—At the end of the second year of residency, students who are performing well, as indicated by their course work, performance on the Qualifying Exam, and teaching and research assistantship performance, are advanced to candidacy. This step implies that the student has demonstrated the relevant qualities required for successful completion of the Ph.D. Future evaluations are based on the satisfactory completion of specific remaining department and University requirements. Students who are not advanced to candidacy will normally be terminated from the program and awarded an M.A. degree. In some cases, the department may require that a student complete outstanding work or complete unmet requirements before admission to candidacy. The university requires that all students must be admitted to candidacy by the beginning of the third year in residence in order to continue in the Ph.D. program. Therefore all requirements stipulated by the department must be met before registration for Autumn Quarter of the student's third year. At any point during the degree program, evidence that a student is performing at a less than satisfactory level may be cause for a formal academic review of that student.
7. *TGR Status*—Doctoral students who have been admitted to candidacy, completed all required courses and degree requirements other than the dissertation, completed 135 units, and submitted a Doctoral Dissertation Reading Committee form, must request Terminal Graduate Registration status to complete their dissertations. Each quarter, all TGR students must enroll in FRENGEN 802 for zero units, in the appropriate section for their adviser.

### GRADING

Doctoral students in the department must take required courses for a letter grade if available and are expected to earn a grade of 'B+' or better in each course. Any grade of 'B' or below is

considered to be less than satisfactory. Grades of 'B' or below are reviewed by faculty; while the grade will stand, the student may be required to revise and resubmit the work associated with that course.

## EXAMINATIONS

There are three examinations: the Qualifying Examination, the Field Examination, and the University Oral Examination. All course work must be current prior to taking any scheduled exams.

*Qualifying Examination*—The first oral examination, which takes place in the first two weeks of October of the second year of study, tests the student's knowledge of language and literature and his/her aptitude for critical thinking. The examining committee, determined by the Director of French and Italian, schedules the precise exam date and time.

Students may take either two qualifying exams, one in French and one in Italian, or a single qualifying exam in French and Italian. The combined French and Italian qualifying exam covers one of three periods, (a) medieval and renaissance, (b) renaissance and early modern, or (c) modern and contemporary. For each period it is based on a standard reading list. The list may be expanded to reflect a student's particular interests, but not abridged. One third of the combined exam takes place in English, one third in French, and one third in Italian (with the student free to choose which portion transpires in which language). The reading lists may be obtained from the Chairs of Graduate Studies, the Graduate Student Affairs Officer, or by referencing the French and Italian student handbook.

The exam is 90 minutes in length and consists of two parts:

1. A 20-minute presentation by the candidate on a topic to be determined by the student. This presentation may be given in English or in the language of study and should engage, in a succinct manner, an issue or set of issues of broad relevance to the literary history of the language(s) of study. The presentation must not simply be a text read aloud, but rather must be given from notes. It is meant to be suggesting and not exhaustive, so as to provoke further discussion.
2. A 70-minute question and answer period in which the examining committee follows up on the candidate's presentation and discusses the reading list with the student. At least part of this portion of the exam takes place in the languages of study. The student is expected to demonstrate a solid knowledge of the texts on the reading list and of the basic issues which they raise, as well as a broader sense of the cultural/literary context into which they fit, and demonstrate the ability to formulate an original point of view on such texts and contexts.

Students who do not pass the Qualifying Exam their first time may be placed on probation with limited enrollment and be allowed to retake the exam at the end of Autumn Quarter. If the student does not pass the second exam, his/her studies in the Ph.D. program will be concluded.

If, at the qualifying exam stage, a student's work is judged insufficient for admission to candidacy for the Ph.D., the student may petition to continue in French only or Italian only. This petition is reviewed by the qualifying exam committee, the relevant Chair of Graduate Studies, and the Director of the Department of French and Italian.

Students already holding an advanced degree in the relevant area may request to be excused from the Qualifying Exam. However, the student must present a formal request for a waiver to the Chair of Graduate Studies upon arrival at Stanford. Such a request must document the course work completed elsewhere and include all relevant reading lists. Only in cases where taking the Qualifying Exam would involve considerable repetition of already completed work is such a waiver likely to be granted.

*Field Examination*—The second oral examination takes place in the Autumn quarter of the third year of study. The exam is 120 minutes in length and consists of two parts:

1. A 20-minute presentation by the student on a topic (a particular literary genre or a broad theoretical, historical, or

interdisciplinary question) freely chosen and developed by the individual student working in collaboration with his/her adviser and the Chair of Graduate Studies. The student should design this research project so that it has the breadth and focus of a book he/she might write or a seminar he/she might teach. The student should discuss the proposed topic with the Chairs of Graduate Studies before the end of the quarter preceding the quarter in which he/she plans to take the exam; together they choose a committee of two faculty members with interests close to the proposed topic. (In most cases, one of these committee members is the student's adviser.) In addition to these two members, the examination committee includes the Chair of Graduate Studies, who serves in an ex officio capacity as the third member of the examination committee. This presentation is followed by a 20-minute discussion.

2. An 80-minute discussion of a reading list, assembled by the student, which covers about a century of writing. The reading list should include works in all genres relevant to the period covered and should be around two single-spaced pages in length. The list may well include critical and scholarly works or texts from outside the traditional domain of literary studies in the chosen tradition (such as film, philosophy, other literary traditions), but such coverage should be regarded as supplemental except in rare instances where the chair and faculty advisers have agreed to define these materials as the student's field. Students are required to discuss the reading list for the examination with the Chairs of Graduate Studies and with members of their committee during the quarter preceding the examination. A final reading list must be submitted to the committee no later than two weeks preceding the examination. Each member of the committee is assigned a 20-minute period to question the candidate on the reading list and its intellectual-historical implications. The aim of these questions is to establish the student's credentials as a specialist in the period of his/her choosing, so the core of the reading list must be made up of texts that are essential to any specialist. It follows that reading lists must not focus on the narrow area of the student's research interest. The tendency to bias reading lists towards the dissertation topic, be it an author or a genre, does not cancel the obligation to cover the major figures and genres. It is understandable that some students, by their third year, have become so deeply committed to their work toward the dissertation that they wish to use the preparation period for the examination as part of their dissertation research. Certainly, some of the exam work may prove relevant, but students should also remember that the examination is the central means of certifying their expertise in a literary period.

*The University Oral Examination*—This examination takes the form of a dissertation proposal defense. It is to be taken no later than Autumn Quarter of the student's fourth year. Students must have completed all course work and language requirements before the quarter in which they take the University Oral examination. One quarter prior to the University Oral examination, students must schedule the exam date and time as well as work with their primary adviser to obtain an outside chair for the examination.

Two weeks before the exam, the student must submit to the committee a 25-35 page proposal. This proposal must contain the following parts:

1. a clear presentation of the student's central thesis
2. a synthetic overview of the dissertation
3. a description of the methodology that is used in the dissertation
4. an in-depth discussion of current secondary sources on the topic.

The student must also append a bibliography, but this does not take the place of number 4. The reading list should include works in both French and Italian in all genres relevant to the period covered. The proposal must be prepared in close consultation with the dissertation director during the months preceding the exam.

The exam committee consists of four members, in addition to a committee chair from outside the Division of Literatures, Cultures,

and Languages, whose principal functions are to keep track of time and to call on the four members of the committee who question the candidate on the talk and on the reading list.

After a 20-minute presentation on the part of the candidate, each member of the committee (apart from the committee chair) questions the student for 20 minutes. At the end of the hour and forty minutes, the faculty readers vote on the outcome of the exam. If the outcome is favorable (four out of five votes in favor of the student passing), the student is free to proceed with work on the dissertation. If the proposal is found to be unsatisfactory, the dissertation readers may ask the student to revise and resubmit the dissertation prospectus and to schedule a second exam. A student who fails a second time will be released from the Ph.D. program and awarded a terminal M.A. degree.

## ADVISING

Given the interdisciplinary nature of the Ph.D. programs and the opportunity they afford each student to create an individualized program of study, regular consultation with an adviser is of the utmost importance. The adviser for all entering graduate students is the Chair of Graduate Studies, whose responsibility it is to assist students with their course planning and to keep a running check on progress in completing the course, teaching, and language requirements. By the end of the second year of study, each student should have chosen a faculty adviser whose expertise is appropriate to his/her own area of research and interests.

*Yearly Review*—The faculty provide students with timely and constructive feedback on their progress toward the Ph.D. In order to evaluate students' progress and to identify potential problem areas, the department's faculty reviews the academic progress of each student at the end of the academic year. The yearly reviews are primarily intended to identify developing problems that could impede progress. In most cases, students are simply given constructive feedback, but if more serious concerns warrant, a student may be placed on probation with specific guidelines for addressing the problems detected. Possible outcomes of the yearly review include (1) continuation of the student in good standing, or (2) placing the student on probation, with specific guidelines for the period on probation and the steps to be taken in order to be returned to good standing. For students on probation at this point (or at any other subsequent points), possible outcomes of a review include: (1) restoration to good standing; or (2) continued probation, again with guidelines for necessary remedial steps; or (3) termination from the program. Students leaving the program at the end of the first or second year are usually allowed to complete the requirements to receive an M.A. degree, if this does not involve additional residency or financial support.

## PH.D. MINOR IN FRENCH OR ITALIAN

The Ph.D. may be combined with a minor in a related field, including Comparative Literature, Linguistics, Modern Thought and Literature, Art History, History, Music, Philosophy, and Spanish. Ph.D. candidates in French may minor in Italian, and vice versa. Students interested in a minor should design their course of study with their adviser(s).

*Ph.D. Minor in French Literature*—The department offers a minor in French Literature. The requirement for a minor in French is completion of 24 units of graduate course work in the French section. Interested students should consult the graduate adviser.

*Ph.D. Minor in Italian Literature*—The department offers a minor in Italian Literature. The requirement for a minor in Italian is a minimum of 24 units of graduate course work in Italian literature. Interested students should consult the graduate adviser.

## OVERSEAS STUDIES COURSES IN FRENCH AND ITALIAN

For course descriptions and additional offerings, see the listings in the *Stanford Bulletin's* ExploreCourses web site (<http://explorecourses.stanford.edu>) or the Bing Overseas Studies

web site (<http://bosp.stanford.edu>). Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

## AUTUMN QUARTER

### FLORENCE

- OSPFLOR 34. The Woman in Florentine Art. 4 units, Timothy Verdon, GER:DB:Hum, EC:Gender  
 OSPFLOR 41. The Contemporary Art Scene in Tuscany: Theory and Practice. 3-5 units, Fillippo Rossi  
 OSPFLOR 115Y. The Duomo and Palazzo della Signoria: Symbols of a Civilization. 4 units, Timothy Verdon, GER:DB:Hum  
 OSPFLOR 134F. Modernist Italian Cinema. 5 units, Ermelinda Campani, GER:DB:Hum

### PARIS

- OSPPARIS 30. The Avant Garde in France through Literature, Art and Theater. 4 units, Tiphaine Karsenti, DB:Hum  
 OSPPARIS 32. Understanding French Politics. 4-5 units, Sylvie Strudel, GER:DB:SocSci  
 OSPPARIS 107Y. The Age of Cathedrals: Religious Art and Architecture in Medieval France. 4 units, Colette Deremble, Jean Paul Deremble, DB: Hum

## WINTER QUARTER

### FLORENCE

- OSPFLOR 44. The Revolution in Science: Galileo and the Birth of Modern Scientific Thought. 5 units, Paolo Galluzzi, GER:DB:Hum  
 OSPFLOR 48. Sharing Beauty: Florence and the Western Museum Tradition. 4 units, Fillippo Rossi, Timothy Verdon, GER:DB:Hum  
 OSPFLOR 49. The Cinema Goes to War: Fascism and World War II as Represented in Italian and European Cinema. 5 units, Ermelinda Campani, GER:DB:Hum  
 OSPFLOR 66. Da Vinci: Renaissance Understanding of Anatomy. 5 units, Gary Gold  
 OSPFLOR 111Y. From Giotto to Michelangelo: Introduction to the Renaissance in Florence. 4 units, Timothy Verdon, GER:DB:Hum

### PARIS

- OSPPARIS 54. The Artist's World: The Workshop, Patronage and Public in 19th and 20th Century France. 4 units, Estelle Halevi, DB:Hum  
 OSPPARIS 57. Human Rights in Comparative Perspective. 4-5 units, Laurie Boussaguet, DB:SocSci, EC:GlobalCom  
 OSPPARIS 81. France During the Second World War: Between History and Memory. 5 units, Fabrice Virgili, DB: SocSci  
 OSPPARIS 186F. Contemporary African Literature in French. 4 units, Florence Mercier, DB:Hum, EC:GlobalCom

## SPRING QUARTER

### FLORENCE

- OSPFLOR 54. High Renaissance and *Maniera*. 5 units, Timothy Verdon, GER:DB:Hum  
 OSPFLOR 58. Space as History: Urban Change and Social Vision: Florence 1059 to the Present. 4 units, Filippo Rossi, Timothy Verdon, DB:Hum  
 OSPFLOR 67. Women in Italian Cinema: Maternity, Sexuality, and the Image. 4 units, Ermelinda Campani, GER:DB:Hum, EC:Gender  
 OSPFLOR 70. Investigating in/exclusion: Introduction to Anthropology through the Study of Embodiment and Consumption in Italy. 5 units, Matthew Kohrman  
 OSPFLOR 71. Becoming an Artist in Florence: The Contemporary Artistic Craftmanship in Tuscany and the New Tendencies in the Visual Future. 3-5 units, Filippo Rossi

OSPFLOR 75. Florence in the Renaissance. 5 units, Anthony Molho

### PARIS

OSPSPARIS 29. Colonization, Decolonization and Immigration: an Overview of French Global History in the 20th Century. 5 units, Choukri Hmed, DB:SocSci, EC:GlobalCom

OSPSPARIS 46. The Baroque. 5 units, Roland Greene

OSPSPARIS 60. Representation of Women in Christian Art: Boldness and Virtue. 4 units, Brigitte Gallini, DB:Hum, EC:Gender

OSPSPARIS 64. Afterlife of the Middle Ages. 3-5 units, Marisa Galvez, DB:Hum

OSPSPARIS 92. Building Paris: its History, Architecture, and Urban Design. 4 units, Estelle Halevi, DB:Hum

## GERMAN STUDIES

*Emeriti: (Professors)* Theodore M. Andersson, Gerald Gillespie, Walter F. W. Lohnes, Katharina Mommsen, Kurt Müller-Vollmer

*Director:* Russell A. Berman

*Chair of Graduate Studies:* Amir Eshel

*Chair of Undergraduate Studies:* Adrian Daub

*Professors:* Russell A. Berman, Elizabeth Bernhardt, Amir Eshel, Orrin W. Robinson III

*Assistant Professors:* Adrian Daub, Márton Dornbach (on leave), Charitini Douvaldzi

*Courtesy Professor:* Thomas Sheehan (on leave, Spring)

*Senior Lecturers:* William E. Petig, Kathryn Strachota

*Visiting Professors:* Karl Heinz Bohrer (Autumn), Kurt Müller-Vollmer (Winter), Bernd Weisbrod (Spring)

*Visiting Assistant Professor:* Falk Cammin (Autumn)

*Visiting Lecturers:* Kate Elswit (Autumn, Spring), Sylke Temple (Spring)

*Department Office:* Building 260, Room 108

*Mail Code:* 94305-2030

*Phone:* (650) 723-3266

*Email:* germanstudies@stanford.edu

*Web Site:* <http://germanstudies.stanford.edu>

Courses offered by the Department of German Studies are listed on the *Stanford Bulletin's* ExploreCourses web site under the subject codes GERGEN (German General) and GERLIT (German Literature). For courses in German language instruction with the subject code GERLANG, see the "Language Center" section of this bulletin.

The department's goal is to provide students with the linguistic and analytic ability to explore the significance of the cultural traditions and political histories of the German-speaking countries of Central Europe. At the same time, the interdisciplinary study of German culture, which can include art, history, literature, media theory, philosophy, and political science, encourages students to evaluate broader and contradictory legacies of modernity, such as how the literary, artistic, and cultural responses to the belated and rapid modernization of Germany allow for reflection on the modern condition in general.

Similarly, the German experience of national identity and political unification sheds light on wider issues of cultural cohesion and difference, as well as on the causes and meaning of phenomena such as racial prejudice, anti-Semitism, and the Holocaust. In general, an education in German Studies not only encourages the student to consider the effects of German-speaking thinkers and artists on the modern world, but also provides a lens through which the contours of the present and past can be evaluated.

The department offers students the opportunity to pursue course work at all levels in the languages, cultures, literatures, and intellectual histories of the German-language traditions. Whether interested in German literature or the influence of German thought on other fields in the humanities, students find a broad range of

courses covering language acquisition and refinement, literary history and criticism, cultural history and theory, history of thought, continental philosophy, and linguistics.

By carefully planning their programs, students may fulfill the B.A. requirements for a double major in German Studies and another subject. An extended undergraduate major in English and German literature is available, as are coterminal programs for the B.A. and M.A. degrees in German Studies. Doctoral students may elect Ph.D. minors in Comparative Literature, Linguistics, and Modern Thought and Literature.

Special collections and facilities at Stanford offer possibilities for extensive research in German Studies and related fields pertaining to Central Europe. Facilities include the Stanford University Libraries and the Hoover Institution on War, Revolution, and Peace. Special collections include the Hildebrand Collection (texts and early editions from the 16th to the 19th century), the Austrian Collection (with emphasis on source material to the time of Maria Theresa and Joseph II, the Napoleonic wars, and the Revolution of 1848), and the Stanford Collection of German, Austrian, and Swiss Culture. New collections emphasize culture and cultural politics in the former German Democratic Republic. The Hoover Institution has a unique collection of historical and political documents pertaining to Germany and Central Europe from 1870 to the present. The department also has its own reference library.

The Republic of Austria has endowed the Distinguished Visiting Professorship in Austrian Studies. The professorship rotates on a yearly basis through several departments.

Haus Mitteleuropa, the German theme house at 620 Mayfield, is an undergraduate residence devoted to developing an awareness of the culture of Central Europe. A number of department courses are regularly taught at the house, and there are in-house seminars and conversation courses. Assignment is made through the regular undergraduate housing draw.

### MISSION OF THE UNDERGRADUATE PROGRAM IN GERMAN STUDIES

The mission of the undergraduate program in German Studies is to provide students with the linguistic and analytic background necessary to explore the significance of cultural traditions and political histories of the German-speaking countries of Central Europe. In addition, its interdisciplinary component prepares students to evaluate how the literary, artistic, and cultural responses to the belated yet rapid modernization of Germany allow for reflection of its modern condition. Students pursue course work at all levels in the languages, literatures, and intellectual histories of the Germanic nations. The program prepares students for careers in business, social service, and government, and for graduate work in German Studies.

### LEARNING OUTCOMES

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. oral proficiency beyond the interpersonal level with presentational language abilities.
2. writing proficiency beyond the interpersonal level with presentational language abilities.
3. close reading skills of authentic texts in German.
4. the ability to develop effective and nuanced lines of interpretation.

### STANFORD IN BERLIN

Undergraduates interested in Germany are encouraged to enroll in the Berlin program, which is open for academic study during the Autumn, Winter, and Spring quarters. The program also offers internships in German industry, government, and cultural organizations year round. Through the Center, students with a



least two years of college-level German can also take courses at the Freie Universität, Technische Universität, or Humboldt Universität. Most students live in homes with German hosts.

Most credits earned in Berlin can be applied to the undergraduate major in German Studies. All students who are planning to study at Stanford in Berlin or engage in an internship are encouraged to consult with the Chair of Undergraduate Studies and the Overseas Studies office about integrating work done abroad into their degree program. Returning interns who wish to develop a paper based on their experience should enroll in GERLIT 298. More detailed information is available at the Overseas Studies Program in Sweet Hall or with the Chair of Undergraduate Studies.

## COTERMINAL PROGRAMS

Students may elect to combine programs for the B.A. and M.A. degrees in German Studies. University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees" section of this bulletin. For University coterminal degree program rules and University application forms, see

<http://studentaffairs.stanford.edu/registrar/publications#Coterm>.

## GRADUATE PROGRAMS IN GERMAN STUDIES

The University requirements for the M.A. and Ph.D. degrees are described in the "Graduate Degrees" section of this bulletin.

## BACHELOR OF ARTS IN GERMAN STUDIES

Majors must demonstrate basic language skills, either by completing GERLANG 1,2,3, First-Year German, or the equivalent such as an appropriate course of study at the Stanford in Berlin Center. Students then enroll in intermediate and advanced courses on literature, culture, thought, and language. Courses counted toward degree requirements must be taken for a letter grade unless that grading option is not available.

*Internships*—Internships in Germany are arranged through the Bing Overseas Studies Program. In addition, students may consult with the department to arrange local internships involving German language use or issues pertaining to Germany or Central Europe. Interns who prepare papers based on their experience enroll in GERLIT 298.

*Extended Major in English and German Literatures*—Students may enter this program with the consent of the Director of German Studies and the Chair of the Department of English. See the "Field of Study IV. Literature and Foreign Language Literature" section in the "Bachelor of Arts in English" section of this bulletin.

*Multiple Majors*—Students can combine a major in German Studies with a major in any other field. By choosing courses in such disciplines as history, international relations, or economics, students can prepare themselves in the area of Central Europe.

### *Degree Requirements*—

1. Completion of 60 units. All classes taken towards this major must be taken for a letter grade unless the only option is C/NC. Units earned towards the Bachelor of Arts in German Studies with Honors degree may be applied to the 60 unit total.
2. Completion of two GERLIT courses at the 120-level
3. Completion of German Studies Core series:
  - a. GERLIT 131. Eighteenth-Century German Literature
  - b. GERLIT 132. Nineteenth-Century German Literature
  - c. GERLIT 133. Twentieth-Century German Literature
4. GERLIT 190. German Studies (WIM)
5. Remaining 33 units to be completed through elective courses approved in consultation with the Chair of Undergraduate Studies. A maximum of 27 units of GERLANG courses and/or 25 units from courses covering German material taught in other departments may be applied to these elective units. A maximum of 12 units towards the Bachelor of Arts in German

Studies with Honors degree may be applied to the elective units.

## GERMAN AND PHILOSOPHY

The German and Philosophy major option offers students the opportunity to combine studies in literature and philosophy. Students take most of their courses from departments specializing in the intersection of literature and philosophy. This option is not declared in Axxess; it does not appear on the transcript or diploma.

The German and Philosophy major option requires a minimum of 16 courses, for a minimum total of 65 units, distributed as follows:

1. 35 units in German Studies, including:
  - a. completion of two GERLIT courses at the 120-level
  - b. completion of German Studies Core series:
    1. GERLIT 131. Eighteenth-Century German Literature
    1. GERLIT 132. Nineteenth-Century German Literature
    2. GERLIT 133. Twentieth-Century German Literature.
  - c. GERLIT 190. German Studies (WIM)
2. GERGEN 181/PHIL 81, the gateway course in philosophy and literature, preferably in the sophomore year.
3. Requirements in Philosophy:
  - a. Prerequisite: an introductory philosophy class
  - b. PHIL 80. Mind, Matter, and Meaning
  - c. a course in the PHIL 170 series
  - d. a course in the PHIL 180 series
  - e. two courses in the history of philosophy numbered above 100
4. Two additional elective courses of special relevance to the study of philosophy and literature as identified by the committee in charge of the program. Students must consult with their advisers, the Chair of Undergraduate Studies, and the undergraduate adviser of the program in philosophical and literary thought.
5. *Capstone*: One of the courses must be taken in the student's senior year. When choosing courses, students must consult with their advisers, the Chair of Undergraduate Studies, and the undergraduate adviser of the program in philosophical and literary thought.
6. Units devoted to meeting the department's language requirement are not counted toward the 65-unit requirement.

The capstone seminar and the two related courses must be approved by both the German Studies Chair of Undergraduate Studies and the undergraduate adviser of the program in philosophical and literary thought administered through the DLCL. Substitutions, including transfer credit, are not normally permitted for items 3b, 3c, and 3d, and are not permitted under any circumstances for items 2, 3a, and 5. Up to 10 units taken in the Philosophy Department may be taken CR/NC or S/NC; the remainder must be taken for a letter grade.

## HONORS

Majors with a minimum grade point average (GPA) of 3.3 in German courses are eligible for departmental honors. Students interested in the honors program should consult the undergraduate adviser early in their junior year. The essay topic is chosen in consultation with a faculty member of the department, and opportunities to start research projects are offered at the Stanford in Berlin Center. In addition to the requirements listed above, the student must submit a proposal for the honors essay to the German faculty by the end of Spring Quarter of the junior year. During this quarter, students may enroll for 2 units of credit in GERLIT 189B for the drafting or revision of the thesis proposal. In Autumn Quarter of the senior year, the student must enroll in DLCL 189, a 5-unit seminar that focuses on researching and writing the honors thesis. Students then enroll for 5 units of credit in GERLIT 189A while composing the thesis during Winter Quarter. Students who did not enroll in 189B in the junior year may enroll in GERLIT 189B in Spring Quarter of the senior year while revising the thesis, if approved by the thesis supervisor. A total of 10-12 units are

awarded for completion of honors course work, independent study, and the finished thesis.

## MINOR IN GERMAN STUDIES

The department offers two minor options; the DLCL offers one additional minor option.

## MINOR IN GERMAN LANGUAGE AND CULTURE

Students may choose to minor in German Language and Culture if they are particularly interested in developing a strong ability in the German language, or in pursuing linguistic issues pertinent to German. Students satisfy the requirements for the minor in German Language and Culture by completing 35 units of course work, including at least three courses at the 100-139 level in either GERLANG or GERLIT, taught in German. Study at the Stanford in Berlin Center for at least one quarter is highly recommended.

## MINOR IN GERMAN CULTURAL STUDIES

Students who wish to study German literature, culture, or thought, without necessarily acquiring facility in the German language, may pursue a minor in German Cultural Studies. Students meet the requirements for the minor in German Cultural Studies by completing 35 units of course work in German literature, culture, and thought in translation, including at least three courses at the 130- or 140- level.

## MINOR IN MODERN LANGUAGES

The Division of Literatures, Cultures, and Languages offers a minor in Modern Languages. This minor draws on literature and language courses offered through this and other literature departments. See the "Literatures, Cultures, and Languages" section of this bulletin for further details about this minor and its requirements.

## MASTER OF ARTS IN GERMAN STUDIES

This program is designed for those who do not intend to continue studies through the Ph.D. degree. Students desiring the M.A. degree must complete a minimum of 45 units of graduate work. If students enroll for three quarters for a minimum of 15 units per quarter, they can fulfill the M.A. requirements in one year. The program normally includes at least one course in each of the three areas of concentration: language and linguistics, literature, and thought.

In addition, students must take graduate-level courses in German and/or approved courses in related fields such as art history, comparative literature, linguistics, history, or philosophy.

M.A. candidates must take an oral examination toward the end of their last quarter.

## DOCTOR OF PHILOSOPHY IN GERMAN STUDIES

The requirements for the Ph.D. in German Studies include:

1. A minimum of 54 graduate units during the first year of graduate study, and a minimum of 10 units per quarter during the six quarters following the first year. In addition, ten graduate units must be completed during each of the first and second summers in the program. A total of 135 units is required for the Ph.D.; doctoral candidates must complete at least one course with each member of the department. During each quarter in year one and year two, enrollment in and completion of at least two graduate courses taught by German Studies faculty are required.
2. A reading knowledge of one language other than English and German. Students in Medieval Studies must also have a reading knowledge of Latin.
3. A first-year oral examination.
4. A qualifying paper

5. A qualifying examination
6. The University Oral examination
7. A dissertation.

During the first year of work, the student should select courses that provide an introduction to the major areas of the discipline. During Spring Quarter of the first year, students must take their first-year examination. During the one-hour oral examination, the student is questioned by three faculty members on work undertaken in specific graduate courses. Students who fail this examination may request to retake it once before October 15.

By July 1 of the summer following the first year of graduate study, students should present as a qualifying paper an example of their course work. Although ordinarily not meant to represent an original contribution to scholarship, it should demonstrate the candidate's ability to grasp complex subject matter with sufficient competence to organize materials and to present arguments in a clear and concise manner commensurate with scholarly standards. The paper is submitted to the department director, who passes it on for approval by the student's faculty adviser and a second reader appointed by the director. If the readers find the paper insufficient, the student will be given one chance to rework the paper, which must then be submitted by October 15.

Students who enter the program with a master's degree from another institution must submit, in lieu of a qualifying paper, a master's thesis or a major research paper as evidence of ability to pursue advanced scholarly work.

Before the end of the autumn quarter of the second year (but only if the qualifying paper has been accepted, and the first-year examination has been completed successfully), the student takes a one-hour oral qualifying exam with two faculty members from German Studies appointed by the director. The purpose of this examination is to demonstrate a broad familiarity with the literature of the major periods, movements, and some major figures. This examination is based on selections from a reading list provided by the department to the student after admission into the program. Only after completion of the qualifying procedure, which includes both the qualifying paper and the qualifying examination, does the department approve the student's admission to candidacy. A student who fails the qualifying examination may retake it once by March 1. Failing the qualifying examination a second time will lead to termination from the program.

After passing the qualifying exam, the student should promptly consult with appropriate faculty members in order to develop a dissertation topic. It is important to consider scholarly significance, access to resources, and feasibility of completion within a reasonable period. The student then prepares a preliminary statement describing the topic (no more than five pages), which is circulated to prospective committee members for discussion at a meeting normally held during the spring of the second year. The purpose of this meeting is to provide the student with feedback and guidance in the preparation of the formal prospectus.

The University Oral examination in the Department of German Studies involves a presentation of a dissertation prospectus. The prospectus, normally 25 pages plus bibliography, elaborates on the topic, the proposed argument, and the organization of the dissertation. It must be distributed to the committee members and the outside chair at least two weeks before the formal University Oral examination. Students should plan this examination for the autumn or winter quarter of the third year. The examination lasts approximately two hours, permitting each of the four examiners a 25-minute question period and reserving an optional ten minutes for questions from the chair of the examination. Should a student fail the University Oral exam, they will be allowed an opportunity to retake the exam. A second fail of the University Oral exam will result in dismissal from the Ph.D. program.

Students, regardless of their future fields of concentration, are expected to acquire excellence in the German language. The department expects Ph.D. candidates to demonstrate teaching proficiency in German; DLCL 201, The Learning and Teaching of Second Languages, is required. The teaching requirement is four quarters during the second and third years of study and mandatory

for continued enrollment or support in the program. Students must teach a fifth course which may be a language course, but they may alternatively request to teach an additional literature course at a latter time in the course of study, normally once their dissertation has reached an advanced stage, contingent upon department need and subject to approval of the director. Such teaching does not extend the length or scope of support.

The department expects candidates to demonstrate research skills appropriate to their special areas of study. The requirement can be fulfilled in the capacity of either a University Fellow or a Research Assistant.

Graduate students are also advised to start developing skills in the teaching of literature by participating in the teaching of undergraduate literature courses. Students may enroll in independent studies with faculty members to gain experience as apprentices in undergraduate literature teaching.

Regular attendance at the departmental colloquium is mandatory. Each student is expected to make a formal presentation at the colloquium for public discussion. The principal conditions for continued registration of a graduate student are the timely and satisfactory completion of University, department, and program requirements for the degree, and fulfillment of minimum progress requirements. Failure to meet these requirements results in corrective measures which may include a written warning, academic probation, and/or the possible release from the program.

*Yearly Review:* In order to evaluate student progress and to identify potential problem areas, the department's faculty reviews the academic progress of each first-year student at the beginning of Winter and Spring quarters and again at the end of the academic year. The first two reviews are primarily intended to identify developing problems that could impede progress. In most cases, students are simply given constructive feedback, but if more serious concerns warrant, a student may be placed on probation with specific guidelines for addressing the problems detected. The review at the end of Spring Quarter is more thorough; each student's performance during the first year is reviewed and discussed. Possible outcomes of the spring review include: (1) continuation of the student in good standing, or (2) placing the student on probation, with specific guidelines for the period of probation and the steps to be taken in order to be returned to good standing. For students on probation at this point (or at any other subsequent points), possible outcomes of a review include: (1) restoration to good standing; (2) continued probation, again with guidelines for necessary remedial steps; or (3) termination from the program. All students are given feedback from their advisers at the end of their first year of graduate work, helping them to identify areas of strength and potential weakness.

At the end of the second year of residency, students who are performing well, as indicated by their counselor, performance on the Qualifying Exam, and teaching and research assistantship performance, are advanced to candidacy. This step implies that the student has demonstrated the relevant qualities required for successful completion of the Ph.D. Future evaluations are based on the satisfactory completion of specific remaining department and University requirements. Students who are not advanced to candidacy will normally be terminated from the program and awarded a terminal M.A. degree. In some cases, the department may require that a student complete outstanding work or complete unmet requirements before admission to candidacy. The university requires that all students must be admitted to candidacy by the beginning of the third year in residence in order to continue in the Ph.D. program. Therefore all requirements stipulated by the department must be met before registration for the fall quarter of the student's third year.

At any point during the degree program, evidence that a student is performing at a less than satisfactory level may be cause for a formal academic review of that student.

*Grading:* Doctoral students in the department must take required courses for a letter grade if available and are expected to earn a grade of 'B+' or better in each course offered by the DLCL. Any grade of 'B' or below is considered to be less than satisfactory.

Grades of 'B' or below are reviewed by faculty and the following actions may take place: (1) the grade stands and the student's academic performance is monitored to ensure that satisfactory progress is being made; (2) the grade stands and the student is required to revise and resubmit the work associated with that course; or (3) the student may be required to retake the course.

## GERMAN STUDIES AND A MINOR FIELD

Students may work toward a Ph.D. in German Studies with minors in such areas as Comparative Literature, Modern Thought and Literature, Linguistics, or History. Students obtaining a Ph.D. in such combinations may require additional training.

## OVERSEAS STUDIES COURSES IN GERMAN STUDIES

For course descriptions and additional offerings, see the listings in the *Stanford Bulletin's* ExploreCourses web site (<http://explorecourses.stanford.edu>) or the Bing Overseas Studies web site (<http://bossp.stanford.edu>). Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

### AUTUMN QUARTER

#### BERLIN

- OSPBER 13. Jewish and Muslim Berlin. 3 units, Charlotte Fonrobert, DB: SocSci, EC: GlobalCom  
 OSPBER 17. Split Images: A Century in Cinema. 4 units, Karen Kramer, DB: Hum, EC: GlobalCom  
 OSPBER 56. A Laboratory of Modernity: Concert and Concerto in 19th Century Germany. 4 units, Camilla Bork, DB: Hum  
 OSPBER 115X. German Economy: Past and Present. 4-5 units, Ingo Klein, DB: SocSci, EC: GlobalCom  
 OSPBER 126X. A People's Union? Money, Markets, and Identity in the EU. 4-5 units, Uli Brückner, DB: SocSci, EC: GlobalCom

### WINTER QUARTER

#### BERLIN

- OSPBER 66. Theory from the Bleachers: Reading German Sports and Culture. 3 units, Wolf-D. Junghanns  
 OSPBER 70. The Long Way to the West--German History from the 18th Century to the Present. 4-5 units, Martin Jander, DB: Hum, EC: GlobalCom  
 OPSBER 161X. The German Economy in the Age of Globalization. 4-5 units, Ingo Klein, DB: SocSci, EC: GlobalCom  
 OSPBER 177A. Culture and Politics in Modern Germany. 4-5 units, Karen Kramer, DB: SocSci, EC: Gender

### SPRING QUARTER

#### BERLIN

- OSPBER 15. Shifting Alliances? The European Union and the US. 4-5 units, Uli Brückner, DB: SocSci, EC: GlobalCom  
 OSPBER 101A. Contemporary Theater. 5 units, Karen Kramer, GER:DB:Hum  
 OSPBER 174. Sports Culture and Gender in Comparative Perspective. 5 units, Wolf Junghanns, GER:DB:SocSci, EC:Gender

# HISTORY

*Emeriti: (Professors)* Barton J. Bernstein, Carl N. Degler, Peter Duus, Terence Emmons, Harold L. Kahn, David M. Kennedy, George H. Knoles, Richard W. Lyman, Mark Mancall, Peter Paret, Paul A. Robinson, Paul Seaver, James J. Sheehan, Peter Stansky, David B. Tyack, Lyman P. Van Slyke; (*Senior Lecturer*) Joseph J. Corn

*Chair:* Kären Wigen

*Professors:* Keith M. Baker, Joel Beinin, Albert Camarillo, James T. Campbell, Clayborne Carson, Gordon Chang, Paula Findlen, Estelle Freedman, Stephen Haber, Tamar Herzog, David Holloway, Nancy S. Kollmann, Mark E. Lewis, Carolyn Lougee Chappell, Ian Morris, Norman M. Naimark, Robert Proctor, Jack N. Rakove, Richard L. Roberts, Aron Rodrigue, Richard P. Saller, Londa Schiebinger, Richard White, Kären E. Wigen, Caroline Winterer, Steven J. Zipperstein

*Associate Professors:* David R. Como, Robert Crews, James P. Daughton, Zephyr Frank, Sean Hanretta, Jessica Riskin, Priya Satia, Matthew H. Sommer, Amir Weiner

*Assistant Professors:* Allyson V. Hobbs, Aishwary Kumar, Yumi Moon, Thomas S. Mullaney, Edith Sheffer, Laura Stokes, Jun Uchida, Ali Yaycioglu

*Courtesy Professors:* Giovanna Ceserani, Daniel Edelstein, Lawrence Friedman, Leah Gordon, Avner Greif, Amalia Kessler, Larry Kramer, David F. Labaree, Reviel Netz, Walter Scheidel, Sam Wineburg, Gavin Wright

*Senior Lecturers:* Katherine Jolluck, Martin W. Lewis

*Acting Assistant Professor:* Arie Dubnov

*Lecturer:* Robert Fredona, Margo Horn, Patrick Iber, Jamie Kreiner, Carol McKibben, Zeb Tortorici, Leandra Zarnow

*Department Office:* Building 200, Room 113

*Mail Code:* 94305-2024

*Phone:* (650) 723-2651

*Web Site:* <http://history.stanford.edu>

Courses offered by the Department of History are listed under the subject code HISTORY on the *Stanford Bulletin's* ExploreCourses web site.

## MISSION OF THE DEPARTMENT OF HISTORY

History courses teach the analytical, interpretive, and writing knowledge and skills necessary for understanding the connections between past and present. History is a pragmatic discipline in which the analysis of change over time involves sifting the influences and perspectives that affect the course of events, and evaluating the different forms of evidence historians exploit to make sense of them. Teaching students how to weigh these sources and convert the findings into persuasive analysis lies at the heart of the department's teaching. Graduates with a History major pursue careers and graduate study in law, public service, business, writing, education, and journalism.

## LEARNING OUTCOMES

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. an understanding of what it means to think historically: locating subjects in time and place and being sensitive to the contingencies of context and to change over time.
2. critical and interpretive thinking skills using course's primary source materials.
3. the ability to identify different types of sources of historical knowledge.
4. analytical writing skills and close reading skills.
5. effective oral communication skills

## DEGREES OFFERED

The Department of History offers the following degree programs: Bachelor of Arts, coterminal Bachelor of Arts and Master of Arts, Master of Arts, and Doctor of Philosophy.

## GRADUATE PROGRAMS IN HISTORY

The primary goal of the Stanford Department of History's graduate program is the training of scholars. Most students who receive doctorates in the program go on to teach at colleges or universities. Other students have obtained positions in university administration and research.

## BACHELOR OF ARTS IN HISTORY

The following History Bachelor of Arts degree requirements apply to students declaring the History major on or after September 1, 2008. Students who declared on or before August 31, 2008 should consult the *Stanford Bulletin, 2007-08* for the History B.A. degree requirements applicable at that time.

## PREREQUISITES FOR THE MAJOR

Before declaring the History major, students must take one lecture course. They must take a second lecture course within one year of declaring. Fulfilling this requirement are courses numbered HISTORY 101-199. (Winter/Spring IHUM History offerings are also allowed.) The choices for 2011-12 are:

- HISTORY 102. History of the International System since 1914
- HISTORY 103E. History of Nuclear Weapons
- HISTORY 106A. Global Human Geography: Asia/Africa
- HISTORY 106B. Global Human Geography: Europe and the Americas
- HISTORY 107. Introduction to Feminist Studies
- HISTORY 108. Century of Violence: Mass Violence in the 20th Century
- HISTORY 9/109. Human Rights and Humanitarianism: A Global History
- HISTORY 110A. Europe from Antiquity to 1500
- HISTORY 110B. Early Modern Europe
- HISTORY 110C. Introduction to Modern Europe
- HISTORY 125. Dark Century: Eastern Europe After 1900
- HISTORY 130A. The Rise of Scientific Medicine
- HISTORY 132A. Enlightenment and the Arts
- HISTORY 134A. European Witch Hunts
- HISTORY 135. History of European Law
- HISTORY 139. Modern Britain and the Empire
- HISTORY 140. World History of Science
- HISTORY 142. Darwin in the History of Life
- HISTORY 145B. Africa in the Twentieth Century
- HISTORY 147. History of South Africa
- HISTORY 150A. Colonial and Revolutionary America
- HISTORY 150B. 19th Century America
- HISTORY 150C. The United States in the Twentieth Century
- HISTORY 154. American Intellectual and Cultural History to the Civil War
- HISTORY 157. The Constitution
- HISTORY 159. Asian American History
- HISTORY 161. Women in Modern America
- HISTORY 166B. Immigration Debates in the U.S., Past and Present
- HISTORY 168. U.S. History through Film since World War II
- HISTORY 169. The Environmental History of North America
- HISTORY 170. Colonial Latin America
- HISTORY 170B. Culture, Politics and Society in Latin America
- HISTORY 175. Modern Mexico
- HISTORY 181B. The Formation of the Contemporary Middle East

- HISTORY 182C. The Making of the Islamic World (600-1300)
- HISTORY 183. Modern Iran
- HISTORY 185B. Jews in the Modern World
- HISTORY 193. Late Imperial China
- HISTORY 195C. Modern Japanese History
- HISTORY 198. The History of Modern China
- HISTORY 198B. The Construction of Modern China through Space and Time
- IHUM 69A,B. Human History: A Global Approach
- IHUM 74A,B. The Problem of Europe
- IHUM 75. Can the People Rule
- IHUM 76. Voyages and Visionaries

## BACHELOR OF ARTS REQUIREMENTS

History majors are required to complete the following:

1. Completion of a minimum of 63 units and at least 13 courses of at least 3 units each, to include:
  - a. one Sources and Methods seminar (HISTORY 1S-99S)  
*Note:* Students must complete the Sources and Methods Seminar requirement prior to enrolling in the Research Seminar for Majors.
  - b. two 200-level undergraduate colloquia (HISTORY 200-298)
  - c. at least one other small group course, to be chosen among the department's undergraduate colloquia, research seminars, or Stanford Introductory Seminars.
  - d. two lecture courses, one of which must be either a Europe survey course (such as HISTORY 110A,B,C) or a United States survey course (such as HISTORY 150A,B,C); the second must be a lecture course in African, Asian, Middle East, or Latin American History. Students may count courses they took as prerequisites to the major for this requirement.
2. Courses comprising the 63 units must be taken for a letter grade, and the student must maintain a grade point average (GPA) in History courses of 2.0 or higher.
3. At least nine courses must be taken from within the Stanford Department of History. Transfer students and those who study abroad may be granted exemptions from this requirement at the discretion of the Director of Undergraduate Studies.
4. Completion of the Writing in the Major requirement. This requirement is satisfied by completing a Research Seminar for Majors (HISTORY 209S) and writing a 20-25 page essay based on original research and including at least two drafts. The Research Seminar for Majors may be taken in either the junior or the senior year. Students must complete the Sources & Methods seminar before enrolling in the Research Seminar.
5. At least six quarters of enrollment in the major. Each candidate for the B.A. in History should declare the major by the Autumn Quarter of the third year of study or earlier, if possible.
6. One Directed Writing (299W) or Directed Research (299S) taken for 3-5 units and for a letter grade may be applied toward the thirteen courses required for the B.A. in History.
7. *Capstone:* The History department organizes a series of luncheon workshops in May, at which students present their research essays and honors theses.

Completion of the major requires planning. History majors should plan to meet with their faculty advisers twice yearly, once in the Autumn and once in the Winter or Spring quarters. These meetings should take place within the first three weeks of the quarter, before the add/drop deadline.

The department also encourages students to acquire proficiency in foreign languages and study at one of Stanford's overseas programs. Such studies are not only valuable in themselves; they can provide an opportunity for independent research and a foundation for honors essays and graduate study.

Advanced Placement credits do not fulfill any major requirements.

For further information on History courses' satisfaction of major requirements, see <http://history.stanford.edu/courses>.

## WRITING IN THE MAJOR (WIM) REQUIREMENT

History's Writing in the Major requirement is satisfied by completing HISTORY 209S, Research Seminar for Majors.

This course may be taken in either the junior or senior year, but not before completing the sources and methods seminar requirement. Students write a 20-25 page research essay. Original research and revision are important parts of the research essay. Students must conduct substantial research in the libraries and must submit at least two drafts (a rough draft and a final draft) of the essay. Any student wishing to write an honors thesis must take HISTORY 209S, Research Seminar for Majors, in the junior year and use it to begin work on the thesis; this work can take the place of a research essay.

HISTORY 209S fulfills the WIM requirement only. It does not fulfill geographical requirements or small group course requirements.

Students select their research topics based on the general topic of each quarter's offering.

- HISTORY 209S. Research Seminar for Majors
  - Autumn: Nineteenth Century America and History of Science
  - Winter: Muslim Modernities
  - Spring: American Identities, History and the Arts: Europe since 1600, and War and Empire

## HONORS PROGRAM

For a limited number of majors, the department offers a special program leading to Departmental Honors in History. Students accepted for this program, in addition to fulfilling the general requirements stated above, begin work on an essay in Spring Quarter of the junior year and complete the essay by mid-May of the senior year. In addition to HISTORY 299H, The Junior Honors Colloquium, students must enroll in 11-15 units of Senior Research in the senior year, to be distributed as best fits their specific project. For students in the Honors program, Senior Research units (299A,B,C) are taken in addition to the thirteen required courses in History.

To enter this program, the student must be accepted by a member of the department who agrees to advise the research and writing of the essay, and must complete the Junior Honors Colloquium (299H) offered in Winter Quarter. An exception to the latter requirement may be made for those studying overseas Winter Quarter of the junior year, but such students should consult with the director of the honors program, if possible, prior to going overseas. Students who study abroad for the entire junior year and want to write an honors thesis should plan to take the Research Seminar for Majors in the first quarter following completion of the study abroad program. Under exceptional circumstances, students are admitted to the program in Autumn Quarter of the senior year. Such students must not enroll in any HISTORY 299A,B,C, Senior Research I,II,III units until HISTORY 209S, Research Seminar for Majors, has been completed.

In considering an applicant for such a project, the adviser and director of the honors program take into account general preparation in the field of the project and expect a GPA of at least 3.3 (B+) in the student's previous work in History and in the University. Students completing the thesis with a grade of 'B+' or higher are eligible for Departmental Honors in History. To enter the Honors program, apply at the Department of History office.

Outstanding Honors essays may be considered for the University's Robert M. Golden Medals, as well as for departmental James Birdsall Weter prizes.

*Honors Program Requirements*—To graduate with departmental honors in History, students must:

1. complete HISTORY 299H in the junior year
2. maintain a 3.3 GPA in History courses and throughout the University during the final 5 quarters of enrollment/thesis preparation

3. select both a primary thesis adviser (who is a member of the Stanford History faculty) and a secondary adviser (who is a Stanford University faculty member) no later than Autumn Quarter of the senior year
4. submit on May 14, 2012 by noon a 65-120 page honors thesis including bibliography that receives a grade of 'B+' or better
5. enroll in the 11-15 units of Senior Research as specified below
6. participate in mandatory Honors Program activities throughout senior year (including, but not limited to, writing workshops and the annual Honors Day oral presentations) as specified in the Honors Program Handbook.

HISTORY 299A,B,C do not fulfill any history major requirements other than honors, but the units do count towards the 180 required for B.A. degree conferral.

*Required Course*—To be taken in the junior year:

- HISTORY 299H. Junior Honors Colloquium

*Required Course*—*Recommended to be taken in junior year:*

- HISTORY 209S. Research Seminar for Majors  
An exception (for HISTORY 299H) may be made for those studying overseas Winter Quarter of the junior year, but such students should consult with the Director of the Honors Program prior to going overseas.

To be taken in the senior year:

- HISTORY 299A. Senior Research I (5 units)
- HISTORY 299B. Senior Research II (5 units)
- HISTORY 299C. Senior Research III (1-5 units)

### OVERSEAS STUDIES OR STUDY ABROAD

Courses offered by Stanford's Bing Overseas Studies Program and appearing on the History department's cognate course list automatically receive credit towards the major or minor in History. Course work completed in non-Stanford Study Abroad programs is evaluated for major/minor credit by designated History department faculty on a case-by-case basis. Students in non-Stanford Study Abroad programs are advised to take classes with reading and writing components comparable to History department course loads.

### HISTORY FIELDS OF STUDY OR DEGREE OPTIONS

The Department of History offers the following tracks to the B.A. in History. These tracks are not declared on Axess. The tracks are:

- General History
- Global Affairs and World History
- History, Literature, and the Arts
- History of Science and Medicine
- History and the Law
- Public History/Public Service

The General History track emphasizes breadth of study among historical areas and periods as well as concentration in one selected field. The five tracks with interdisciplinary emphasis (Global Affairs and World History; History, Literature and the Arts; History of Science and Medicine; History and the Law; and Public History/Public Service) combine the study of history with the methods and approaches of other disciplines, and involve substantial course work outside of History.

### GENERAL HISTORY TRACK

In addition to completing the requirements for all History majors, the student in the General History track is required to satisfy breadth and concentration requirements.

1. Breadth Requirements: to ensure chronological and geographical breadth, at least two courses must be completed in a premodern chronological period and in each of three geographical fields: Field I (Africa, Asia, and Middle East); Field II (the Americas); and Field III (Europe, including Western Europe, Eastern Europe, and Russia). Courses fulfilling the premodern chronological period (Field IV) may

also count for Fields I-III. For 2011-2012, these courses are as follows:

#### 1. Field I: Africa/Asia/Middle East

- HISTORY 47S. Saints and Sorcerer-Kings: History and the Epic in West Africa
- HISTORY 48Q. South Africa
- HISTORY 82N. Modern Islamic Movements
- HISTORY 84N. American Empire in the Middle East Since Cold War
- HISTORY 91N. Mao Zedong: Man Who Would Become China
- HISTORY 95S. Chinese Capitalism in Historical Perspective: Commerce and Society in Early Modern China, 1600-1840
- HISTORY 106A. Global Human Geography: Asia/Africa
- HISTORY 145B. Africa in the Twentieth Century
- HISTORY 147. History of South Africa
- HISTORY 181B. The Formation of the Contemporary Middle East
- HISTORY 182C. The Making of the Islamic World (600-1300)
- HISTORY 183. Modern Iran
- HISTORY 193. Late Imperial China
- HISTORY 195C. Modern Japanese History
- HISTORY 198. The History of Modern China
- HISTORY 198B. The Construction of Modern China through Space and Time
- HISTORY 204B. History Without Documents
- HISTORY 208C. History of Death and Dying
- HISTORY 224B. Modern Afghanistan
- HISTORY 281. Economic and Social History of the Middle East
- HISTORY 281B. Modern Egypt
- HISTORY 284F. Empires, Markets, and Networks: Early Modern Islamic World, 1500-1800
- HISTORY 287D. Tel Aviv: Site, Symbol, City
- HISTORY 290G. Dilemmas of Modernity in Twentieth-Century Japan
- HISTORY 295F. Race and Ethnicity in East Asia
- HISTORY 295J. Chinese Women's History
- HISTORY 298E. China-Taiwan-U.S. Triangular Relations from World War II through the Cold War

#### 1. Field II: The Americas

- HISTORY 41Q. Mad Women: Explorations in Gender and Mental Illness in US History
- HISTORY 41S. Speed and Power and Work by the Hour: The Revolution of Western Industry
- HISTORY 44Q. History of Women in Science, Medicine, and Engineering
- HISTORY 52S. Working for the Man: Historical Approaches to Workers and Business in American History, 1815-1940
- HISTORY 53S. Race Riots and Rebellions in 20th Century Urban America
- HISTORY 54S. Prohibition in America
- HISTORY 55S. Real Men and Dragon Ladies: Race and Sexuality in America, 1662-1965
- HISTORY 56N. Celluloid America
- HISTORY 103E. History of Nuclear Weapons
- HISTORY 107. Introduction to Feminist Studies
- HISTORY 150A. Colonial and Revolutionary America
- HISTORY 150B. 19th Century America
- HISTORY 150C. The United States in the Twentieth Century
- HISTORY 154. American Intellectual and Cultural History to the Civil War
- HISTORY 157. The Constitution
- HISTORY 159. Asian American History
- HISTORY 161. Women in Modern America

- HISTORY 166B. Immigration Debates in the U.S., Past and Present
  - HISTORY 169. The Environmental History of North America
  - HISTORY 170. Colonial Latin America
  - HISTORY 170B. Culture, Politics and Society in Latin America
  - HISTORY 175. Modern Mexico
  - HISTORY 201. Introduction to Public History in the United States, 19th Century to the Present
  - HISTORY 253D. Approaches to American Legal History
  - HISTORY 254. Popular Culture and American Nature
  - HISTORY 255D. Racial Identity in the American Imagination
  - HISTORY 260. California's Majority Minority Cities
  - HISTORY 262G. The Pivotal Decade in U.S. History: 1960s or 1970s?
  - HISTORY 263G. History Through a Life: The Allure of American Biography
  - HISTORY 268E. American Foreign Policy and International Relations
  - HISTORY 272B. Frontiers in Iberian and Latin American Culture and History
  - HISTORY 273G. Geographical Imagination and the Making of Brazil and the Hispanic American States: Maps, Historical Narratives and Performance (1750-1850)
  - HISTORY 275G. Religion in Colonial Latin America and Iberian World
  - HISTORY 276E. Gender and Sexuality in Early Modern Iberian World
2. *Field III: Europe, Eastern Europe, and Russia*
- HISTORY 5S. Disciplining the Colonial Body: Violence, Sex, and Resistance in Europe's Empires, 1830-2011
  - HISTORY 13N. Slavery and Rebellion in Ancient Rome: Spartacus in Legend and History
  - HISTORY 13S. The Politics of Food in Early Modern England
  - HISTORY 22S. Big Brother is Watching: The Communist Secret Police
  - HISTORY 30Q. English Society through Fiction
  - HISTORY 102. History of the International System since 1914
  - HISTORY 108. Mass Violence
  - HISTORY 110A. Europe from Antiquity to 1500
  - HISTORY 110B. Early Modern Europe
  - HISTORY 110C. Introduction to Modern Europe
  - HISTORY 125. Dark Century: Eastern Europe After 1900
  - HISTORY 132A. Enlightenment and the Arts
  - HISTORY 134A. European Witch Hunts
  - HISTORY 135. History of European Law
  - HISTORY 139. Modern Britain and the Empire
  - HISTORY 142. Darwin in the History of Life
  - HISTORY 185B. Jews in the Modern World
  - HISTORY 204E. Origins of Totalitarianism
  - HISTORY 211C. Saints in the Middle Ages
  - HISTORY 211D. Law and Society in Medieval Europe
  - HISTORY 212G. Economy and Society in Precapitalist Europe
  - HISTORY 214D. Mediterranean Crossroads: Power, Culture, and Religion in Medieval Sicily
  - HISTORY 220G. Demons, Witches, Holy Fools, and Folk Belief: Popular Religion in Russia, 19th and 20th Centuries
  - HISTORY 221D. Historiography of the Soviet Union
  - HISTORY 225C. Leaders and Leadership in Soviet and Post-Soviet Russia
- HISTORY 227. East European Women and War in the Twentieth Century
  - HISTORY 229. Poles and Jews: The Two Saddest Nations on Earth
  - HISTORY 232A. Power, Art, and Knowledge in Renaissance Italy
  - HISTORY 233A. Modern Intellectual History: From Bacon to Hegel
  - HISTORY 233E. Modern Intellectual History: From the Left Hegelians to Freud
  - HISTORY 236. The Idea of Society
  - HISTORY 236D. Cold War Europe
  - HISTORY 237. The Holocaust
  - HISTORY 239D. Capital and Empire
3. *Field IV: Pre-1700*
- HISTORY 13N. Slavery and Rebellion in Ancient Rome: Spartacus in Legend and History
  - HISTORY 13S. The Politics of Food in Early Modern England
  - HISTORY 110A. Europe from Antiquity to 1500
  - HISTORY 110B. Early Modern Europe
  - HISTORY 132A. Enlightenment and the Arts
  - HISTORY 134A. European Witch Hunts
  - HISTORY 135. History of European Law
  - HISTORY 140. World History of Science: From Prehistory to the Scientific Revolution
  - HISTORY 170. Colonial Latin America
  - HISTORY 182C. Early Middle East
  - HISTORY 193. Late Imperial China
  - HISTORY 203E. Global Catholicism
  - HISTORY 204B. History Without Documents
  - HISTORY 211C. Saints in the Middle Ages
  - HISTORY 211D. Law and Society in Medieval Italy
  - HISTORY 212G. Economy and Society in Precapitalist Europe
  - HISTORY 214D. Mediterranean Crossroads: Power, Culture & Religion in Medieval Sicily
  - HISTORY 232A. Power, Art, and Knowledge in Renaissance Italy
  - HISTORY 275G. Religion in Colonial Latin America and Iberian World
  - HISTORY 276E. Gender and Sexuality in Early Modern Iberian World
2. Concentration: to develop some measure of expertise, students must complete four courses in a single area (including one undergraduate colloquium or research seminar). The proposed concentration must be approved by the major adviser; a proposal for a thematic concentration must be approved by both the adviser and the department's director of undergraduate studies. Areas of concentration are:
- Africa
  - Asia
  - Eastern Europe and Russia
  - Europe before 1700
  - Europe since 1700
  - Jewish History
  - Latin America
  - Science and Technology
  - The United States
  - The Middle East
  - International History
  - Comparative Empires and Cultures
  - or a thematic subject treated comparatively, such as war and revolution, work, gender, family history, popular culture, or high culture.
3. Required course: HISTORY 102. The History of the International System is a required course for students who select the International History concentration. This course is offered in Spring quarter.

Certain Introduction to the Humanities (IHUM) courses taught by History faculty in a Winter-Spring sequence count toward the General History major. These are: IHUM 69A,B; 74A,B

## GLOBAL AFFAIRS AND WORLD HISTORY TRACK

The Global Affairs and World History track is designed to offer an empirically rich curriculum for Stanford students interested in international affairs. The goal is to impart an understanding of today's world through a historical examination of its evolution, from the early modern to the contemporary era. This track appeals to students who are aiming for a career in the international arena, and who seek to inform themselves about the complexities of cultural diversity and spatial differentiation on the ground. Deploying both connective and comparative modes of analysis, majors who choose this track will acquire a robust understanding of the relevance of the past to current events.

The Global Affairs and World History track features gateway courses in Global Human Geography, a recommended skills component, a geographical concentration, and a core cluster of global and comparative offerings. Students choosing this track also develop proficiency in a foreign language at the second-year level or above. Incorporating primary sources in a language other than English into the capstone seminar or honors thesis is strongly encouraged.

*Gateway Courses* (two courses)—All students in Global Affairs & World History will complete the two-quarter Global Human Geography sequence, HISTORY 106A (Asia/Africa) and 106B (Europe & the Americas).

*Geographical Cluster* (four courses)—Students select four History courses in one geographic area, such as Europe, Latin America, Asia, Middle East, or Africa. The faculty coordinator must pre-approve all courses in this cluster.

*Global and Comparative Courses* (Methodological Cluster) (six courses): Majors selecting this track will take at least 6 thematic history courses of global scope. Current offerings are listed below.

- HISTORY 4N. A World History of Genocide
- HISTORY 5S. Disciplining the Colonial Body: Violence, Sex, and Resistance in Europe's Empires, 1830-2011
- HISTORY 10W. Visualizing Evidence
- HISTORY 44N. History of Women in Science, Medicine and Technology
- HISTORY 82N. Modern Islamic Movements
- HISTORY 102. History of the International System since 1914
- HISTORY 103D. Human Society and Global Change
- HISTORY 103E. History of Nuclear Weapons
- HISTORY 104A. Revolution: A Global History
- HISTORY 107. Introduction to Feminist Studies
- HISTORY 108. Century of Violence: Mass Violence in the 20th Century to Present
- HISTORY 109. Human Rights and Humanitarianism: A Global History
- HISTORY 140. World History of Science
- HISTORY 181B. The Formation of the Contemporary Middle East
- HISTORY 182C. The Making of the Islamic World, 600-1300
- HISTORY 185B. Jews in the Modern World
- HISTORY 201D. The Changing Face of War: An Introduction to Military History
- HISTORY 202. International History and International Relations Theory
- HISTORY 202G. Peoples, Armies and Governments of the Second World War
- HISTORY 203E. Global Catholicism
- HISTORY 204B. History Without Documents
- HISTORY 204E. Origins of Totalitarianism

- HISTORY 205A. The History of Information
- HISTORY 206. History and Geography of Contemporary Global Events
- HISTORY 208C. History of Death and Dying
- HISTORY 208S. Facing the Past: The Politics of Retrospective Justice
- HISTORY 210. The History of Occupation, 1914-2010
- HISTORY 236B. The Idea of Society
- HISTORY 239D. Capital and Empire
- HISTORY 243G. Tobacco and Health in World History
- HISTORY 268E. American Foreign Policy & International History, 1941-2009
- HISTORY 272B. Frontiers in Iberian and Latin American Culture and History
- HISTORY 284F. Empires, Markets & Networks: Early Modern Islamic World and Beyond, 1500-1800
- HISTORY 298E. China-Taiwan-U.S. Triangular Relations from World War II through the Cold War
- IHUM 69A, B. Human History: A Global Approach
- IHUM 76. Voyages and Visionaries

*Proficiency in a foreign language*—Students electing this track must acquire proficiency in a foreign language through two years of college-level course work (second-year, third-quarter) or by passing a proficiency exam. Language courses do not count toward the 13 required courses in the major; students may, however, find it appealing to pair this track in the History major with a foreign language minor.

*Skills Training*—Students in the Global Affairs & World History track are encouraged to acquire technical proficiencies relevant for geo-historical analysis and fieldwork abroad. The following courses, while not required, are highly recommended, and either may be counted toward the Methodological Cluster requirement.

- HISTORY 10W. Visualizing Evidence
- ANTHRO 130D. Spatial Approaches to Social Science

Those planning to pursue research overseas are also advised to enroll in the one-credit workshop, HISTORY 299X, International Field Research (spring quarter).

*Overseas Study Experience*—Students electing this track are strongly encouraged to study abroad, with a Stanford BOSP program or another program approved by the Directors of the track. Course work taken overseas can be accepted for credit in the track on a case by case basis, in consultation with a faculty coordinator.

*Writing in the Major (WIM)*—History's Writing in the Major requirement is satisfied by completing History 209S, Research Seminar for Majors. This course may be taken in either the junior or senior year, but not before completing the sources and methods seminar requirement. Students write a 20-25 page research essay. Original research and revision are important parts of the research essay. Students conduct substantial research in the libraries and must submit at least two drafts (a rough draft and a final draft) of the essay. Any student wishing to write an honors thesis should consider taking History 209S, Research Seminar for Majors, in the junior year and use it to begin work on the thesis.

History 209S fulfills the WIM requirement only. It does not fulfill geographical requirements or small group course requirements. Students select their research topics based on the general theme of the course in which they enroll. For 2011-12, the offerings are:

- HISTORY 209S. Research Seminar for Majors
  - Autumn Quarter:
    - Nineteenth Century America
    - History of Science
  - Winter Quarter:
    - Muslim Modernities



- Spring Quarter:
  - American Identities
  - History and the Arts: Europe Since 1600
  - War and Empire

*General Requirements*—Like all history majors, students in this track must complete two lecture courses (one Europe or US, and one Africa, Asia, Middle East or Latin America), two 200-level courses, a Sources & Methods seminar, and HISTORY 209S, Research Seminar for Majors.

## HISTORY TRACKS WITH INTERDISCIPLINARY EMPHASIS (HMIE)

These tracks are designed for students who are interested in other disciplines who want to focus on the historical aspects of the subject matter covered by that discipline, who want to understand how interdisciplinary approaches can deepen their understanding of history, or who are primarily interested in developing interdisciplinary approaches to historical scholarship by combining the careful attention to evidence and context that motivates historical research with the analytic and methodological tools of science and the humanities. In pursuing the above requirements for all History majors, students in HMIE are required to complete their thirteen courses for the major as follows:

*Gateway Course (one course)*—Students are required to take the appropriate gateway course for their interdisciplinary track. This course introduces students to the application of particular interdisciplinary methods to the study of history. See the section on each HMIE for the gateway course appropriate to that major track. (*Note:* The History and the Law track has no gateway course requirement.)

*Methodological Cluster (three courses)*—This cluster is designed to acquaint students with the ways in which interdisciplinary methods are employed in historical scholarship, by practicing historians and scholars in other disciplines whose work is historical. This program of study must provide methodological coherence and must be approved in advance by the student's adviser. See the section on each HMIE for the appropriate historical methods courses. (*Note:* The History and the Law track requires four methodology courses.)

*Geographic Cluster (four courses)*—History is embedded in time and place. This cluster is designed to emphasize that the purpose of studying methodology is to more fully understand the history of a particular region of the world. Students select a particular geographic region, as specified in the History major, and complete four courses in that area.

*Interdisciplinary Cluster (four courses)*—These courses, taken outside the Department of History, acquaint students with the methods and approaches of another discipline appropriate for the interdisciplinary study of history. This program of study must provide methodological coherence and must be approved in advance by the student's adviser. See the section on each HMIE for appropriate interdisciplinary courses.

*Research Seminar for Majors (HISTORY 209S)*—Fulfills Writing in the Major Requirement.

HMIE tracks do not mandate the breadth or concentration requirements of the General History track. Introduction to the Humanities courses taught by History faculty may apply to HMIE tracks only insofar as their content is specifically appropriate to the particular methodological or geographic cluster.

## HISTORY, LITERATURE, AND THE ARTS

The History, Literature, and the Arts (HLA) track is designed for the student who wishes to complement his or her work in History with study in literature, particularly in a foreign language. For the purposes of this major, literature is defined broadly, including art, drama, films and poetry, memoirs and autobiography, novels, as well as canonical works of philosophy

and political science. It appeals to students who are interested in studying literature primarily in its historical context, or who want to focus on both the literature and history of a specific geographical area while also learning the language of that area.

*Gateway Course*—HISTORY 132A. Enlightenment and the Arts gives students a broad introduction to the study of literary texts in history. *Note:* The former gateway course, HISTORY 239E, History, Literature and the Arts in Great Britain, may be counted in lieu of 132A.

*Methodological Cluster*—This three-course cluster teaches students how historians, in particular, analyze literary texts as documentary sources. Students choose three courses from among the pre-approved HLA methodology curriculum. These courses need not be in the student's geographic concentration. For 2011-12, these courses are:

- HISTORY 8N. How We Remember the Past: Historical, Legal, and Artistic Interpretations
- HISTORY 22S. History of the Communist Secret Police
- HISTORY 30Q. English Society through Fiction
- HISTORY 36N. Gay Autobiography
- HISTORY 54S. Prohibition in America
- HISTORY 55S. Real Men & Dragon Ladies: Race & Sexuality in America, 1662-1965
- HISTORY 56N. Celluloid America
- HISTORY 109. Human Rights and Humanitarianism: A Global History
- HISTORY 145B. Africa in the Twentieth Century\*
- HISTORY 150A. Colonial and Revolutionary America
- HISTORY 154. American Intellectual and Cultural History to the Civil War
- HISTORY 168. U.S. History through Film: since World War II
- HISTORY 183. Modern Iran\*
- HISTORY 193. Late Imperial China\*
- HISTORY 208C. History of Death and Dying
- HISTORY 211. Saints in the Middle Ages
- HISTORY 232A. Power, Art, and Knowledge in Renaissance Italy
- HISTORY 233A. Modern Intellectual History: From Bacon to Hegel
- HISTORY 233E. Modern Intellectual History from the Left Hegelians to Freud
- HISTORY 236B. The Idea of Society
- HISTORY 254. Popular Culture and American Nature
- HISTORY 263G. History Through a Life: The Allure of American Biography
- HISTORY 287D. Tel Aviv: Site, Symbol, City
- HISTORY 287E. Jewish Intellectuals and the Crisis of Modernity

\* Courses marked with an asterisk are non-Western lectures that students in the The History, Literature, and the Arts (HLA) track can use towards both a HLA methodology course and as the non-Western lecture requirement.

*Geographical Cluster*—Students select four History courses in one geographic area. These are: Europe, Britain and the countries of the former British Empire, Asia, North America, Latin America, the Middle East, or Africa. These four courses must be taken in addition to the three methodological courses required above.

*Interdisciplinary Cluster*—Four courses, taken outside the Department of History, must address the literature and arts, broadly defined, of the area chosen for the geographic concentration. The student's adviser must pre-approve all courses in this cluster; these courses may not be double-counted towards a minor or major other than History.

*Research Seminar for Majors*—HISTORY 209S; fulfills Writing in the Major requirement.

*General Requirements*—Like all History majors, students in History Interdisciplinary Programs must complete two lecture courses (one Europe or U.S., one Africa, Asia, Middle East or Latin America), two 200-level courses, a Sources and Methods seminar, and a Research Seminar for Majors.

## HISTORY OF SCIENCE, AND MEDICINE

The History of Science, and Medicine (HS&M) track is a collaborative program of the Department of History and the Program in the History and Philosophy of Science. The major is designed for students interested in both sciences and humanities, and in the interactions between the two. It is also especially useful for students contemplating medical school, since it allows them to study the history of medicine, biology, and allied sciences in conjunction with fulfilling the pre-med science requirements.

*Gateway Course (one course)*—HISTORY 140. World History of Science, Technology and Medicine: From Prehistory to the Scientific Revolution (Winter)

*Methodological Cluster (three courses)*—These History courses focus on the history of science, technology, and medicine. For 2011-12, these courses are:

- AMSTUD 156. Women and Medicine in U.S. History: Women as Patients, Healers and Doctors
- HISTORY 41Q. Mad Women: Explorations in Gender & Mental Illness in US History
- HISTORY 41S. Speed and Power and Work by the Hour: The Revolution of Western Industry
- HISTORY 44Q. History of Women and Gender in Science, Medicine and Technology
- HISTORY 103D. Human Society & Environmental Change
- HISTORY 130A. The Rise of Scientific Medicine
- HISTORY 142. Darwin in the History of Life
- HISTORY 169. Environmental History of North America
- HISTORY 205A. The History of Information
- HISTORY 242G. Einstein: Science, Technology, and Culture
- HISTORY 243C. 18th-Century Colonial Science and Medicine
- HISTORY 243G. Tobacco and Health in World History
- HPS 154. The History of Scientific Methods, Pythagoras to Popper
- HPS 158. Madness: Explorations in Mental Illness

*Geographical Cluster (four courses)*—Students select four History courses in one geographic area. Examples include: Europe, Britain and the countries of the former British Empire, Asia, North America, Latin America, the Middle East, or Africa. These four courses must be taken in addition to the three methodological cluster courses. Courses in the history of science, technology, and medicine that have a geographic focus may be used to fulfill this requirement, but cannot be double-counted in the methodological cluster.

*Interdisciplinary Cluster (four courses)*—Students select four courses in scientific disciplines and/or in philosophy of science, anthropology of science, or sociology of science. These courses require faculty adviser pre-approval.

*Research Seminar for Majors (HISTORY 209S)*—Fulfills the Writing in the Major requirement.

*General Requirements*—Like all history majors, students in History Interdisciplinary Programs must complete two lecture courses (one Europe or U.S., one Africa, Asia, Middle East or Latin America), two 200-level courses, a Sources and Methods seminar, and a Research Seminar for Majors.

## HISTORY AND LAW

The History and Law (HL) interdisciplinary track is for students who wish to explore the intersections between historical and legal studies. The HL curriculum focuses on the role of legal institutions, policies, and structures in various societies. HL track majors enroll in at least four History department courses that focus

on issues of law in civil societies and four courses that provide a geographic concentration. In addition, students enroll in four courses outside History that provide disciplinary or interdisciplinary perspectives on the role of law in shaping societies and a Research Seminar for Majors.

*Gateway Course*—There is no gateway course for this track. Instead, students take an extra course in the Methodological cluster.

*Methodological Cluster (four courses)*—Students enroll in at least four History department courses, including courses outside History taught by faculty affiliated with the department, that focus on how law, policies, constitutions, and legal structures affect the development of various societies. (*Note:* The Methodological Cluster for this HIP contains one extra course since there is no Gateway course.)

For 2011-12, these courses are—

- HISTORY 4N. A World History of Genocide
- HISTORY 8N. How We Remember the Past: Historical, Legal and Artistic Interpretations
- HISTORY 53S. Race Riots and Rebellions in 20th-Century Urban America
- HISTORY 54S. Prohibition in America
- HISTORY 55S. Real Men and Dragon Ladies: Race and Sexuality in America, 1662-1965
- HISTORY 108. Century of Violence: Mass Violence in the 20th Century
- HISTORY 109. Human Rights and Humanitarianism: A Global History
- HISTORY 134A. European Witch Hunts
- HISTORY 135. History of European Law
- HISTORY 157. The Constitution: A Short History
- HISTORY 183. Modern Iran\*
- HISTORY 208S. The Politics of Retrospective Justice
- HISTORY 211D. Law and Society in Medieval Europe
- HISTORY 243G. Tobacco and Health in World History
- HISTORY 253D. Approaches to American Legal History

\* Asterisk indicates a "non-Western" lecture that students in this track can use towards both a HLA methodology course and as the "non-Western" lecture requirement.

*Geographical Cluster (four courses)*—Students choose four History courses in one geographic area, such as the United States, Europe, Latin America, Asia, Middle East, or Africa.

*Interdisciplinary Cluster (four courses)*—Students may select from courses offered in the School of Law, School of Education, and others as appropriate. *Note:* Courses in the School of Law and School of Education require the permission of the instructor before undergraduate students can enroll, since these are graduate-level courses.

*Research Seminar for Majors (HISTORY 209S)*—Fulfills the Writing in the Major requirement.

*General Requirements*—Like all history majors, students in History Interdisciplinary Programs must complete two lecture courses (one Europe or U.S., one Africa, Asia, Middle East or Latin America), two 200-level courses, a Sources and Methods seminar, and a Research Seminar for Majors.

## PUBLIC HISTORY/PUBLIC SERVICE

The Public History/Public Service (PH/PS) interdisciplinary history track is designed for students who wish to include in their course of studies the application of historical study in (1) public settings such as museums and heritage sites, national and state parks, public agencies, and private foundations, and (2) public service settings in non-profit organizations, public agencies, and educational institutions.

PH/PS majors enroll in a gateway course on public history and public service and in four History department courses that provide a geographic concentration as well as completing a two-course

methodological requirement. In addition, students, in consultation with the PH/PS faculty coordinator, complete four courses from outside the History department drawn from the annual listing of service-learning courses provided by the Haas Center for Public Service; these courses provide interdisciplinary and methodological perspectives on public service. PH/PS majors must also complete an internship through a regularly offered service-learning course or through a summer internship or fellowship.

*Gateway course (one course)*—HISTORY 201, Introduction to Public History in the U.S., Nineteenth Century to the Present, provides grounding in the theory and practice of public service and exposure to the types of public history practiced in venues such as museums, historical sites, parks, and non-profit organizations, including local historical societies.

*Geographical Cluster (four courses)*—Students select four History courses in one geographic area, such as the United States, Europe, Latin America, Asia, Middle East, or Africa. The faculty coordinator must pre-approve all courses in this cluster.

*Interdisciplinary Cluster (four courses)*—Students select four courses from outside the History department drawn from the annual listing of service-learning and theory/practice courses provided by the Haas Center for Public Service. The faculty coordinator must pre-approve all courses in this cluster.

Examples of appropriate PH/PS interdisciplinary courses are:

- AMSTUD 221. Public and Professional Service: Theories and Ethical Practice of Public and Community
- ETHICSOC 144. Nongovernmental Organizations and Development in Poor Countries
- POLISCI 133. Ethics and Politics In Public Service
- POLISCI 141. Global Politics of Human Rights
- SOC 118. Social Movements and Collective Action
- SOC 137. Homelessness: Its Causes, Consequences, and Policy Solutions

*Methodological Cluster (two courses)*—Students must enroll in one Sources and Methods seminar course and one additional 200-level History course. The Writing in the Major (WIM) requirement must be completed in a Research Seminar for Majors.

- HISTORY 166B. Immigration Debates in the United States: Past and Present
- HISTORY 260. California's Majority Minority Cities

*Public Service/Service Learning Internship (one course)*—Students must engage in at least a one quarter internship through a service learning course or through a full-time public service or public history summer internship or fellowship. This internship must be pre-approved by the faculty coordinator.

Students who complete a paid summer internship in lieu of one for academic credit have two options: they can complete an additional history course, or they can enroll in 3 units of HISTORY 299S with the faculty coordinator of the PH/PS track and write a 20-page research paper related to their internship work. This research paper is in addition to that required for the Research Seminar for Majors.)

Two History Department service-learning courses are offered in 2011-12:

- HISTORY 201. Introduction to Public History in the U.S., 19th Century to the Present (Autumn)
- HISTORY 260. California's Minority-Majority Cities (Spring)

If students elect to fulfill the internship requirement through a History Department service-learning course, they must enroll in an additional course in either the geographical cluster or the Interdisciplinary cluster in order to complete the 13 courses required for the major.

*Research Seminar for Majors*—HISTORY 209S; fulfills Writing in the Major requirement.

*General Requirements*—Like all history majors, students in History Interdisciplinary Programs must complete two lecture

courses (one Europe or US, one Africa, Asia, Middle East or Latin America), two 200-level courses, a Sources and Methods seminar, and a Research Seminar for Majors.

## HISTORY SECONDARY TEACHER'S CREDENTIAL

Applicants for the Single Subject Teaching Credential (Secondary) in the social studies may obtain information regarding this program from the Credential Administrator, School of Education.

## MINOR IN HISTORY

Students must declare the minor in History no later than Autumn Quarter of the senior year via Axess. Minor declarations are approved by the Department of History and confirmation is sent via email to the student.

Candidates for the minor in History must complete six courses, at least three of which must have a field or thematic focus. Students completing the minor may choose to concentrate in such fields as African, American, Asian, British, European (medieval, early modern, or modern), Russian and East European history, comparative empires and cultures, or such thematic topics as the history of gender, the family, religion, technology, or revolution. Students may also petition to have a concentration of their own design count toward the minor.

## REQUIREMENTS

All six courses must be of at least 3 units each and must be taken for a letter grade. The student must maintain a grade point average (GPA) in History courses of 2.0 (C) or higher. Two of the six courses must be small-group in format (Stanford Introductory Seminars, Sources and Methods Seminars, departmental colloquia, and research seminars). History courses taken at Stanford overseas campuses may count toward the minor, but at least three of the six courses must be taken from Stanford History faculty.

Advanced Placement credits do not fulfill any minor requirements.

*Optional Courses for the Minor*—History courses taken at non-Stanford Study Abroad programs may count toward the minor (provided the History Department approves them), but at least three of the six courses must be taken from Stanford History faculty. One course from certain Introduction to the Humanities courses (IHUM 69A,B; and 74A,B) may count toward the six-course requirement, but not for the three-course field of concentration. One Directed Research (299S) course may count toward the minor, if taken for 3-5 units and for a letter grade. A maximum of three transfer courses may be used toward the minor.

## COTERMINAL B.A. AND M.A. PROGRAM IN HISTORY

The department each year admits a limited number of undergraduates for coterminal B.A. and M.A. degrees in History. Coterminal applications are accepted during Autumn Quarter for admission in Spring Quarter; check with the History office for the application deadline. Applicants are responsible for checking their compliance with University co-terminal requirements listed in the "Undergraduate Degrees and Programs" section of this bulletin.

## ADMISSION

Applicants must meet the same general standards as those seeking admission to the M.A. program; they must submit a written statement of purpose, a transcript, GRE test scores, and three letters of recommendation, at least two of which should be from members of the Department of History faculty. To be competitive, coterminal applicants should have a 3.75 GPA in their undergraduate history major (or equivalent if they are entering without a History major.) The decision on admission rests with the department faculty upon recommendation by the Graduate Admissions Committee. Students must meet all requirements for

both degrees. They must complete 15 full-time quarters (or the equivalent), or three full-time quarters after completing 180 units, for a total of 225 units. During the senior year they may, with the consent of the instructors, register for as many as two graduate courses. In the final year of study, they must complete at least three courses that fall within a single Ph.D. field.

The application filing deadline is December 7, 2011.

The coterminal B.A. and M.A. program is not declarable on Axxess.

University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees" section of this bulletin. For University coterminal degree program rules and University application forms, see <http://studentaffairs.stanford.edu/registrar/publications#Coterm>.

## MASTER OF ARTS IN HISTORY

University requirements for the M.A. are described in the "Graduate Degrees" section of this bulletin.

The department requires the completion of nine courses (totaling not less than 45 units) of graduate work; seven courses of this work must be Department of History courses. Of the seven, one must be a seminar and four must be either graduate colloquia or graduate seminars. Directed reading may be counted for a maximum of 10 units. A candidate whose undergraduate training in history is deemed inadequate must complete nine courses of graduate work in the department. The department does not recognize for credit toward the M.A. degree any work that has not received the grade of 'A' or 'B.'

*Terminal M.A. Program*—Applicants who do not wish to continue beyond the M.A. degree are admitted to this program at the discretion of the faculty in individual fields (U.S., modern Europe, and so on). Students admitted may not apply to enter the Ph.D. program in History during the course of work for the M.A. degree.

*M.A. in Teaching (History)*—The department cooperates with the School of Education in offering the Master of Arts in Teaching degree. For the general requirements, see the "School of Education" section of this bulletin. For certain additional requirements made by the Department of History, contact the department office. Candidates must possess a teaching credential or relevant teaching experience.

## ADMISSION

Applicants for admission to graduate work must take the General Test of the Graduate Record Examination. It may be taken at most American colleges and in nearly all foreign countries. For details, see the Guide to Graduate Admission, available from Graduate Admissions, the Registrar's Office, 630 Serra Street, Suite 120, or at <http://gradadmissions.stanford.edu>.

Students admitted to graduate standing do not automatically become candidates for a graduate degree. With the exception of students in the terminal M.A. program, they are admitted with the expectation that they will be working toward the Ph.D. degree and may become candidates to receive the M.A. degree after completing three quarters of work.

The application filing deadline is December 7, 2011.

## DOCTOR OF PHILOSOPHY IN HISTORY

University requirements for the Ph.D. are described in the "Graduate Degrees" section of this bulletin.

Students planning to work for the doctorate in history should be familiar with the general degree requirements of the University outlined in the "Graduate Degrees" section of this bulletin. Those interested in applying for admission to the M.A. and Ph.D. programs should contact the graduate program coordinator in the History department. Online applications are available in September of the year prior to intended enrollment. The application filing deadline is December 7, 2011. Applicants must file a report of their general scores on the Graduate Record Examination and

submit a writing sample of 10-25 pages on a historical topic. Successful applicants for the M.A. and Ph.D. programs may enter only in Autumn Quarter.

Upon enrollment in the graduate program in History, the student has a member of the department designated as an adviser with whom to plan the Ph.D. program. Much of the first two years of graduate study is spent taking courses, and, from the outset, the student should be aware that the ultimate objective is not merely the completion of courses but preparation for general examinations and for writing a dissertation.

Admission to the Department of History in the graduate division does not establish any rights respecting candidacy for an advanced degree. At the end of the first year of graduate study, students are evaluated by the faculty and given a progress report. A decision as to whether the student is admitted to candidacy for the Ph.D. is normally made by the start of the student's third year.

After the completion of certain further requirements, students must apply for acceptance for candidacy for the doctorate in the graduate division of the University.

## ADMISSION

Applicants for admission to graduate work must take the General Test of the Graduate Record Examination. It may be taken at most American colleges and in nearly all foreign countries. For details, see <http://gradadmissions.stanford.edu>.

Students admitted to graduate standing do not automatically become candidates for a graduate degree. With the exception of students in the terminal M.A. program, they are admitted with the expectation that they will be working toward the Ph.D. degree and may become candidates to receive the M.A. degree after completing three quarters of work.

The application filing deadline is December 7, 2011.

## DEGREE REQUIREMENTS

*Required Courses*—

- HISTORY 304. Approaches to History—for all first-year Ph.D. students
- HISTORY 305. Graduate Workshop in Teaching—for all first-year Ph.D. students
- HISTORY 351A,B,C,D,E,F. Core in American History—for first-year and second-year Ph.D. students in American History
- HISTORY 313,314. Core in Medieval History—for Ph.D. students in Medieval History.

Other Graduate Core Colloquia required for Ph.D. students studying in fields other than the above are listed in the Department of History's Graduate Handbook.

*University Oral Examinations*—The student is expected to take the University oral examination in the major concentration in the third graduate year.

*Dissertation*—The student must complete and submit a dissertation which is the result of independent work and is a contribution to knowledge. It should evidence the command of approved techniques of research, ability to organize findings, and competence in expression. For details and procedural information, inquire in the department.

*Dissertation Committee*—The reading committee consists of the principal dissertation adviser (first reader), and two additional members of the Department (second and third readers) agreed upon by the adviser and the student.

## FINANCIAL SUPPORT

Students who are admitted with financial support are provided multiple years of support through fellowships, teaching and research assistantships, and tuition grants. Applicants should indicate on the admissions application whether they wish to be considered for such support. No separate application for financial aid is required.

U.S. citizens and permanent resident aliens who are interested in area language studies in East Asia, Africa, and the republics of

the former Soviet Union may request a Foreign Language and Area Studies (FLAS) fellowship application from the FLAS coordinator of the respective programs offering the FLAS (CEAS, CAS, CREEES). The FLAS application deadlines are in January and February (CAS).

## RESOURCES

The degree requirements section relates to formal requirements, but the success of a student's graduate program depends in large part on the quality of the guidance received from faculty and on the library resources available. Prospective graduate applicants are advised to study the list of History faculty and the courses this faculty offers. As to library resources, no detailed statement is possible in this bulletin, but areas in which library resources are unusually strong are described following.

The University Library maintains strong general collections in almost all fields of history. It has a very large microtext collection, including, for instance, all items listed in Charles Evans' American Bibliography, and in the Short-Title Catalogues of English publications, 1474-1700, and virtually complete microfilmed documents of the Department of State to 1906. It also has a number of valuable special collections including the Borel Collection on the History of California; many rare items on early American and early modern European history; the Brasch Collection on Sir Isaac Newton and scientific thought during his time; the Gimon Collection on French political economy, and other such materials.

The rich collection of the Hoover Institution on the causes, conduct, and results of WW I and WW II are being augmented for the post-1945 period. The materials include government documents, newspaper and serial files, and organization and party publications (especially the British and German Socialist parties). There are also important manuscript collections, including unpublished records of the Paris Peace Conference of 1919 and the Herbert Hoover archives, which contain the records of the Commission for Relief in Belgium, the American Relief Administration, the various technical commissions established at the close of WW I for reconstruction in Central and Eastern Europe, the personal papers of Herbert Hoover as United States Food Administrator, and other important personal papers. Other materials for the period since 1914 relate to revolutions and political ideologies of international importance; colonial and minority problems; propaganda and public opinion; military occupation; peace plans and movements; international relations; international organizations and administration including the publications of the United Nations, as well as principal international conferences. The Hoover Institution also possesses some of the richest collections available anywhere on the British labor movement; Eastern Europe, including the Soviet Union; East Asia (runs of important newspapers and serials and extensive documentary collections, especially for the period of WW II); and Africa since 1860, especially French-speaking Africa, the former British colonies, and South Africa.

## REQUIREMENTS

- In consultation with the adviser, students select an area of study from the list below in which to concentrate their study and later take the University oral examination. The major concentrations are:
    - Europe, 300-1500
    - Europe, 1400-1800
    - Europe since 1700
    - Jewish History
    - Russia
    - Eastern Europe
    - Middle East and Central Asia
    - South Asia
    - East Asia before 1600
    - China since 1600
    - Japan since 1600
    - Africa
  - Britain and the British Empire since 1460
  - Latin America
  - The United States (including colonial America)
  - The History of Science, Medicine, and Technology
  - Transnational, International, and Global
- The department seeks to provide a core colloquium in every major concentration. Students normally enroll in this colloquium during the first year of graduate study.
  - Students are required to take two research seminars, at least one in the major concentration. Normally, research seminars are taken in the first and second years.
  - Each student, in consultation with the adviser, defines a secondary concentration. This concentration should represent a total of four graduate courses or their equivalents, and it may be fulfilled by working in a historical concentration or an interdisciplinary concentration. The historical concentrations include:
    - One of the concentrations listed above (other than the student's major concentration).
    - One of the concentrations listed below, which falls largely outside the student's major concentration:
      - The Ancient Greek World
      - The Roman World
      - Europe, 300-1000
      - Europe, 1000-1400
      - Europe, 1400-1600
      - Europe, 1600-1789
      - Europe, 1700-1871
      - Europe since 1848
      - England, 450-1460
      - Britain and the British Empire, 1460-1714
      - Britain and the British Empire since 1714
      - Russia to 1800
      - Russia since 1800
      - Eastern Europe to 1800
      - Eastern Europe since 1800
      - Jewish History
      - Middle East and Central Asia to 1800
      - Middle East and Central Asia since 1800
      - Africa
      - South Asia
      - China before 1600
      - China since 1600
      - Japan before 1600
      - Japan since 1600
      - Latin America to 1825
      - Latin America since 1810
      - The United States (including Colonial America) to 1865
      - The United States since 1850
      - The History of Science, Medicine, and Technology
      - Transnational, International, and Global
  - Work in a national history of sufficiently long time to span chronologically two or more major concentrations. For example, a student with Europe since 1700 as a major concentration may take France from 1000 to the present as a secondary concentration.
  - A comparative study of a substantial subject across countries or periods. The secondary concentration requirement may also be satisfied in an interdisciplinary concentration. Students plan these concentrations in consultation with their advisers. Interconcentrations require course work outside the Department of History which is related to the student's training as a historian. Interdisciplinary course work can either add to a student's technical competence or broaden his or her approach to the problems of the research concentration.
- Each student, before conferral of the Ph.D., is required to satisfy the department's teaching requirement.
  - There is no University or department foreign language requirement for the Ph.D. degree. A reading knowledge of one

or more foreign languages is required in concentrations where appropriate. The faculty in the major concentration prescribes the necessary languages. In no concentration is a student required to take examinations in more than two foreign languages. Certification of competence in commonly taught languages (that is, French, German, Italian, Portuguese, Russian, and Spanish) for candidates seeking to fulfill the language requirement in this fashion is done by the appropriate language department of the University. Certification of competence in other languages is determined in a manner decided on by faculty in the major concentration. In either case, certification of language competence must be accomplished before a student takes the University oral examination.

7. The student is expected to take the University oral examination in the major concentration in the third graduate year.
8. The student must complete and submit a dissertation which is the result of independent work and is a contribution to knowledge. It should evidence the command of approved techniques of research, ability to organize findings, and competence in expression. For details and procedural information, inquire in the department.

## PH.D. IN HISTORY AND HUMANITIES

The department of History participated in the Graduate Program in Humanities leading to a Ph.D. degree in History and Humanities. At this time, the option is available only to students already enrolled in the Graduate Program in Humanities; no new students are being accepted. The University remains committed to a broad-based graduate education in the humanities; the courses, colloquium, and symposium continue to be offered, and the Division of Literatures, Cultures, and Languages provides advising for students already enrolled who may contact DLCL Student Affairs at 650-724-1333 or dlcl@stanford.edu for further information. Courses are listed under the subject code HUMNTIES and may be viewed on the *Stanford Bulletin's* ExploreCourses web site.

## PH.D. MINOR IN HISTORY

Students pursuing a Ph.D. other than in History may apply for the Ph.D. Minor in History. Ph.D. students cannot pursue a minor in their own program. The minimum University requirement for a Ph.D. minor is 20 units of History course work at the graduate level (courses numbered 300 and above) at Stanford. All units should be in a single field. Units taken for the minor can be counted as part of the overall requirement for the Ph.D. of 135 units taken at Stanford. Courses used for a minor may not be used to meet the requirements for a master's degree.

*Requirements*—20 units of History course work at the graduate level (HISTORY 300-399W and 400-499X) at Stanford. All units should be in a single field.

*Optional Courses for the Minor*—A Ph.D. minor form outlining the program of study must be approved by the major and minor departments.

## OVERSEAS STUDIES COURSES IN HISTORY

For course descriptions and additional offerings, see the listings in the *Stanford Bulletin's* ExploreCourses web site (<http://explorecourses.stanford.edu>) or the Bing Overseas Studies web site (<http://bosp.stanford.edu>). Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

## AUTUMN QUARTER

### BEIJING

OSPBEIJ 67. China-Africa and Middle East Relations. 4 units, Li, Wang, GER:DB:SocSci, EC:GlobCom

## MOSCOW

OSPMOSC 78. Russian-American Relations: from the War of Independence to the War on Terror. 5 units, Ivanian, GER:DB:SocSci

## OXFORD

OSPOXFRD 221Y. Art and Society in Britain. 5 units, Tyack, GER:DB:Hum

## SANTIAGO

OSPSANTG 68. The Emergence of Nations in Latin America. 4-5 units, Jaksic, Ger:DB:SocSci

## WINTER QUARTER

### BERLIN

OSPBER 70. The Long Way to the West-- German History from the 18th Century to the Present. 4-5 units, Jander, GER:DB:Hum, EC:GlobCom

### CAPETOWN

OSPCPTWN 33. From Apartheid to Democracy: Namibia and South Africa. 4 units, Saunders, GER: EC:GlobCom  
OSPCPTWN 38. Genocide: The African Experience. 4 units, Adhikari, GER:DB:SociSci, EC:GlobCom

### FLORENCE

OSPFLO 49. The Cinema Goes to War: Fascism and World War II As Represented in Italian and European Cinema. 5 units, Campani, GER:DB:Hum

### OXFORD

OSPOXFRD 70. History of London. 4-5 units, Tyack, GER:DB:SocSci, EC:GlobCom

### PARIS

OSPPARIS 81. France During the Second World War: Between History and Memory. 5 units, Virgili, GER:DB:SocSci

## SPRING QUARTER

### BEIJING

OSPBEIJ 30. History of U.S.- China Relations. 3-5 units, Chang  
OSPBEIJ 32. Site, Memory, History: Beijing as Place. 3-5 units, Chang

### BERLIN

OSPBER 14. Clausewitz and Sunzi. 3-5 units, Lewis  
OSPBER 50. Female Divinities in Europe & China. 3-5 units, Lewis

### FLORENCE

OSPFLO 58. Space as History: Urban Change and Social Vision: Florence 1059 to the Present. 4 units, Rossi, Verdon, GER:DB:Hum

OSPFLO 75. Florence in the Renaissance. 5 units, Molho

### KYOTO

OSPKYOTO 62. Japan and America: A Historical Survey. 4-5 units, Duus

### MADRID

OSPMADR 62. Spanish California: Historical Issues. 5 units, Hilton

### OXFORD

OSPOXFRD 74. History and Architecture of Oxford. 3-4 units, Tyack

### PARIS

OSPPARIS 29. Colonization, Decolonization, and Immigration: Overview of French Global History in the 20th Century. 5 units, Hmed, GER:DB:SocSci, EC:GlobCom

## SANTIAGO

OSPSANTG 68. The Emergence of Nations in Latin America. 4-5 units, Jaksic, GER:DB:SocSci

# HISTORY AND PHILOSOPHY OF SCIENCE AND TECHNOLOGY

*Co-chairs:* Michael Friedman (Philosophy), Jessica Riskin (History)

*Committee-in-Charge:* Paula Findlen (History), Michael Friedman (Philosophy), Helen Longino (Philosophy), Reviel Netz (Classics), Robert Proctor (History)

*Program Committee:* Paula Findlen (History), Michael Friedman (Philosophy), Helen Longino (Philosophy), Tom Mullaney (History), Reviel Netz (Classics), Robert Proctor (History), Jessica Riskin (History), Londa Schiebinger (History)

*Professors:* Keith Baker (History), Paula Findlen (History), Michael Friedman (Philosophy), David Holloway (History, Institute for International Studies, Political Science), Helen Longino (Philosophy), Reviel Netz (Classics), Robert Proctor (History), Londa Schiebinger (History), Richard White (History), Caroline Winterer (History)

*Associate Professors:* Jessica Riskin (History), Fred Turner (Communication), Sarah Jain (Anthropology), Priya Satia (History)

*Assistant Professor:* Thomas Mullaney (History)

*Professor (Research):* Rega Wood (Philosophy, emerita)

*Lecturers:* Tom Ryckman (Philosophy), Margo Horn, John McCaskey

*Other Affiliation:* Henry Lowood (Stanford University Libraries), Larry Lagerstrom (UAR)

*Visiting Scholar:* Adrienne Mayor (Classics)

*Mail Code:* 94305-2024

*Email:* rrogers@stanford.edu

*Web Site:* <http://HPST.stanford.edu>

Courses offered by the Program in History and Philosophy of Science and Technology are listed under the subject code HPS on the *Stanford Bulletin's* ExploreCourses web site.

The Program in History and Philosophy of Science and Technology (HPST) teaches students to examine the sciences, medicine and technology from myriad perspectives, conceptual, historical and social. The community of scholars includes core faculty and students in History and Philosophy and affiliated members in Classics, Anthropology, English, Political Science, Communication, and other disciplines. Together, they draw upon the multiple methods of their disciplines to study the development, functioning, applications, and social and cultural engagements of the sciences.

Stanford's Program in History and Philosophy of Science and Technology is a collaborative enterprise of the departments of History and Philosophy. Each department has its own undergraduate and graduate degree programs in this area, but these overlap and interact through the structure of requirements, advising, team-taught courses, an active graduate student community and a shared colloquium series.

The program's courses span from antiquity to the late 20th century, with emphasis on:

- ancient science
- Renaissance science
- the Scientific Revolution
- Enlightenment and transatlantic science
- history of medicine and the body
- history and philosophy of biology
- history and philosophy of modern physics
- history of the philosophy of science in the modern period
- gender, science, and technology

## UNDERGRADUATE DEGREES

The Department of History offers an interdisciplinary track in History, Science, and Medicine. The Department of Philosophy offers a degree field in History and Philosophy of Science.

## GRADUATE DEGREES

Graduate students in the Program in History and Philosophy of Science and Technology can pursue a Ph.D. either in History, through its Ph.D. field in History of Science, Medicine, and Technology, or in Philosophy, through its Ph.D. field in Philosophy of Science. Students completing the requirements of the HPST program graduate with a diploma stating their concentration in HPST. For more information, see the program's web site at <http://HPST.stanford.edu/grad.html>.

## COURSES

The following courses may be used to fulfill course requirements.

### INTRODUCTORY

- HPS/PHIL 60. Introduction to Philosophy of Science
- PHIL 16N. Values and Objectivity
- PHIL 15N. Freedom, Community, and Morality
- CLASSGEN 133. Invention of Science
- CLASSGEN 16. Archimedes and His Science

### SCIENCE IN HISTORY

This sequence is designed to introduce students to the history of Science from antiquity to the 20th century. Students are advised to take most or all of this sequence as a core foundation.

- CLASSGEN 22N. Technologies of Civilization: Writing, Number, and Money
- HISTORY 31/STS 125/225. Science, Technology, and Art: The Worlds of Leonardo
- HISTORY 40/140. World History of Science
- HISTORY 41A/141A. The Emergence of Modern Medicine
- HISTORY 44N. The History of Women and Gender in Science, Medicine, and Engineering
- OSPFLOR 44. The Revolution in Science: Galileo and the Birth of Modern Scientific Thought

### MEDICINE IN HISTORY

This sequence is designed to introduce students to the history of medicine from antiquity to the 20th century. Students are advised to take most or all of this sequence as a core foundation.

- AMSTUD 156. History of Women and Medicine in the United States
- HISTORY 243G/343G. Tobacco and Health in World History
- HISTORY 130A. The Rise of Scientific Medicine
- HPS 158. The Social History of Mental Illness

### PHILOSOPHICAL PERSPECTIVES ON SCIENCE, MEDICINE, AND TECHNOLOGY

This sequence is designed to introduce students to the philosophy of science. Students are advised to take HPS 60 above as a starting point, and combine a number of the electives listed below in conjunction with courses in the other concentrations that address their specific interests.

- FEMST 166/PHIL 184F/284F. Feminist Theories of Knowledge
- HPS 220. Nineteenth-Century Philosophy of Science
- PHIL 107/207. Plato and Heraclitus
- PHIL 115/215. Problems in Medieval Philosophy
- PHIL 163/263. Significant Figures in Philosophy of Science
- PHIL 164/264. Central Topics in the Philosophy of Science: Theory and Evidence
- PHIL 165C/265C. Philosophy of Physics: Probability and Relativity

- PHIL 167A/267A. Philosophy of Biology
- PHIL 167B/267B. Philosophy, Biology, and Behavior
- PHIL 167C/267C. Associative Theories of Mind and Brain
- PHIL 224. Kant's Philosophy of Physical Science
- PHIL 224A. Math in Kant's Philosophy
- PHIL 348. Evolution of Signals
- PHIL 360. Core Seminar in Philosophy of Science
- PHIL 365. Seminar in Philosophy of Science: Time
- OSPOXFRD 26. Spirit, Mind, Brain: Evolving Understanding in Neurology/Neuroscience

## ADVANCED

### HISTORICAL PERSPECTIVES ON SCIENCE

The following courses focus on specific episodes in or approaches to the history of science.

- HPS 154. The History of Scientific Methods, Pythagoras to Popper
- FRENGEN 295. Science, Technology, and Society in Europe and the U.S.: Ethical Debates and Controversies
- HISTORY 42/142/342. Darwin in the History of Life
- HISTORY 208A/308A. Science and the Law in History
- HISTORY 231A/331A. Charles Darwin and the Global 19th Century
- HISTORY 332F. The Scientific Revolution
- HISTORY 234F/334F. Science, Technology, and Empire
- HISTORY 241F/341F. History of the Modern Fact
- HISTORY 241G/341G/STS 134/234. History of the Senses
- HISTORY 241S. Science and Culture Wars
- HISTORY 242A/342A. Technology and Society in the Modern World

### CONTEMPORARY PERSPECTIVES ON SCIENCE, MEDICINE, AND TECHNOLOGY

The following courses focus on contemporary cultural and social science approaches to science, technology, and medicine.

- HPS 199. Directed Reading
- HPS 299. Graduate Individual Work
- ANTHRO 180. Science, Technology, and Gender
- HISTORY 44Q. The History of Women and Gender in Science, Medicine, and Engineering
- HISTORY 205A/305A. History of Information
- HISTORY 242G/342G. Einstein: Science, Technology and Culture
- HISTORY 243C/343C. 18th-Century Colonial Science and Medicine
- HISTORY 243S/443A. Human Origins: History, Evidence, and Controversy
- HISTORY 244C/444C. The History of the Body in Science, Medicine, and Culture
- HUMBIO 175. Healthcare as Seen through Medical History, Literature, and the Arts

## OVERSEAS STUDIES COURSES IN HISTORY AND PHILOSOPHY OF SCIENCE AND TECHNOLOGY

For course descriptions and additional offerings, see the listings in the *Stanford Bulletin's* ExploreCourses web site (<http://explorecourses.stanford.edu>) or the Bing Overseas Studies web site (<http://bosp.stanford.edu>). Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

## WINTER QUARTER

### FLORENCE

- OSPFLOR 44. The Revolution in Science: Galileo and the Birth of Modern Scientific Thought. 5 units, Paolo Galluzzi, GER:DB:Hum

## HUMAN BIOLOGY

*Emeriti: (Professors)* Clifford Barnett (Anthropological Sciences), Doug Brutlag (Biochemistry), Luigi Cavalli-Sforza (Genetics), Christos Constantinou (Urology), Carl Djerassi (Chemistry), Sanford Dornbusch (Sociology), Stanley Falkow (Microbiology/Immunology), Shirley Feldman (Associate Director), Ute Francke (Genetics), Albert H. Hastorf (Psychology), Dale Kaiser (Biochemistry), Herant Katchadourian (Human Biology), Donald Kennedy (Biology), Carol Winograd (Medicine)

*Director:* Carol Boggs (Biology)

*Associate Director:* Katherine Preston

*Professors:* Russ Altman (Applied Biomedical Engineering), Laurence Baker (Health Research and Policy), Ben Barres (Neurobiology), Lisa Curran (Anthropology), William H. Durham (Anthropology), Heidi Feldman (Pediatrics: Neonatology), Russell D. Fernald (Biology), Paul Fisher (Neurology), Margaret Fuller (Developmental Biology), Rona Giffard (Anesthesia), Lawrence H. Goulder (Economics), James Gross (Psychology), H. Craig Heller (Biology), Paula Hillard (Obstetrics and Gynecology), Patricia Jones (Biology), Terence Ketter (Psychiatry and Behavioral Sciences), Richard Klein (Biology, Anthropology), Amy Ladd (Orthopaedic Surgery), Helen Longino (Philosophy), Tanya Luhrmann (Anthropology), Yvonne Maldonado (Pediatrics: Infectious Diseases), Michael Marmor (Ophthalmology), Gordon Matheson (Orthopaedic Surgery), Robert Negrin (Medicine: Blood and Marrow Transplantation), Roeland Nusse (Developmental Biology), Amado Padilla (Education), Julie Parsonnet (Medicine: Infectious Diseases), Thomas Rando (Neurology), Natalie Rasgon (Psychiatry and Behavioral Sciences), Thomas Robinson (Pediatrics), Lee Ross (Psychology), Robert Sapolsky (Neurology and Neurological Sciences and of Neurosurgery, Biology), Kenneth Schultz (Political Science), Matthew Scott (Developmental Biology), William Talbot (Developmental Biology), Lucy Tompkins (Infectious Diseases), Shripad Tuljapurkar (Biology), Jeffrey Wine (Psychology), Paul Wise (Pediatrics), Arthur P. Wolf (Anthropological Sciences)

*Associate Professors:* Jayanta Bhattacharya (Medicine), Rebecca Bird (Anthropology), Firdaus Dhabhar (Psychiatry and Behavioral Sciences), Dean Felsher (Medicine: Oncology), Anne Fernald (Psychology), James Fox (Anthropology), Garry Gold (Diagnostic Radiology), Brenda Golianu (Anesthesia), James Jones (Anthropology), Brian Knutson (Psychology), Sean Mackey (Anesthesia), Jose Montoya (Infectious Diseases), John Rick (Anthropology), Randall Stafford (Stanford Prevention Research Center), Anthony Wagner (Psychology), Nancy Wang (Surgery: Emergency)

*Assistant Professors:* Daniel Garza (Orthopedic Surgery), Samuel McClure (Psychology), Norman G. Miller (Medicine), Jelena Obradovic (Education), Anna Penn (Pediatrics: Neonatology), Michael Ramscar (Psychology), Jamie Zeitzer (Psychiatry)

*Professor (Research):* Marcia Stefanick (Stanford Prevention Research Center)

*Associate Professors (Research):* Christopher Gardner (Stanford Prevention Research Center), David Katzenstein (Medicine: Infectious Diseases), David Lyons (Psychiatry and Behavioral Sciences)

*Assistant Professor (Research):* Scott Hall (Interdisciplinary Brain Science Research)



*Professors (Teaching):* Carol Boggs (Biology), David Magnus (Pediatrics), Ellen Porzig (Developmental Biology)

*Associate Professors (Teaching):* Donald Barr (Pediatrics), Catherine Heaney (Psychology), Eunice Rodriguez (Pediatrics), Robert Siegel (Microbiology and Immunology)

*Clinical Professors:* Nancy Morioka-Douglas (Medicine: Family and Community Medicine), Laraine Zappert (Psychiatry and Behavioral Sciences)

*Clinical Associate Professors:* Mary Therese Jacobson (Obstetrics and Gynecology), Katherine Williams (Psychiatry and Behavioral Sciences)

*Clinical Assistant Professors:* Cynthia Nguyen (Psychiatry and Behavioral Sciences), Rita Papat (Health Research and Policy, Epidemiology), Daryn Reichert (Psychiatry and Behavioral Sciences)

*Senior Research Associates:* Wesley F. Alles (Medicine: Stanford Prevention Research Center), Douglas Bird (Anthropology)

*Other Teaching Faculty and Staff:* William Abrams, Maya Adam-Seef, Susan Charnley, Judy Chu, Gerda Endemann, Anne Firth-Murray, Anne Friedlander, Ronald Garcia (Center for Excellence), Renu Heller (Biology), Alan Launer, Donald Light, Michael Mastrandrea (Woods Institute), Lisa Medoff, Tania Mitchell (Ctr for Comparative Studies in Race and Ethnicity), Denise Monack (Microbiology and Immunology), Katherine Preston, Noa Pinter-Wollman, Lisa Goldman Rosas (Medicine: Stanford Prevention Research Center), Lynn Rothschild, Merritt Ruhlen (Anthropology), Daniel Salkeld (Anthropology), Darwin Scott Smith (Microbiology and Immunology), Szonja Szelenyi (Institute for Research in the Social Sciences), Jennifer Wolf (School of Education), Nathan Wolfe, Larry Zaroff

*Course Associates:* Autumn Albers, Anna Grummon, Sami Hartley, Rebecca LaGrandeur, Ariel Marcy, Ron Pomper, Dane Saks, Timothy Wolfe

*Honors Chair:* Katherine Preston

*Program Offices:* Building 20

*Mail Code:* 94305-2160

*Phone:* (650) 725-0336

*Email:* [cacciari@stanford.edu](mailto:cacciari@stanford.edu) (Student Services)

*Web Site:* <http://humbio.stanford.edu>

Courses offered by the Program in Human Biology are listed under the subject code HUMBIO on the *Stanford Bulletin's* ExploreCourses web site.

The program offers a Bachelor of Arts in Human Biology, as well as a minor and an honors program.

## MISSION OF THE UNDERGRADUATE PROGRAM IN HUMAN BIOLOGY

The mission of the undergraduate program in Human Biology is to provide students with an interdisciplinary approach to understanding human beings from biological, behavioral, social, and cultural perspectives. Courses in the major allow students to see connections and parallels with other fields as they learn to formulate and evaluate health, environmental, and other public policies issues that influence human welfare. The program prepares majors to pursue advanced training in professional or graduate programs.

To achieve these goals, all students complete a 30-unit core sequence, normally in the sophomore year, that provides the foundation for the major. Also during the sophomore year, students consult with student advisers to choose a faculty adviser and complete the declaration process. Together they plan a road map of course work designed to help each student focus on an area of interest within Human Biology. Early planning and subsequent refining of an individualized course of study, in consultation with student and faculty advisers, is a strength and requirement of the program. The curriculum draws on faculty from across the University. To complete a B.A. in Human Biology, students must take courses from within the program and from other University

departments. Most Human Biology majors go on to advanced training in professional schools, or graduate programs in the behavioral, natural, and social sciences, including coterminal master's degree programs in other University departments. Additional information about the major may be obtained from the program's offices or at <http://humbio.stanford.edu>.

## LEARNING OUTCOMES

The program expects its undergraduate majors to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the Program in Human Biology. Students are expected to demonstrate:

1. ability to acquire and synthesize scientific information from a variety of sources.
2. ability to apply analytical tools to evaluate policy.
3. ability to interpret knowledge in meaningful and appropriate ways as they draw conclusions about the significance of their findings.
4. ability to communicate their scientific ideas clearly and persuasively.

## STUDENT ADVISERS

Human Biology has an advising program comprising faculty and student advisers. Before declaring Human Biology as the undergraduate major, each student must meet with one of six student advisers who assist in developing a coherent study plan based on an individualized area of concentration, and the selection of foundation, concentration, and upper-division courses. The student advisers also assist students in selecting an appropriate faculty adviser and a suitable internship for their area of concentration and career goals. Student advisers offer drop-in services during scheduled office hours every weekday and some evenings. The student advisers also sponsor events including the Internship Faire, Beyond HumBio, and declaration workshops. To maintain high standards of advising that respond to the needs of individual students, student advisers meet weekly with the program's faculty advising chairs and the student services coordinator to review the program's policies and specific student inquiries and petitions concerning the program.

## BACHELOR OF ARTS IN HUMAN BIOLOGY

### DECLARING THE MAJOR

A prospective major must consult with the student and faculty advisers to obtain detailed information about the program and guidance in the development of an individual course of study.

At the time the major is declared, the student must submit a written statement (3-5 pages) of academic and long-term goals and the proposed list of courses satisfying the requirements for the major. The proposal is then reviewed by the student advisers who help identify an appropriate faculty adviser. Final approval of the proposed course of study rests with the faculty adviser.

It is important to declare early, preferably in early spring as soon as students have passed both Autumn and Winter Quarter core courses (2A,B, 3A,B). The University requires students to declare a major by the end of Spring Quarter of the sophomore year. Under special circumstances students may declare as late as Autumn Quarter of the junior year. Petitions to declare late require additional documentation and are less likely to be approved.

Students who plan to pursue graduate work should be aware of the admission requirements of the schools to which they intend to apply. Early planning is advisable to guarantee completion of major and graduate school requirements.

## REQUIREMENTS

The B.A. in Human Biology (HUMBIO) requires a minimum of 87 units in the major divided among four levels of courses:

1. *Fundamental Program:* at least 38 units, to include
  - a. Human Biology Core (30 units)

- The Human Biology Core refers to HUMBIO 2A and 2B, 3A and 3B, and 4A and 4B. See "Human Biology Core" below for more information.
- b. Statistics (4-5 units)
    - Statistics may be chosen from courses such as STATS 60 or 141, PSYCH 10, SOC 181B, and BIO 141. For questions about other statistics courses that might fulfill this requirement, see the program office. The core and statistics courses must be taken for a letter grade by majors.
  - c. Internship (HUMBIO 197, 4 units)
    - The internship requirement, a mentored non-classroom project, is graded satisfactory/no credit only.
2. *Foundation Courses*: 20-unit minimum. Total units vary, depending on the focus of study chosen by the student for the area of concentration. They may include introductory-level courses from across the University and lab courses. The minimum grade requirement for foundation courses is 'C-.'
  3. *Area of Concentration*: a minimum of five courses totaling at least 20 units. This in-depth area of study enables the student to focus on educational and post-baccalaureate goals. Courses are non-introductory, theory-based, and are usually numbered over 100. Three or more departments must be represented in the concentration. Each course must be taken for a minimum of 3 units. The area of concentration is individually designed by the student in consultation with the student advisers and faculty adviser. Final approval of the concentration rests with the student advisers and faculty adviser. All area of concentration courses must be taken for a letter grade. The minimum grade requirement for area of concentration courses is 'C-'. The area of concentration generally has an emphasis in one, and sometimes more than one, of the following eight areas:
 

*Area 1: Environment and Environmental Policy*

    - Environment
    - Environmental Policy
    - Culture/Demography/Human Ecology

*Area 2: Health and Health Policy*

    - Health Policy
    - Public Health
    - International Health

*Area 3: Human Performance*

*Area 4: Human Development*

    - Biological Development
    - Psychological Development
    - Education

*Area 5: Biomedical Science*

    - Genetics
    - Molecular Biology
    - Human Physiology
    - Infectious Diseases

*Area 6: Brain and Behavior*

*Area 7: Ethics and Medical Humanities*

*Area 8: Evolution*

A non-exclusive list of possible courses for each emphasis is available at the student advisers' office or at <https://humbio.stanford.edu/node/474>.
  4. *Upper-Division Courses*: students must take three Human Biology upper-division courses numbered 100 to 189. These courses should be used to explore subjects outside the area of concentration. One upper-division course may be taken satisfactory/no credit. Each course must be taken for a minimum of 3 units. All non-laboratory advanced HUMBIO courses (those numbered 100 to 189) fulfill the Human Biology upper-division requirement. A list of Human Biology cognate courses can be found at <http://www.stanford.edu/dept/humbio/cgi-bin/?q=node/1382>.

## HUMAN BIOLOGY CORE

Required core sequences (HUMBIO 2A,B, 3A,B, and 4A,B) introduce the biological and social sciences, and most importantly,

relationships between the two. Classes meet throughout the academic year. Students must register concurrently for the A and B series and take the core in sequence. Students should initiate the core in Autumn Quarter of the sophomore year. Freshmen are not permitted to enroll. Majors must earn a minimum letter grade of 'C-' in core courses. The Human Biology core consists of the following courses:

- HUMBIO 2A. Genetics, Evolution, and Ecology
- HUMBIO 2B. Culture, Evolution, and Society
- HUMBIO 3A. Cell and Developmental Biology
- HUMBIO 3B. Behavior, Health, and Development
- HUMBIO 4A. The Human Organism
- HUMBIO 4B. Environmental and Health Policy Analysis

## HONORS PROGRAM

The honors program in Human Biology provides qualified majors the opportunity to work closely with faculty on an individual research project, culminating in an honors thesis. Students may begin honors research from a number of starting points including topics introduced in the core or upper-division courses; independent interests stemming from an internship experience; or collaborating with faculty from the natural, social, or behavioral sciences.

Students may apply to the honors program if they have completed the Human Biology core with a minimum GPA of 3.0, have an overall Stanford grade point average (GPA) of 3.2, and meet other requirements detailed in the honors handbook. Interested students should consult the Human Biology Honors Handbook at <https://humbio.stanford.edu/node/152> and meet with the Human Biology Associate Director or student services officer.

Most honors projects involve a total of 10-15 units of course work in HUMBIO 193 and 194.

Admission to the honors program is by submission of an intention to undertake honors research in early February, followed by the application in early March of the junior year. Students planning to undertake honors begin research or preparation as early as completion of the sophomore year.

The honors thesis is normally completed by the middle of Spring Quarter of the senior year. Honors students then present summaries of their research at the Human Biology Honors Poster Symposium in May.

Human Biology also holds a Summer Honors College just prior to Autumn Quarter each year for students who have applied to the honors program. Students apply to Summer Honors College in April of the junior year. For applications, contact the program office.

## MINOR IN HUMAN BIOLOGY

A minor in Human Biology provides an introductory background to the relationship between the biological and social aspects of humanity's origin, development, and prospects. Many of the major problems facing human civilization today involve both biological and social aspects. Scientific approaches to these problems are essential, but they must be broadly conceived, integrating what is known of the biological with an understanding of the social and cultural setting in which they exist. Students with a minor in Human Biology are expected to develop a strong background in the integration between the biological and social aspects of human beings.

Students declaring a minor in Human Biology must do so no later than two quarters prior to their intended quarter of degree conferral (for example, a student must declare a minor before the end of Autumn Quarter to graduate the following Spring Quarter).

To minor in Human Biology, students must take the Human Biology Core (HUMBIO 2A, 2B, 3A, 3B, 4A, and 4B) and one additional upper-division course (for example, any HUMBIO course numbered 100-189). The student must earn a minimum letter grade of 'C-'. Courses that count towards the fulfillment of major requirements may not be counted towards the minor.

## STOREY HOUSE

Storey House, 544 Lasuen Mall, is an undergraduate resident theme house for Human Biology, devoted to developing an intellectual community among Human Biology majors at Stanford, and allowing faculty and students to become acquainted and share their Human Biology interests and research. Its goals are to foster intellectual discussion in the residential lives of the students living in Storey House, mentoring relationships between upperclassmen and core students in the house, and stimulating events for all Human Biology majors facilitated by academic theme associates. Assignment is made through the regular undergraduate housing draw.

## OVERSEAS STUDIES COURSES IN HUMAN BIOLOGY

For course descriptions and additional offerings, see the listings in the *Stanford Bulletin's* ExploreCourses web site (<http://explorecourses.stanford.edu>) or the Bing Overseas Studies web site (<http://bosp.stanford.edu>). Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

### AUTUMN QUARTER

#### AUSTRALIA

OSPAUSTL 10. Coral Reef Ecosystems. 3 units, Kevin Arrigo, Selina Ward, GER:DB:EngrAppSci

OSPAUSTL 20. Coastal Resource Management. 3 units, Ron Johnstone, GER:DB:EngrAppSci

OSPAUSTL 30. Coastal Forest Ecosystems. 3 units, Claire Baker, Catherine Lovelock, GER:DB:EngrAppSci

#### PARIS

OSPPARIS 153X. Health Systems and Health Insurance: France and the U.S., a Comparison across Space and Time. 4-5 units, Jean-Marie Fessler, GER:DB:SocSci, EC:GlobCom

### WINTER QUARTER

#### CAPE TOWN

OSPCPTWN 43. Public and Community Health in Sub-Saharan Africa. 4 units, Diane Cooper

#### FLORENCE

OSPFLO 66. Da Vinci: Renaissance Understanding of Anatomy. 5 units, Garry Gold

#### MADRID

OSPMADR 72. Issues in Bioethics Across Cultures. 5 units, Staff

### SPRING QUARTER

#### CAPE TOWN

OSPCPTWN 43. Public and Community Health in Sub-Saharan Africa. 4 units, Diane Cooper

#### FLORENCE

OSPFLO 57. Global Change and Italian Ecosystems: Management and Conservation for Mitigation. 4 units, Stefano Cannicci, GER:DB:NatSci

#### MADRID

OSPMADR 57. Health Care: A Contrastive Analysis between Spain and the U.S. 5 units, Alicia Perez Blanco, GER:DB:SocSci

## IBERIAN AND LATIN AMERICAN CULTURES

*Emeriti: (Professors)* Bernard Gicovate, Mary Pratt, Sylvia Wynter; *(Professor, Teaching)* María-Paz Haro

*Director:* Jorge Ruffinelli

*Chair of Graduate Studies:* Michael P. Predmore

*Chair of Undergraduate Studies:* Lisa Surwillo

*Minors Coordinators:* Héctor Hoyos, Marília Librandi Rocha

*Professors:* Michael P. Predmore (on leave, Spring), Joan Ramon Resina (Iberian and Latin American Cultures, Comparative Literature), Jorge Ruffinelli, Yvonne Yarbrow-Bejarano

*Associate Professor:* Vincent Barletta

*Assistant Professors:* Héctor M. Hoyos, Marília Librandi Rocha, Lisa Surwillo

*Courtesy Professors:* John Felstiner, Roland Greene (on leave, Spring), Hans U. Gumbrecht, Ramón Saldívar

*Courtesy Associate Professors:* James A. Fox, Paula Moya

*Visiting Professor:* Margalida Jamme Pons (Autumn)

*Visiting Lecturers:* Ximena Briceño, Caridad Kenna

*Lecturer:* Seth Kimmel (Humanities Fellow)

*Director of Iberian Studies Program:* Joan Ramon Resina

*Spanish Language Program Coordinator:* Alice Miano

*Portuguese Language Program Coordinator:* Lyris Wiedemann

*Catalan Language Program Coordinator:* Joan Molitoris

*Department Offices:* Building 260, Room 128

*Mail Code:* 94305-2014

*Phone:* (650) 723-4977

*Email:* [ilac@stanford.edu](mailto:ilac@stanford.edu)

*Web Site:* <http://ilac.stanford.edu>

Courses offered by the Department of Iberian and Latin American Cultures, formerly the Department of Spanish and Portuguese, are listed under the subject code ILAC on the *Stanford Bulletin's* ExploreCourses web site. For courses in Catalan, Portuguese, and Spanish language instruction with the subject codes CATLANG, PORTLANG and SPANLANG, see the "Language Center" section of this bulletin.

The Department of Iberian and Latin American Cultures offers courses focused on the languages, literatures, and cultures of the Iberian Peninsula, Latin America, and Latina/o populations in the United States. To achieve its goal of training students as experts in the cultures of the Iberian Peninsula and Latin America, the department balances an emphasis on literary studies with philosophical, historical, and social approaches to cultural issues.

The department's faculty includes scholars of modern and contemporary Spanish literature and cinema, contemporary Latin American literature and cinema, medieval and contemporary Catalan literature and culture, Aljamiado and medieval Spanish literature, early modern Portuguese literature, modern and contemporary Brazilian literature, and Chicana/o culture and literature. In general, the department's courses are characterized by an intercultural and interdisciplinary focus that combines the study of literature with wide ranging intellectual concerns.

The department nurtures relationships with other departments and programs at Stanford in areas such as anthropology, philosophy, history, Mediterranean studies, medieval and Renaissance studies, European and Latin American politics, feminist studies, Chicana/o studies, and film studies.

The department is committed to three main educational goals:

1. to provide students with a contextualized knowledge of the literatures and cultures of the Iberian Peninsula from the medieval period to the present, of the Spanish and Portuguese speaking countries of Latin America, and of the Spanish-speaking communities of the United States.
2. to prepare undergraduates for advanced study in those areas and/or in a range of professional fields.

3. to provide doctoral students with advanced training as research scholars and teachers in preparation for careers as university professors or in related roles.

In addition, the department, through the Iberian Studies Program, regularly hosts visiting faculty including the Ginebre Serra Visiting Chair in Catalan Studies, the Eusko Ikaskuntza Visiting Professor in Basque Culture, and the Consello de Cultura Galega Visiting Professor.

The department awards B.A., M.A., and Ph.D. degrees in Iberian and Latin American Cultures to eligible candidates, as well as undergraduate minors in Spanish and Portuguese and a Ph.D. minor in Spanish.

*Courses for Heritage Language Speakers*—The Language Center offers a series of second- and third-year courses designed for students who grew up in homes where Spanish is spoken and who wish to develop their existing linguistic strengths. See the "Language Center" section of this bulletin for these courses.

## MISSION OF THE UNDERGRADUATE PROGRAM IN IBERIAN AND LATIN AMERICAN CULTURES

The mission of the undergraduate program in Iberian and Latin American Cultures is to expose students to a variety of perspectives in languages, literatures, and cultures of the Iberian Peninsula, Latin America, and Latina/o populations in the United States. The program balances an emphasis on literary studies with a diverse set of approaches to cultural and social issues. Courses in the program provide students with a contextualized knowledge of the literatures and cultures of the Iberian Peninsula from the medieval period to the present; the Spanish and Portuguese speaking countries of Latin America; and the Spanish-speaking communities of the United States. Students in the major are prepared for advanced study in these areas and for a range of professional fields.

## LEARNING OUTCOMES

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. the ability to develop effective and nuanced lines of interpretation.
2. critical thinking skills using course's primary source materials.
3. facility with the methodologies and presuppositions underlying interpretive positions in secondary literature and in their own work.
4. analytical writing skills and close reading skills.
5. expository oral skills.

## TEACHING CREDENTIALS

For information concerning the requirements for teaching credentials, see the "School of Education" section of this bulletin and the credentials administrator, School of Education.

## GRADUATE PROGRAMS IN IBERIAN AND LATIN AMERICAN CULTURES

University requirements for the M.A. and Ph.D. degrees are discussed in the "Graduate Degrees" section of this bulletin.

## COTERMINAL B.A. AND M.A.

The requirements for the coterminal M.A. are the same as those outlined for the M.A. No course can count for both the B.A. and M.A. degrees. University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees" section of this bulletin.

## BACHELOR OF ARTS IN IBERIAN AND LATIN AMERICAN CULTURES

The major in Iberian and Latin American Cultures (ILAC) requires 60 units of course work. Courses must be taken for a letter grade, and a maximum of 20 units of course work from abroad may be applied towards the major. At the discretion of the Chair of Undergraduate Studies, up to 10 units of course work from outside the department, clearly related to the study of literature and culture in the areas and traditions taught by the department, may be counted towards the degree. The core courses (requirements 1, 2, 3 and 4 below) may not be taken abroad. Exceptional cases for any of these requirements must be referred to the Chair of Undergraduate Studies who, in consultation with the department Director, makes a final decision.

## PREREQUISITES

For all ILAC courses taught in Spanish, students must have successfully completed SPANLANG 102 or successfully tested above this level through the Language Center.

*How to Declare a Major*—Students declare the major in Axess and are required to meet with the Chair of Undergraduate Studies.

*Double Majors*—The major in ILAC is designed to combine with a second major in another field and with study abroad. Students may not count the same courses to fulfill requirements in both majors.

## GENERAL COURSE REQUIREMENTS

1. Writing in the Major (WIM): 5 units are required, and this is a prerequisite for every course in the major; however, concurrent enrollment is allowed.
  - ILAC 120. Introduction to Literary and Scholarly Research (3-5 units)
2. Core courses in literature. Students are required to take:
  - ILAC 136. Modern Iberian Literatures
  - ILAC 157. Medieval and Early Modern Iberian Literatures
  - ILAC 161. Modern Latin American Literature
3. Core course in culture, history, and civilization. Choose at least one:
  - ILAC 130. Cultural Perspectives in Iberia
  - ILAC 131. Cultural Perspectives in Latin America
4. A senior seminar, ILAC 278 or 278A. Topics vary. Two options are offered each year.
5. Up to three language courses (not including conversational courses) in Spanish, Portuguese, or Catalan (SPANLANG/PORTLANG/CATLANG), including SPANLANG 102, may count toward the major.
6. Additional 100- or 200-level ILAC literature courses above 100 to complete the required 60 units. One course above 100 and one core course, or consent of the instructor, are prerequisites for 200-level courses. When choosing courses, students are encouraged to consult the Chair of Undergraduate Studies who makes recommendations about a course of study related to the student's academic interests. IHUM courses taught at least partially by a faculty member of the department, or 10 units of SLE may count towards these electives.

## HONORS PROGRAM

ILAC majors with a grade point average (GPA) of 3.5 or better in major courses may apply to the honors program in Spring Quarter of the junior year. Students should submit an application for the honors program and a proposal outline and may enroll for 2 units of ILAC 189B for the drafting or revision of the thesis proposal and preliminary research.

Honors students are encouraged to participate in the honors college coordinated by the Division of Literatures, Cultures, and Languages and offered at the end of the summer before the senior year. In Autumn Quarter of the senior year, students must enroll in DLCL 189, a 5-unit seminar that focuses on researching and

writing the honors thesis. Students then enroll for 5 units of credit in ILAC 189A while composing the thesis during Winter Quarter.

Each honors student must write a substantial honors essay under the direction of a faculty member who serves as adviser, and the completed thesis must be submitted by the end of Winter Quarter. Students who do not enroll in an ILAC 189B course in the junior year may enroll in ILAC 189B in Spring Quarter of the senior year while revising the thesis, if approved by the thesis adviser.

A total of 10-12 units are awarded for completion of honors course work, independent study, and the finished thesis. Students should consult their undergraduate advisers for additional information on the honors program.

## MINORS IN SPANISH AND PORTUGUESE

The minors in Spanish and Portuguese are for students who want to combine acquisition of linguistic competence with the study of the literature, thought, culture, or language systems of the Spanish- or Portuguese-speaking worlds. The minors in Spanish and Portuguese require 30 units of course work taken for a letter grade. Up to 5 units of course work outside the department, up to 10 units of relevant course work taken abroad, and up to 15 units of second-year and above Spanish or Portuguese language courses (not including conversational courses) may count toward these minors with the approval of the minors coordinator. To declare either of these minors or for more information, see the minors coordinator or the student affairs officer in the Division of Literatures, Cultures, and Languages.

### MINOR IN SPANISH

*Requirements—*

1. A 100- or 200-level course in Iberian literature
2. A 100- or 200-level course in Latin American literature
3. Any additional 100- or 200-level courses in literature and culture to complete 30 units. IHUM courses with a Hispanophone component taught at least partially by a faculty member of the department may count toward these electives as may 5 units of SLE.

### MINOR IN PORTUGUESE

*Requirements—*

1. A 100- or 200-level course in Iberian literature with a Lusophone component
2. A 100- or 200-level course in Latin American literature with a Lusophone component
3. Any additional 100- or 200-level courses in literature and culture to complete 30 units. IHUM courses with a Lusophone component taught at least partially by a faculty member of the department may count toward these electives as may 5 units of SLE.

### MINOR IN MODERN LANGUAGES

The Division of Literatures, Cultures, and Languages offers a minor in Modern Languages. This minor draws on literature and language courses offered through this and other literature departments. See the "Literatures, Cultures, and Languages" section of this bulletin for further details about this minor and its requirements.

## STUDY ABROAD PROGRAMS IN IBERIAN AND LATIN AMERICAN CULTURES

All majors are encouraged to study abroad. To transfer credits from non-Stanford programs abroad, consult the Bing Overseas Studies Office. Depending on course selections, up to 20 units of course work taken abroad may be applied toward the major in ILAC and 10 units toward the minor in Spanish or Portuguese. Students planning to study abroad, or returning from study

programs, are encouraged to consult with the Chair of Undergraduate Studies to coordinate the course work from abroad with their degree program.

The department and Bechtel International Center maintain information on study abroad programs. Stanford supports the options listed below and credits course work taken in academically sound programs. Students considering different options are encouraged to speak with the Director of the department or the Chair of Undergraduate Studies.

### STANFORD IN SANTIAGO, CHILE AND MADRID OR BARCELONA, SPAIN

The Bing Overseas Studies Programs in Santiago, Chile and Madrid, Spain require one year of college-level Spanish (SPANLANG 3). Course work is primarily in Spanish. Information is available in the "Overseas Studies" section of this bulletin or at <http://bossp.stanford.edu>. Internships and research opportunities may be arranged for students staying for two quarters.

For ILAC majors with an interest in Iberian Studies, the department recommends study in Barcelona through CASB, a consortium of U.S. universities of which Stanford is a participating member. This program combines courses at the program's center with open access to courses at three Barcelona universities: Universitat Pompeu Fabra, University of Barcelona, and Autonomous University of Barcelona. Visiting faculty from Brown, Chicago, Stanford, and Northwestern complement the offerings of these three major universities. Admission is highly competitive. Other programs are also recognized by the department, and students are encouraged to discuss their interests with the Director of the department or with the Chair of Undergraduate Studies.

### BRAZIL AND PORTUGAL

The University maintains a relationship with the Universidade Estadual do Rio de Janeiro in Brazil at the graduate level. Students interested in study in Brazil should contact Professor Marília Librandi Rocha. Students interested in study in Portugal should contact Professor Vincent Barletta.

### MASTER OF ARTS IN IBERIAN AND LATIN AMERICAN CULTURES

This terminal M.A. degree program is for students who do not intend to continue their studies through the Ph.D. degree. Students in this program may not apply concurrently for entrance to the Ph.D. program. Students must complete a minimum of 45 graduate-level units, 36 of which must be taken at Stanford. All 45 units must have a letter grade of 'B' or above. Students enrolled in the terminal M.A. program must file a Program Proposal for a Master's Degree during their first quarter of enrollment. Any changes to the proposal should be reviewed and approved by the Chair of Graduate Studies.

The requirements for the terminal M.A. and coterminal M.A. are:

1. A 200-level or above course in literary or cultural theory
2. Two 200-level or above courses in Latin American (including Brazilian) or Latino/Chicano literature and culture
3. Two 200-level or above courses in Iberian literature and culture
4. One 300-level course in Latin American (including Brazilian) or Latino/Chicano literature and culture
5. One 300-level course in Iberian literature and culture
6. Enrollment in at least one 300-level graduate seminar offered in the department each quarter
7. Intermediate-high proficiency in Portuguese or Catalan (equivalent to one year of university study).

Independent study courses (ILAC 299, 399) and crosslisted courses originating outside the department may not be used to fulfill requirements except by consent of the Chair of Graduate Studies.

In addition, students may take approved courses in related fields such as classics, comparative literature, education, history of art, linguistics, modern thought, and philosophy.

## DOCTOR OF PHILOSOPHY IN IBERIAN AND LATIN AMERICAN CULTURES

University requirements for the Ph.D. are described in the "Graduate Degrees" section of this bulletin. The requirements of the Ph.D. in Iberian and Latin American Cultures (ILAC) are:

1. *Course work*—135 units of graduate-level course work with a grade point average (GPA) of 3.0 (B) or above. All candidates for the Ph.D. degree are expected to fulfill all requirements for the M.A. during their first year in the program. Units completed for the M.A. degree at another institution (up to 45 units) can be counted toward the Ph.D., pending university and department approval. Independent study courses (ILAC 299, 399) may not be used to fulfill requirements except by permission of the Chair of Graduate Studies in consultation with the student's graduate adviser. Students must be enrolled in at least one 300-level graduate seminar offered through ILAC each quarter before advancing to TGR. In consultation with the adviser, students choose one major field and two minor fields of study from the following:

- A1. Medieval and Early Modern Iberian Literature and Culture
- A2. Eighteenth- and Nineteenth-Century Iberian Literature and Culture
- A3. Twentieth- and Twenty-First-Century Iberian Literature and Culture
- B1. Colonial to Nineteenth-Century Latin American Literature and Culture
- B2. Twentieth- and Twenty-First-Century Latin American Literature and Culture
- B3. Luso-Brazilian Literature and Culture
- C. US Latin/Chicano Literature and Culture

Students must select one minor area from a group (A, B, C) other than that in which their major area falls. At least four graduate-level courses must be taken in the major area of study. At least two graduate-level courses must be taken in each minor area.

2. *Language*—All students are required to have advanced-high proficiency in English and Spanish by the time they take the comprehensive examination. In addition, students specializing in Iberian literature and culture must attain intermediate-mid proficiency in Catalan and Portuguese (equivalent to two quarters of university study for each language); for students specializing in Latin American and/or US Latino/Chicano literature and culture, the level of advanced-low proficiency in Portuguese (equivalent to four quarters of university study) must be attained. This requirement must be fulfilled before students take the comprehensive examination. Students wishing to satisfy the language requirements in Catalan and/or Portuguese may do so by passing a proficiency exam administered by the Language Center.

3. *Examinations*—All students must pass the following: a Qualifying Paper; an oral and written Department Comprehensive exam; and a University Oral examination.

3a. *Qualifying Paper*—The qualifying paper is a research paper, written in either English or Spanish, consisting of no more than 6,000 words. The student chooses as its source a term paper written for a course taught by a core member of the ILAC faculty. This instructor will serve as advisor to the student in preparing the qualifying paper for submission. The paper must be submitted to the Graduate Student Services Coordinator by the first day of instruction in Autumn Quarter of the student's second year of study. Students who do not pass the initial submission will have the opportunity to revise and resubmit it by November 15. Should the second qualifying paper not satisfy the minimum requirements, the student will be released from the Ph.D. program at the end of that same quarter. A terminal M.A. degree may be awarded if all requirements for that degree have been completed satisfactorily.

3b. *Comprehensive examination*—This exam consists of two parts, a written submission and an oral presentation, and is

designed for students to demonstrate intellectual competence in multiple areas of study. This exam occurs during Winter Quarter of the third year of graduate study, and it must be completed prior to the last day of instruction in that same quarter. Students must select three examination areas from the following options:

- A1. Medieval and Early Modern Iberian Literature and Culture
  - A2. Eighteenth- and Nineteenth-Century Iberian Literature and Culture
  - A3. Twentieth- and Twenty-First-Century Iberian Literature and Culture
  - B1. Colonial to Nineteenth-Century Latin American Literature and Culture
  - B2. Twentieth- and Twenty-First-Century Latin American Literature and Culture
  - B3. Luso-Brazilian Literature and Culture
  - C. US Latin/Chicano Literature and Culture
- Students may not select all three areas from the same group (A, B, C).

The committee for the Comprehensive Exam is formed by asking three ILAC professors to serve on the committee, one for each of the three examination areas chosen by the student. In consultation with each member of the committee, the student must develop a list of twenty-one themes (seven for each area of study) plus a reading list of 130-150 texts and critical works. In addition, the student will submit a 6,000-word research paper (different from the Qualifying Paper) on a topic preferably related to the dissertation. This paper must be written in English. This list and research paper must be presented to committee members and to the Graduate Student Services Coordinator at least two weeks prior to the Oral portion of the Comprehensive Exam. The Oral exam will be based upon the submitted list and research paper and will last no more than two hours. Students must demonstrate their proficiency in Spanish and English during the course of this exam.

3c. *University Oral examination*—All Ph.D. candidates in ILAC are required to take a University Oral examination no later than one quarter after successfully completing the Comprehensive Examination. This examination is a defense of the dissertation prospectus. During the examination, the candidate speaks approximately 20 minutes on the proposed dissertation, the methods to be used in research and the conclusions the candidate expects to reach. Afterward, there will be questions by the members of the committee, in an order established by the Chair of the committee. The examination may be taken in English or Spanish, as mutually agreed by the student and the committee. The examination will last no more than two hours.

The University Oral examination committee must be finalized no later than the last week of the quarter during which the student successfully completes the comprehensive examination. The examination committee should include the dissertation advisor and three other members, usually from the Reading Committee, and a Chair from outside the department, for a total of five members. All members must belong to the Academic Council. The adviser and two other members must be ILAC faculty. Once a committee and date are finalized the student must submit the University Oral Examination form to the Graduate Student Services Coordinator. The members of the Oral Examination committee must receive copies of the dissertation prospectus no later than three weeks prior to the examination.

The dissertation prospectus should consist of 20-25 pages (approximately 7,500 words) and follow the most recent MLA Style guidelines. The student must prepare the dissertation prospectus with the help of the principal adviser, and other advisers. The dissertation prospectus must contain a title along with the following elements:

- a. Statement of Thesis
- b. Statement of Significance and Impact
- c. Brief Literature Review
- d. Outline of Theoretical Framework
- e. Chapter Outline
- f. Preliminary Biography
- g. Timetable for Completion

4. *Teaching*—Each Ph.D. candidate must teach a minimum of five quarters of undergraduate courses (three are taught during the second year and the remaining two after advancing to TGR status). Language course assignments are arranged through the Language Center. In preparation for teaching, Ph.D. candidates are required to take DLCL 201 in the first year.

5. *Ph.D. Dissertation*—The doctoral dissertation should demonstrate the student's ability to carry out original research and to organize and present the results in publishable form. The scope of the dissertation should be such that it is completed in twelve to eighteen months of full-time work. A copy of the completed dissertation must be submitted to each member of the reading committee at least eight weeks before the University filing deadline in the quarter during which the candidate expects to receive the Ph.D. degree. Committee members will have three weeks to read the dissertation before determining whether to approve or require changes. Ph.D. dissertations must be completed and approved within five years from the date of admission to candidacy. Students taking more than five years must apply for reinstatement of candidacy which is reviewed on a case by case basis.

*Yearly review:* In order to evaluate student progress and to identify potential problem areas, the department's faculty reviews the academic progress of each first-year student at the beginning of Winter and Spring quarters and again at the end of the academic year. The first two reviews are primarily intended to identify developing problems that could impede progress. In most cases, students are simply given constructive feedback, but if more serious concerns warrant, a student may be placed on probation with specific guidelines for addressing the problems detected. The review at the end of Spring Quarter is more thorough; each student's performance during the first year is reviewed and discussed. Possible outcomes of the spring review include: (1) continuation of the student in good standing, or (2) placing the student on probation, with specific guidelines for the period of probation and the steps to be taken in order to be returned to good standing. For students on probation at this point (or at any other subsequent points), possible outcomes of a review include: (1) restoration to good standing; (2) continued probation, again with guidelines for necessary remedial steps; or (3) termination from the program. All students are given feedback from their advisers at the end of their first year of graduate work, helping them to identify areas of strength and potential weakness.

At the end of the second year of residency, students who are performing well, as indicated by their counselors, performance on the Comprehensive Exam, and teaching and research assistantship performance, are advanced to candidacy. This step implies that the student has demonstrated the relevant qualities required for successful completion of the Ph.D. Future evaluations are based on the satisfactory completion of specific remaining department and University requirements. Students who are not advanced to candidacy will normally be terminated from the program and awarded a terminal M.A. degree. In some cases, the department may require that a student complete outstanding work or complete unmet requirements before admission to candidacy. The university requires that all students must be admitted to candidacy by the beginning of the third year in residence in order to continue in the Ph.D. program. Therefore all requirements stipulated by the department must be met before registration for Autumn Quarter of the student's third year.

At any point during the degree program, evidence that a student is performing at a less than satisfactory level may be cause for a formal academic review of that student.

*Grading:* Doctoral students in the department must take required courses for a letter grade if available and are expected to earn a grade of 'B+' or better in each course instructed in the DLCL. Any grade of 'B' or below is considered to be less than satisfactory. Grades of 'B' or below are reviewed by faculty and the following actions may take place: (1) the grade stands and the student's academic performance is monitored to ensure that satisfactory progress is being made; (2) the grade stands and the

student is required to revise and resubmit the work associated with that course; or (3) the student may be required to retake the course.

## PH.D. MINOR IN IBERIAN AND LATIN AMERICAN CULTURES

For a minor in Spanish, the student must complete 25 units, with a grade point average (GPA) of 3.0 or above, selected from courses numbered 200 or higher.

Students in the Ph.D. program in ILAC who choose a minor in another department should consult with advisers in that department.

## IBERIAN AND LATIN AMERICAN CULTURES COURSE CATALOG NUMBERING SYSTEM

WIM indicates that the course satisfies the Writing in the Major requirements.

Students interested in literary studies should also consult course listings in the departments of East Asian Languages and Cultures, Classics, Comparative Literature, English, French and Italian, German Studies, and Slavic Languages and Literatures, in the Program in Modern Thought and Literature, and in the Division of Literatures, Cultures, and Languages.

### OVERVIEW

- Stanford Introductory Seminars, freshman and sophomore preference (suffix of N or Q)
- Courses in Literature and Culture (100-399)
  - Undergraduate Courses (100-199)
  - Courses for Advanced Undergraduates and Graduates (200-299)
    - Iberian Literature (200-239)
    - Latin American Literature, including Brazil (240-279)
    - Latino/Chicano Literature (280-298)
    - Individual Work (299)
- Graduate Seminars (300-399)
  - Iberian Literature (300-339)
  - Latin American and Brazilian Literature (340-379)
  - Chicano Literature (380-398)
  - Individual Work (399)
  - Dissertation Research (802)

Courses bearing the suffix 'E' are taught in English and do not assume competence in another language. All other courses require some knowledge of Spanish or Portuguese, and may be given in those languages or bilingually.

## OVERSEAS STUDIES COURSES IN IBERIAN AND LATIN AMERICAN STUDIES

For course descriptions and additional offerings, see the listings in the *Stanford Bulletin's* ExploreCourses web site (<http://explorecourses.stanford.edu>) or the Bing Overseas Studies web site (<http://bossp.stanford.edu>). Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

### AUTUMN QUARTER

#### MADRID

OSPMADRD 40. Introduction to Literary and Cultural Analysis in the Spanish World. 4-5 units, Santiago Tejerina-Canal, GER:DB:Hum

OSPMADRD 46. Drawing with Four Spanish Masters: Goya, Velázquez, Picasso and Dalí. 3 units, Oscar Sánchez Fuster

OSPMADRD 61. Society and Culture Change: The Case of Spain. 5 units, Antonio Muñoz Carrión

#### SANTIAGO

OSPSANTG 14. Women Writers of Latin America in the 20th Century. 4-5 units, Sergio Missana, GER:DB:Hum, EC:Gender

OSPSANTG 68. The Emergence of Nations in Latin America. 4-5 units, Ivan Jaksic, DB: SocSci  
 OSPSANTG 104X. Modernization and Culture in Latin America. 5 units, Bernardo Subercaseaux, GER:DB:SocSci, EC:GlobalCom

## WINTER QUARTER

### MADRID

OSPMADRD 41. Dissidence and Continuity: Spanish Theater 1907 to the Present. 4-5 units, Santiago Tejerina-Canal, GER:DB:Hum  
 OSPMADRD 45. Women in Art: Case Study in the Madrid Museums. 4 units, Julia Doménech López, GER:DB:Hum, EC:Gender

### SANTIAGO

OSPSANTG 11. Dance and Culture in Latin America. 4 units, Susan Cashion  
 OSPSANTG 14. Women Writers of Latin America in the 20th Century. 4-5 units, Sergio Missana, GER:DB:Hum, EC:Gender  
 OSPSANTG 118X. Artistic Expression in Latin America. 5 units, César Albornoz, GER:DB:SocSci, EC:GlobalCom

## SPRING QUARTER

### MADRID

OSPMADRD 43. The Jacobean Star Way and Europe: Society, Politics and Culture. 5 units, Miguel Larrañaga Zulueta, DB: Hum, EC: GlobalCom  
 OSPMADRD 47. Independent Studies in Modern Peninsular Spanish Literature. 3-5 units, Michael Predmore  
 OSPMADRD 50. Flirting with Spanish Metafiction: Cervantes, Velázquez, Fuentes, Almodóvar. 4-5 units, Santiago Tejerina-Canal  
 OSPMADRD 55. Dissidence and Nationalism in Modern Iberian Literature. 3-5 units, Michael Predmore, DB: Hum  
 OSPMADRD 62. Spanish California: Historical Issues. 5 units, Sylvia Hilton

### SANTIAGO

OSPSANTG 10. Borges and Argentina. 4-5 units, Sergio Missana, GER:DB:Hum  
 OSPSANTG 68. The Emergence of Nations in Latin America. 4-5 units, Ivan Jaksic, DB: SocSci  
 OSPSANTG 116X. Modernization and its Discontents: Chilean Politics at the Turn of the Century. 5 units, German Correa, DB: SocSci

## INDIVIDUALLY DESIGNED MAJORS AND INDIVIDUALLY DESIGNED HONORS PROGRAM IN HUMANITIES

The Individually Designed Major (IDM) is overseen by the Office of Graduate and Undergraduate Studies in the School of Humanities and Sciences. (See the "Individually Designed Majors in Engineering" section of this bulletin for information about the IDM in Engineering.)

The IDM is intended for exceptional undergraduates interested in pursuing an area of study that, by virtue of its focus and intellectual content, cannot be accommodated by existing departmental or programmatic majors. Students must have a minimum GPA of 3.5 and the IDM cannot be a student's secondary major. IDM curricula are designed by students with the assistance of three faculty members of their choice; all advisers must be members of the Academic Council.

Students wishing to pursue an IDM must submit an application detailing the proposed course of study. It is required that students consult with the Office of Graduate and Undergraduate Studies in the School of Humanities and Sciences before submitting an application. IDM programs must meet the following requirements:

1. A minimum of 75 units, with all courses at or above the 100 level.
2. A maximum of 5 units on a credit/no credit basis.
3. A maximum of 8 units in directed reading or independent study, prior approval required.
4. A core sequence in the department of one of the advisers.
5. A WIM course in the department of one of the advisers.
6. None of the units may count towards another major, minor, or other special program.

The proposed major must not be achievable through a major or combination of majors and/or minors already offered by degree-granting departments or programs. IDM students are required to complete a capstone requirement in the form of an honors thesis.

Each application must include the following:

Application Cover Sheet: This form must be signed by three faculty members who agree to serve as advisers. These signatures certify that the faculty endorse the major as described in the proposal and agree to serve as the student's advisers. One faculty member must agree to serve as the primary adviser.

- *Proposal*—Each application should include a detailed statement that describes the proposed major. This statement should make clear the student's motivation for pursuing the major, justify it intellectually, indicate the student's ultimate goal and how the major relates to it, and show how the courses comprising the curriculum make sense. A proposed title for the major should be included. This title, should the proposal be accepted, will appear on the student's diploma and transcript.
- *Proposed Course of Study*—This form should be filled out completely, identifying all courses that will count towards the proposed IDM, including a core course sequence and the course used to meet the University's WIM requirement.
- *Four-Year-Plan*—Submission of a completed four-year study plan that identifies the courses to be taken each quarter to fulfill major and graduation requirements. The courses listed as part of the plan should comprise a well-coordinated sequence.
- *Letter of Recommendation*—A letter of support from the student's primary adviser appraising the proposal in terms of academic value and viability, including assessment of the student's ability to successfully complete the major.

Any changes to a previously approved IDM must be endorsed by the primary adviser and approved by the Office of Graduate and Undergraduate Studies. A request by a student to make changes in his or her approved curriculum must be made sufficiently far in advance so that, should the request be denied, adequate time remains to complete the original, approved curriculum.

The application deadline for IDM proposals is the fifth week of Spring Quarter of the sophomore year. Applications are reviewed only once a year by an IDM Evaluation Committee. Application forms and information about proposal procedures is available at the Office of Graduate and Undergraduate Studies in the School of Humanities and Sciences. Applications should be submitted to Sheila Booth in the Office of Graduate and Undergraduate Studies in the School of Humanities and Sciences, Building 1, Main Quad (2nd Floor).

## INDIVIDUALLY DESIGNED HONORS PROGRAM IN HUMANITIES

The Individually Designed Honors Program (IDHP) in Humanities is overseen by the Office of Graduate and Undergraduate Studies in the School of Humanities and Sciences. This program is available to exceptional students who wish to complete an honors thesis in the Humanities and to have the



notation "Honors in Humanities" recorded on their diplomas and transcripts in addition to their primary degree. This program is also available to students completing an Individually Designed Major. The requirements for the IDHP are as follows:

1. A minimum GPA of 3.5. Students must maintain a 3.5 GPA throughout the course of their Stanford undergraduate career.
2. Students must select two advisers for the honors thesis who are members of the Academic Council, at least one of whom is not from the student's major department. Both faculty members must be from humanities and arts departments.
3. Students majoring in a humanities or arts department must complete 25 additional units in the humanities and arts, chosen from areas outside of the major department. Areas of concentration include arts, literature, history, and philosophy. Courses must be chosen in consultation with the student's advisers, and a potential list of such courses submitted with the proposal.
4. Students majoring in a non-humanities and arts department must complete the equivalent of a minor in one humanities and arts department, and an additional 10 units in another. Winter-Spring IHUM courses may be used to satisfy part of this requirement. Courses must be chosen in consultation with the student's advisers, and a potential list of such courses submitted with the proposal.
5. Students must complete a capstone, majors seminar, or honors seminar in a humanities and arts department.
6. The honors thesis may be taken for a minimum of 5 units up to a maximum of 10 units. These units must be in addition to the requirements above. The student should determine the size and scope of the thesis in consultation with his or her advisers.
7. Students should consult with the Office of Graduate and Undergraduate Studies in the School of Humanities and Sciences before submitting a proposal.
8. All proposals must be submitted no later than the third week of Autumn Quarter in the student's junior year, and preferably by Spring Quarter of the sophomore year. The H&S Curriculum Committee in the Humanities and Arts reviews and approves all proposals.

## DIVISION OF INTERNATIONAL, COMPARATIVE AND AREA STUDIES

*Director:* Andrew Walder

*Advisory Committee:* Vincent Barletta (Iberian and Latin American Cultures), Gordon Chang (History), Judith Goldstein (Political Science), Kathryn Stoner-Weiss (Freeman Spogli Institute for International Studies), Andrew Walder (Sociology), Jeremy Weinstein (Political Science)

*Directors' Committee:* Keith Baker (History), Vincent Barletta (Iberian and Latin American Cultures), Carl Bielefeldt (Religious Studies), Gordon Chang (History), Robert Crews (History), Rodolfo Dirzo (Biology), Amir Eshel (German Studies), Judith Goldstein (Political Science), Thomas Blom Hansen (Anthropology), Paul Harrison (Religious Studies), Abbas Milani (Hoover Institution), Kathryn Stoner-Weiss (Freeman Spogli Institute for International Studies), Andrew Walder (Sociology), Jeremy Weinstein (Political Science), Stephen P. Weitzman (Religious Studies)

*Division Office:* Encina Hall West, second floor

*Mail Code:* 94305-6045

*Web Site:* <http://ica.stanford.edu>

The Division of International, Comparative and Area Studies (ICA) supports research and teaching in the cultures and societies of the world, and studies the problems facing developing societies as they seek to end their poverty and social and economic

inequalities. ICA promotes new centers of teaching excellence in traditional areas of historical and cultural concerns, as well as promoting interdisciplinary activities related to developing new ideas for dealing with fundamental issues of justice, equality, and growth within nation states, cultures, and regions.

The Division of International, Comparative and Area Studies is comprised of research centers, degree granting programs, and religion and cultural centers: Center for African Studies\*; Center for East Asian Studies\*; The Europe Center; Center for Latin American Studies\* ; Center for Russian, East European and Eurasian Studies\*; Center for South Asia; Ford Dorsey Program in International Policy Studies\*; France-Stanford Center for Interdisciplinary Studies; Hamid and Christina Moghadam Program in Iranian Studies; Mediterranean Studies Forum; Program in International Relations\*; Robert H. N. Ho Family Foundation Center for Buddhist Studies at Stanford University; Sohaib and Sara Abbasi Program in Islamic Studies; and the Taube Center for Jewish Studies\*.

Degree granting programs are denoted with an asterisk (\*); the Taube Center for Jewish Studies oversees an Individually Designed Major.

### CENTER FOR AFRICAN STUDIES

*Director:* Jeremy Weinstein

*Office:* Encina Hall West, second floor

*Web Site:* <http://africanstudies.stanford.edu>

The Center for African Studies (CAS) is an interdisciplinary research program. CAS offers an undergraduate minor and certificate, and a Master of Arts (M.A.) degree. For further information, see the "African Studies" section of this bulletin.

### CENTER FOR EAST ASIAN STUDIES

*Director:* Gordon Chang

*Office:* Encina Commons

*Web Site:* <http://ceas.stanford.edu>

The Center for East Asian Studies (CEAS) seeks to increase interdisciplinary communication among faculty, students, and outside scholars whose research, teaching, or study focuses on East Asia. CEAS offers a master's degree program. It sponsors programs that enhance public knowledge and access to the University's East Asia resources.

For further information, see the "East Asian Studies" section of this bulletin.

### THE EUROPE CENTER

*Director:* Amir Eshel

*Office:* Encina East 106

*Web Site:* <http://europeanstudies.stanford.edu>

The Europe Center is a multidisciplinary institute committed to the examination of European society, culture, politics, diplomacy, and security.

### CENTER FOR LATIN AMERICAN STUDIES

*Director:* Rodolfo Dirzo

*Office:* Bolivar House

*Web Site:* <http://las.stanford.edu>

The Center for Latin American Studies at Stanford University (CLAS) offers academic programs for students, coordinates academic conferences and lectures, and fosters interdisciplinary research for students and faculty through fellowships and funding opportunities. The Center offers an undergraduate minor, an interdisciplinary honors program for undergraduates, and a master's degree.

For further information, see the "Center for Latin American Studies" section of this bulletin.

## CENTER FOR RUSSIAN, EAST EUROPEAN AND EURASIAN STUDIES

*Director:* Robert Crews

*Office:* Encina Hall West, second floor

*Web Site:* <http://creees.stanford.edu>

The Center for Russian, East European and Eurasian Studies (CREEES) offers an undergraduate minor and a one-year master's program in interdisciplinary area studies.

For further information, see the "Center for Russian, East European and Eurasian Studies" section of this bulletin.

## CENTER FOR SOUTH ASIA

*Director:* Thomas Blom Hansen

*Office:* Encina Hall West, first floor

*Web Site:* <http://southasia.stanford.edu>

The Center for South Asia (CSA) serves to coordinate and develop Stanford's resources for the study of South Asia across all the disciplines in the School of Humanities and Sciences. It works closely with departments and other units of the University to increase faculty strength, support research, enhance the curriculum, build the library collection, and sponsor programs and events.

## FORD DORSEY PROGRAM IN INTERNATIONAL POLICY STUDIES

*Director:* Kathryn Stoner-Weiss

*Office:* Encina Hall West, second floor

*Web Site:* <http://ips.stanford.edu>

The Ford Dorsey Program in International Policy Studies (IPS) is a two-year master's program that seeks to train the next generation of policy analysts to solve key global problems.

For further information, see the "International Policy Studies" section of this bulletin.

## FRANCE-STANFORD CENTER FOR INTERDISCIPLINARY STUDIES

*Director:* Keith Baker

*Office:* Building 260, room 105

*Web Site:* <http://francestanford.stanford.edu>

The France-Stanford Center for Interdisciplinary Studies, founded in partnership with the French Ministry of Foreign Affairs, aims to bridge the disciplines of the humanities, social sciences, sciences, engineering, business, and law, addressing historical and contemporary issues of significance for France and the United States. The Center brings together Stanford faculty and students and academics in France to advance collaborative research and foster interdisciplinary inquiry. Its programs include conferences, support for collaborative research projects, internships, exchanges, lectures, and seminars.

## HAMID AND CHRISTINA MOGHADAM PROGRAM IN IRANIAN STUDIES

*Director:* Abbas Milani

*Office:* Encina Hall West, second floor

*Web Site:* <http://iranian-studies.stanford.edu>

The Hamid and Christina Moghadam Program in Iranian Studies at Stanford fosters the interdisciplinary study of Iran as a civilization, one of the oldest in the world. The program combines pedagogy, policy analysis, and research on all aspects of Iran's past, present, and future. The program organizes lectures and student research conferences on Iran.

## MEDITERRANEAN STUDIES FORUM

*Interim Director:* Vincent Barletta

*Office:* Encina Hall West, Room 211

*Web Site:* <http://mediterraneanstudies.stanford.edu>

The Mediterranean Studies Forum encourages scholars to explore the interplay among societies, cultures, and communities around the Mediterranean Basin from the Middle Ages to the present. Its focus is on all aspects of co-existence and conflict that have marked these encounters in the empires, port cities, nation states, and transregional and transnational social, religious, cultural, and economic contexts of North Africa, the Levant, the Balkans, and Southern Europe. It is also interested in the relations of the Mediterranean with other regions and areas of the world. The central goal of the forum is to contribute to interfield and interdisciplinary dialogue among scholars of these areas through lectures, colloquia, workshops, conferences, and publications.

## PROGRAM IN INTERNATIONAL RELATIONS

*Interim Director:* Judith Goldstein

*Office:* Encina Hall West, second floor

*Web Site:* <http://internationalrelations.stanford.edu>

International Relations (IR) is an interdisciplinary undergraduate major focusing on changing political, economic, and cultural relations within the international system in the modern era.

For further information, see the "International Relations" section of this bulletin.

## ROBERT H. N. HO FAMILY FOUNDATION CENTER FOR BUDDHIST STUDIES AT STANFORD UNIVERSITY

*Directors:* Carl Bielefeldt, Paul Harrison

*Office:* Building 70, Room 71E

*Web Site:* <http://hcbss.stanford.edu>

The Robert H. N. Ho Family Foundation Center for Buddhist Studies at Stanford University (HCBSS) serves to coordinate, support, and develop the University's resources for Buddhist Studies in scholarly research, academic communication, teaching, and public outreach. The Center supports individual and team research projects for faculty, students, and visiting fellows. It houses a reference collection and reading room and sponsors lectures, conferences, symposia, workshops, and seminars. The Center works closely with the Department of Religious Studies, the Buddhism in the Modern World Program, and the Group in Buddhist Studies at UC Berkeley.

## SOHAIB AND SARA ABBASI PROGRAM IN ISLAMIC STUDIES

*Interim Director:* Vincent Barletta

*Office:* Encina Hall West, Room 211

*Web Site:* <http://islamicstudies.stanford.edu>

The mission of the Sohaib and Sara Abbasi Program in Islamic Studies is to serve as a forum for interdisciplinary research and teaching in Islamic studies, complemented by seminars, colloquia and public lectures. The program seeks to illuminate Islamic history from its beginnings to the 21st century, the religion of Islam in its many aspects, and the diversity of Muslim cultures and societies, past and present, not only in the Middle East but also including South and Southeast Asia, Africa, Europe, and America. In addition to geographical breadth, the program promotes the use of scholarly resources from both the humanities and the social sciences. Participating faculty and students bring perspectives and methods from academic fields including anthropology, art, economics, history, international relations, languages, law, literature, philosophy, political science, and religious studies.

## TAUBE CENTER FOR JEWISH STUDIES

*Director:* Steven Weitzman

*Office:* Building 360, Room 362G

*Web Site:* <http://jewishstudies.stanford.edu>

The interdisciplinary Taube Center for Jewish Studies coordinates and promotes the study of all aspects of Jewish life. The center offers an undergraduate minor and an interdisciplinary major coordinated by the Humanities and Sciences dean's office.

For further information, see the "Jewish Studies" section of this bulletin.

## INTERNATIONAL POLICY STUDIES

*Director:* Kathryn Stoner-Weiss (Freeman Spogli Institute for International Studies)

*Executive Committee Co-chairs:* Coit D. Blacker (Freeman Spogli Institute for International Studies), Andrew Walder (Sociology)

*Executive Committee:* Larry Diamond (Hoover Institution), Nicholas C. Hope (Stanford Institute for Economic Policy Research), Jenny Martinez (Law), Norman Naimark (History), Rosamond Naylor (Freeman Spogli Institute for International Studies), Bruce Owen (Public Policy), Julie Parsonnet (Medicine), Frank Wolak (Economics)

*Lecturers:* Chonira Aturupane, Thomas Fingar, Erica Gould, Christine Jojarth, Anja Manuel, Eric Morris, Joe Nation, Daniel Sneider, David Straub

*Affiliated Faculty:* Mike Armacost (Freeman Spogli Institute for International Studies), Jonathan Bendor (Business), Paul Brest (Law), Jeremy Bulow (Economics), Gordon Chang (History), John Cogan (Hoover Institution), Joshua Cohen (Political Science), Martha Crenshaw (Freeman Spogli Institute for International Studies), Larry Diamond (Hoover Institution), Lynn Eden (Sociology), Walter P. Falcon (Freeman Spogli Institute for International Studies), James Fearon (Political Science), Lawrence Goulder (Economics), Justin Grimmer (Political Science), Stephen H. Haber (Political Science), Deborah Hensler (Law), David J. Holloway (History, Political Science), Joy Ishii (Graduate School of Business), Simon Jackman (Political Science), Seema Jayachandran (Economics), Timothy Josling (Freeman Spogli Institute for International Studies), Terry Karl (Political Science), Daniel P. Kessler (Business), Stephen D. Krasner (Political Science), Gail Lapidus (Freeman Spogli Institute for International Studies), Susanna Loeb (Education), Michael McFaul (Political Science, on leave), Ronald I. McKinnon (Economics), Norman Naimark (History), Rosamond Naylor (Freeman Spogli Institute for International Studies), Jean Oi (Political Science), William Perry (Management Science and Engineering), Rob Reich (Political Science), Douglas Rivers (Political Science), Richard Roberts (History), Lee Ross (Psychology), Scott D. Sagan (Political Science), Stephen J. Stedman (Freeman Spogli Institute for International Studies), Jeff Strnad (Law), Michael Tomz (Political Science), Andrew Walder (Sociology), Allen Weiner (Law), Jeremy Weinstein (Political Science)

*Program Office:* Encina Hall West, Second Floor

*Mail Code:* 94305-6045

*Phone:* (650) 725-9155

*Web Site:* <http://ips.stanford.edu>

Courses offered by the Ford Dorsey Program in International Policy Studies are listed under the subject code IPS on the *Stanford Bulletin's* ExploreCourses web site.

The Ford Dorsey Program in International Policy Studies (IPS) is an analytical interdisciplinary program focusing on international policy analysis. Its goal is to provide students with exposure to issues they will face in international business and public policy, and to develop the skills and knowledge to address those issues. The program allows students to specialize in: democracy, development, and the rule of law; energy, environment, and natural resources; global health; global justice; international negotiation and conflict management; international political economy; or international security and cooperation.

University requirements for the M.A. degree are described in the "Graduate Degrees" section of this bulletin.

### ADMISSION

IPS is designed for students who have an undergraduate background in economics and political science. To enroll in the program, students must have completed prerequisite courses in calculus-based statistics, microeconomics, macroeconomics, international trade and international finance. Stanford courses satisfying these requirements are ECON 51, 52, 102A or POLISCI 150A, and ECON 165 and 166.

To apply or for information on graduate admission, see <http://gradadmissions.stanford.edu>.

Applicants from schools other than Stanford or applicants from Stanford who did not apply in their senior year should submit a graduate admission application including:

- a statement setting forth relevant personal, academic, and career plans and goals
- official transcripts
- three letters of recommendation
- Graduate Record Examination (GRE) scores
- a writing sample of at least eight double-spaced pages
- resume or curriculum vitae
- TOEFL scores are required of applicants for whom English is not their first language or who did not attend an undergraduate institution where English is the language of instruction. Applicants are expected to have a B.A. or B.S. degree from an accredited school.

Applications for admission in Autumn Quarter must be filed with supporting credentials by January 10, 2012.

### COTERMINAL PROGRAM

Undergraduates at Stanford may apply for admission to the coterminal master's program in IPS when they have earned a minimum of 120 units toward graduation, including AP and transfer credit, and no later than the quarter prior to the expected completion of their undergraduate degree. The coterminal application requires the following supporting materials:

- two letters of recommendation from University faculty
  - a writing sample of at least eight double-spaced pages
  - a statement of relevant personal, academic, and career plans and goals.
- Applications must be filed together with supporting materials by January 110 2012.

University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees" section of this bulletin. For University coterminal degree program rules and University application forms, see <http://studentaffairs.stanford.edu/registrar/publications#Coterm>.

### JOINT DEGREE PROGRAM

Students may also choose to pursue a joint J.D./M.A. in IPS degree. The joint degree program supplements the strengths of the Law School with training through IPS. Prospective students interested in the joint J.D./M.A. in IPS program may apply concurrently to both the Stanford Law School and the IPS program. This means that two separate application forms are required and applicants must submit LSAT scores to the Law School and GRE scores to the IPS program.

Students already enrolled at Stanford Law School may apply to the joint J.D./M.A. in IPS program by no later than the end of the second year of Law School. The IPS program will make rolling admissions decisions based on the student's original application materials (GRE scores are not required in addition to LSAT scores in this case). Submission of the following is required for consideration:

- IPS Joint Degree Application Form (available from the IPS web site)

- Law School Joint Degree Petition (available from the Law School Registrar's Office)
  - Graduate Program Authorization Petition (submitted via Axxess)
  - Enrollment Agreement for Students with Multiple Programs (available for download on the University Registrar's forms page)
- For further information, see the "Joint Degree Programs" section of this bulletin and the University Registrar's site.

## MASTER OF ARTS IN INTERNATIONAL POLICY STUDIES

### DEGREE REQUIREMENTS

To receive the M.A. degree in International Policy Studies, students must complete the courses listed below. These requirements entail a minimum of 26 units of policy skills courses, a 10-unit practicum or master's thesis, a 5-unit writing and rhetoric seminar, a 5-unit course in international economics, a 1-unit colloquium, a 3-unit course in international relations theory, and a total of six courses at a minimum of 24 units from the concentration curriculum. Only students with two or more years of relevant policy work experience may petition to write a master's thesis instead of taking the practicum. To obtain the M.A. degree in IPS, students must complete a minimum of 74 units over two years.

The IPS program has the following prerequisites:

- ECON 51
- ECON 52
- ECON 102A or POLISCI 150A
- ECON 165
- ECON 166

### COURSE REQUIREMENTS

*Core Courses—*

1. IPS 300. Issues in International Policy Studies Colloquium (1 unit)
2. IPS 201. Managing Global Complexity (3 units)

*Policy Skills Courses—*

1. POLISCI 350A. Political Methodology I (5 units) and POLISCI 350B. Political Methodology II (5 units) or ECON 102A. Introduction to Statistical Methods for Social Scientists (5 units) and ECON 102B. Introduction to Econometrics (5 units)
2. IPS 208. Justice (4 units) or POLISCI 336. Global Justice (5 units)
3. IPS 221. International Political Economy and International Organizations: Theory and Practice (4-5 units) or SOC 260. Formal Organizations (5 units)
4. IPS 207A. Judgment and Decision Making (4 units) or IPS 207B. Public Policy and Social Psychology: Implications and Applications (4 units)
5. Those concentrating in international political economy must choose one of the following:
  - IPS 204A. Microeconomics (4 units)
  - IPS 204B. Cost-Benefit Analysis and Evaluation (4 units)

Those not concentrating in international political economy must choose one of the following:

- IPS 204A. Microeconomics (4 units)
- IPS 204B. Cost-Benefit Analysis and Evaluation (4 units); *must petition and have strong microeconomic background*
- IPS 202 (5 units) or IPS 203 (5 units); take whichever course is not taken for the international economics requirement

*Writing and Rhetoric Seminar—*One of the following (5 units):

- IPS 210. The Politics of International Humanitarianism
- IPS 211. The Transition from War to Peace: Peacebuilding Strategies
- IPS 213. International Mediation and Civil Wars

- IPS 244. US Policy Toward Northeast Asia
- IPS 314S. Decision Making in U.S. Foreign Policy

*International Economics Seminar—*One of the following (5 units):

- IPS 202. Topics in International Macroeconomics
- IPS 203. Issues in International Economics

*Practicum or Thesis—*One of the following (10 units):

- IPS 209. Practicum
- IPS 209A. Master's Thesis. The student must petition and receive program director approval to take this course.

*Area of Concentration Curriculum—*Students are required to choose one area of concentration from the list below and complete a total of six courses within the concentration at a minimum of 24 total units. Each area of concentration has a gateway course, which must be taken during the first year and prior to enrolling in subsequent courses. Additionally, each area of concentration has a list of approved courses (see list below).

- Democracy, Development, and Rule of Law  
*Gateway course:* IPS 230. Democracy, Development, and Rule of Law (5 units)
- Energy, Environment, and Natural Resources  
*Gateway course:* CEE 207A. Energy Resources (4-5 units)
- Global Health  
*Gateway course:* HUMBIO 129S. Global Public Health (4 units)
- International Negotiation and Conflict Management  
*Gateway courses:* IPS 250. International Conflict: Management and Resolution (3 units) and IPS 250A. International Conflict Resolution Colloquium (1 unit)
- International Political Economy  
*Gateway course:* IPS 202. Topics in International Macroeconomics (5 units) and IPS 203. Issues in International Economics (5 units); one course counts towards international economics requirement
- International Security and Cooperation  
*Gateway course:* IPS 241. International Security in a Changing World (5 units)

*Language Requirement—*Proficiency in a foreign language is required and may be demonstrated by completion of three years of university-level course work in a foreign language or by passing an oral and written proficiency examination prior to graduation. International students who speak English as a second language already meet this requirement.

*Grade Requirements—*All courses to be counted toward the degree, except IPS 300, must be taken for a letter grade. An overall GPA of 3.0 must be maintained.

*Additional Academic Requirements—*

1. Students are not required to repeat a course that duplicates material they have already mastered. Students, may, by petition and approval, substitute a different course for a core requirement whose material would be duplicative. This flexibility does not reduce the unit requirements for the M.A. degree.
2. All graduate degree candidates must submit a Master's Degree Program Proposal to the International Policy Studies office by the end of Autumn Quarter; this document must be on file in order to apply to graduate.

### COGNATE COURSES

The courses listed below fulfill elective requirements within the various areas of concentration. Not all courses are applicable for every area of concentration. Additional relevant courses may be offered. For course descriptions, see ExploreCourses.

- ANTHRO 109/209. Archaeology: World Cultural Heritage
- ANTHRO 277. Environmental Change and Emerging Infectious Diseases (same as HUMBIO 114)
- ANTHRO 336. Anthropology of Rights
- ANTHRO 356. The Anthropology of Development

- BIO 180/280. Fundamentals of Sustainable Agriculture (same as EARTHYSYS 280)
- BIO 247. Controlling Climate Change in the 21st Century (same as EARTHYSYS 247, HUMBIO 116)
- BIOMEDIN 432. Analysis of Costs, Risks, and Benefits of Health Care (same as MGTECON 332, HRP 392)
- CEE 242A. Creating Sustainable Development
- CEE 265A. Sustainable Water Resources Development
- CEE 265C. Water Resources Management
- CEE 265D. Water and Sanitation in Developing Countries
- CEE 275A. Law and Science of California Coastal Policy (same as EARTHYSYS 275)
- COMM 336G. Democracy, Justice, and Deliberation
- COMM 338. Democratic Theory: Normative and Empirical Issues
- COMM 344. Democracy, Press, and Public Opinion
- ECON 106. World Food Economy
- ECON 127. Economics of Health Improvement in Developing Countries (same as MED 262)
- ECON 214. Development Economics I
- ECON 216. Development Economics II
- ECON 265. International Economics I
- ECON 266. International Economics II
- GES 253. Petroleum Geology and Exploration
- HISTORY 102. The History of the International System
- HISTORY 227/327. East European Women and War in the 20th Century
- HISTORY 257/347. The Politics and Ethics of Modern Science and Technology (same as STS 221)
- HISTORY 304G. War, Culture, and Society in the Modern Age
- HISTORY 326G. Civilians and War in Modern Europe
- HISTORY 378A. The Logic of Authoritarian Government, Ancient and Modern
- HISTORY 391E. Maps, Borders, and Conflict in East Asia
- HRP 207. Introduction to Concepts and Methods in Health Services and Policy Research I
- HRP 208. Introduction to Concepts and Methods in Health Services and Policy Research II
- HRP 212. Crosscultural Medicine
- HRP 231. Epidemiology of Infectious Diseases
- HUMBIO 122S. Social Class, Race, Ethnicity, Health (same as SOC 141A)
- HUMBIO 153. Parasites and Pestilence: Infectious Public Health Challenges
- INTNLREL 140C. The U.S., U.N. Peacekeeping, and Humanitarian War
- LAW 330. International Human Rights
- LAW 336. International Jurisprudence
- LAW 338. Land Use
- LAW 407. International Deal Making: Legal and Business Aspects
- LAW 605. International Environmental Law: Climate Change
- MED 242. Physicians and Human Rights
- MGTECON 331. Political Economy of Health Care in the United States (same as HRP 391, PUBLPOL 231)
- MS&E 243. Energy and Environmental Policy Analysis (same as IPER 243)
- MS&E 248. Economics of Natural Resources
- MS&E 294. Climate Policy Analysis
- PHIL 176/276. Political Philosophy: The Social Contract Tradition
- POLISCI 110B. Strategy, War, and Politics
- POLISCI 110D/110Y. War and Peace in American Foreign Policy
- POLISCI 113F. The United Nations and Global Governance
- POLISCI 116. History of Nuclear Weapons (same as HISTORY 103E)
- POLISCI 134. Democracy and the Communication of Consent (same as COMM 236)
- POLISCI 215. Explaining Ethnic Violence
- POLISCI 216E/316. International History and International Relations Theory (same as HISTORY 202/306E)
- POLISCI 218. U.S. Relations in Iran
- POLISCI 221. Tolerance and Democracy
- POLISCI 223S. The Imperial Temptation: U.S. Foreign Policy in a Unipolar World
- POLISCI 231S. Contemporary Theories of Justice
- POLISCI 236. Theories of Civil Society, Philanthropy, and the Nonprofit Sector
- POLISCI 336. Justice (same as PHIL 271)
- POLISCI 348R. Workshop: China Social Science (same as SOC 368W)
- POLISCI 440B. Political Economy of Development (same as HISTORY 378E)
- PSYCH 215. Mind, Culture, and Society
- SOC 141/241. Controversies about Inequality
- SOC 210. Politics and Society
- SOC 218. Social Movements and Collective Action
- SOC 240. Introduction to Social Stratification
- SOC 247A. Comparative Ethnic Conflict
- SOC 314. Economic Sociology
- SOC 345. Seminar in Comparative Race and Ethnic Relations
- STS 210. Ethics, Science, and Technology

## INTERNATIONAL RELATIONS

*Interim Director:* Judith Goldstein (Political Science)

*Faculty Committee:* Kyle Bagwell (Economics), Larry J. Diamond (Freeman Spogli Institute for International Studies), Zephyr Frank (History), Judith L. Goldstein (Political Science), Stephen H. Haber (Political Science), Rosamond Naylor (Freeman Spogli Institute for International Studies), Kenneth Schultz (Political Science), Michael Tomz (Political Science)

*Affiliated Faculty:* David Abernethy (Political Science, emeritus), Barton Bernstein (History, emeritus), Gordon Chang (History), Larry J. Diamond (Hoover Institution), Peter Duus (History, emeritus), Amir Eshel (German Studies), James Fearon (Political Science), Zephyr Frank (History), Lawrence H. Goulder (Economics), David J. Holloway (History, Political Science), Terry L. Karl (Political Science), David M. Kennedy (History, emeritus), Stephen D. Krasner (Political Science), Gail Lapidus (Freeman Spogli Institute for International Studies, emerita), Philip Lipsky (Political Science), Beatriz Magaloni (Political Science), Mark I. Mancall (History, emeritus), Robert McGinn (Management Science and Engineering), Norman Naimark (History), Rosamond Naylor (Freeman Spogli Institute for International Studies), Jean C. Oi (Political Science), Daniel I. Okimoto (Political Science, emeritus), William J. Perry (Freeman Spogli Institute for International Studies, Management Science and Engineering), Richard Roberts (History), Jonathan Rodden (Political Science), Scott Sagan (Political Science), Debra M. Satz (Philosophy), Andrew Walder (Sociology), Amir Weiner (History), Jeremy Weinstein (Political Science)

*Other Affiliation:* Jasmina Bojic (International Relations), Christophe Crombez (Freeman Spogli Institute for International Studies), Rafiq Dossani (Freeman Spogli Institute for International Studies), Gili S. Drori (International Relations), John Dunlop (Hoover Institution), Katherine Jolluck (History), Anjini Kochar (Stanford Institute for Economic Policy Research), Martin W. Lewis (History), Pawel Lutomski (International Relations), Alice Lyman Miller (Hoover

Institution), Thomas O'Keefe (International Relations), Bertrand Patenaude (Hoover Institution), Armin Rosencranz, Miriam Abu Sharkh (CDDRL), Stephen Stedman (Political Science), Richard Steinberg (International Comparative and Area Studies), Kathryn Stoner-Weiss (Freeman Spogli Institute for International Studies)

*Program Office:* Encina Hall West, Room 216  
*Mail Code:* 94305-6045  
*Phone:* (650) 725-0715  
*Web Site:* <http://internationalrelations.stanford.edu>

Courses offered by the Program in International Relations are listed under the subject code INTNLREL on the *Stanford Bulletin's* ExploreCourses web site.

International Relations (IR) is an interdisciplinary undergraduate major focusing on the changing political, economic, and cultural relations within the international system in the modern era. The program explores how global, regional, and domestic factors influence relations among world actors. Students are equipped with the skills and knowledge necessary to analyze choices and challenges that arise in this arena. IR majors pursue a study in world politics that includes courses in political science, economics, history, and languages, focusing on issues such as international security, international political economy, political and economic development, and democratization. Students must spend at least one quarter overseas and show two-year proficiency in a foreign language.

International Relations offers an undergraduate Bachelor of Arts program, an honors program, and a minor in International Relations.

## MISSION OF THE UNDERGRADUATE PROGRAM IN INTERNATIONAL RELATIONS

The undergraduate program in International Relations provides an interdisciplinary approach to the study of the changing political, economic, and cultural relations within the international system of the modern era. Students in the program explore how global, regional, and domestic factors influence relations among world actors. The program equips students with the skills and knowledge necessary to analyze choices and challenges that arise in this arena. IR majors pursue study in world politics, including courses in political science, economics, history, and language, focusing on issues such as international security, political economy, economic development, and democratization. Students must spend at least one quarter overseas. The major prepares students for careers in government and the corporate sector, and for admission into graduate programs in law, business, economics, and political science.

## LEARNING OUTCOMES

The program expects its undergraduate majors to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the Program in International Relations. Students are expected to demonstrate:

1. understanding of core knowledge within International Relations.
2. ability to analyze a problem and draw correct inferences using qualitative and/or quantitative analysis.
3. ability to write clearly and persuasively, communicating ideas clearly.
4. ability to evaluate theory and critique research within the discipline.

## COTERMINAL PROGRAMS IN RELATED FIELDS

It is possible for students majoring in International Relations to work simultaneously for a coterminal master's degree in a number of related fields. Coterminal students should consult advisers in both departments or programs to ensure that they fulfill the degree

requirements in both fields. For information on the M.A. program in International Policy Studies, see the "International Policy Studies" section in this bulletin. University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees" section of this bulletin. For University coterminal degree program rules and University application forms, see <http://studentaffairs.stanford.edu/registrar/publications#Coterm>.

## BACHELOR OF ARTS IN INTERNATIONAL RELATIONS

The International Relations major must be declared no earlier than the beginning of sophomore year and no later than the end of the second quarter of the junior year. Students must submit an acceptable proposal to the director of the program and declare IR on Axess. Students completing a double major, or fulfilling International Relations as a secondary major, are also required to file a proposal by the end of the second quarter of the junior year.

Requirements for the major (70 units) are as follows; IR core courses are listed in items 1-5:

1. POLISCI 1
2. POLISCI 110A or 110B or 110C or 110D or HISTORY 158
3. ECON (10 units), two of these five courses: ECON 1A, 1B, 50, 51, 52
4. Two additional upper-division courses with strong economic components from the IR approved course offerings lists
5. At least one of the following skills classes: ECON 102A, POLISCI 150A, STATS 60
6. Complete either a functional specialization or an area specialization (see below for descriptions of specializations). Courses that are used in the core area (1-5 above) cannot also be counted for the specialization.
7. At least one course must be an upper-division seminar or colloquium.
8. At least one writing intensive course designated as Writing in the Major (WIM) for International Relations.
9. No more than 20 units can be lower-division courses.
10. A minimum grade of 'C' is required for courses to count towards major requirements.
11. Completion of one quarter study overseas either through the Stanford Overseas Studies Program or an approved non-Stanford program; non-Stanford programs must be pre-approved by the IR program before the student enrolls in the program.
12. Proficiency in a foreign language through two years of course work (second-year, third-quarter) or a proficiency exam.

## FUNCTIONAL SPECIALIZATION

The three functional specializations are:

1. Comparative Political and Historical Analysis (CPHA)
  2. Comparative Culture and Society (CCAS)
  3. Comparative and International Political Economy (CIPE)
- Students must complete a total of seven courses (35 units) for their functional specialization. Four courses must be from the student's functional area (CPHA, CCAS, CIPE); two courses from a second track; and the final course from the third track (4-2-1). Functional specializations are not declared on Axess.

The following courses are approved for each functional specialization. Updated lists are made available every quarter on the web and they are also available in the International Relations office.

- COMPARATIVE POLITICAL AND HISTORICAL ANALYSIS (CPHA)**  
 INTNLREL 114D. Democracy, Development, and the Rule of Law  
 INTNLREL 116. Politics of Divided Korea  
 INTNLREL 120. Terrorism and Security in Israel  
 INTNLREL 125. Japanese Postwar Politics  
 INTNLREL 131. Globalization and Organizations  
 INTNLREL 136R. Introduction to GLObal Justice  
 INTNLREL 140A. International Law and International Relations

INTNLREL 140B. Theories of International Law  
 INTNLREL 163. History and Geography of Contemporary Global Issues  
 INTNLREL 170. Energy and the Climate  
 COMM 177K. Specialized Writing and Reporting - Human Rights Reporting  
 EASTASN 189K. Politics of Divided Korea  
 HISTORY 102. The History of the International System (WIM)  
 HISTORY 120C. 20th-Century Russian and Soviet History  
 HISTORY 123. Reform and Revolution in Modern Russia, 1856-2008  
 HISTORY 125. 20th-Century Eastern Europe  
 HISTORY 137/337. The Holocaust  
 HISTORY 145B. Africa in the 20th Century  
 HISTORY 150C. The United States in the Twentieth Century  
 HISTORY 158. The United States Since 1945  
 HISTORY 181B. The Middle East in the 20th Century  
 HISTORY 195. Modern Korean History  
 HISTORY 195C. Modern Japanese History  
 HISTORY 197. Southeast Asia: From Antiquity to the Modern Era  
 HISTORY 198. The History of Modern China  
 HISTORY 202/306E. International History and International Relations  
 HISTORY 224/324. Violence, Islam, and the State in Central Asia  
 HISTORY 224A/324A. Modern Russia, Iran, and Afghanistan  
 HISTORY 228/328. Circles of Hell: Poland in World War II  
 HISTORY 252/355. Decision Making in International Crises: The A-Bomb, the Korean War, and the Cuban Missile Crisis  
 HISTORY 256/356. U.S.-China Relations: From the Opium War to Tiananmen  
 IPS 210. The Politics of International Humanitarian Action  
 IPS 211. The Transition from War to Peace: Peacebuilding Strategies  
 IPS 219. The Role of Intelligence in U.S. Foreign Policy  
 IPS 220. The US, Europe and the World  
 IPS 243. Missile Defense  
 MS&E 93Q. Nuclear Weapons, Terrorism and Energy  
 MS&E 193/193W/293. Technology and National Security  
 POLISCI 110B. Strategy, War, and Politics  
 POLISCI 110D/110Y. War and Peace in American Foreign Policy  
 POLISCI 111D. British Politics  
 POLISCI 113F. The United Nations and Global Governance  
 POLISCI 114S. International Security in a Changing World  
 POLISCI 116. History of Nuclear Weapons (Same as HISTORY 103E)  
 POLISCI 140L. China in World Politics  
 POLISCI 144T. Democracies and Dictatorships  
 POLISCI 147. Comparative Democratic Development  
 POLISCI 147S. Comparative Democratic Politics  
 POLISCI 148/348. Chinese Politics: The Transformation and the Era of Reform  
 POLISCI 149S. Islam and the West  
 POLISCI 149T. Middle Eastern Politics  
 POLISCI 210C. Globalizations and Discontents  
 POLISCI 212. Managing Global Complexity (Same as IPS 201)  
 POLISCI 217. International Organizations  
 POLISCI 218. U.S. Relations in Iran  
 POLISCI 245R. Politics in Modern Iran  
 POLISCI 248. Mexican Politics  
 POLISCI 248S. Latin American Politics  
 POLISCI 346S. The Logic of Authoritarian Government, Ancient and Modern  
 SOC 167A/267A. Asia-Pacific Transformation

#### COMPARATIVE CULTURE AND SOCIETY (CCAS)

INTNLREL 114D. Democracy, Development, and the Rule of Law  
 INTNLREL 141A. Camera as a Witness  
 INTNLREL 161A. Global Human Geography: Asia and Africa  
 INTNLREL 161B. Global Human Geography: Europe and Americas

INTNLREL 165A. Global Governance and Human Rights  
 INTNLREL 166. Russia and Islam  
 AFRICAST 111/211. Education for All? The Global and Local in Public Policy Making in Africa  
 AFRICAST 107. Community Restructuring and Development in South Africa  
 CASA 77/277. Japanese Society and Culture  
 EASTASN 118. History, Memory and Citizenship in East Asia  
 ECON 143. Ethics in Economics Policy  
 EDUC 136/306D. World, Societal, and Educational Change: Comparative Perspectives  
 HISTORY 185B. Jews in the Modern World  
 HISTORY 221B. The Woman Question in Modern Russia  
 HISTORY 227/327. East European Women and War in the 20th Century  
 HISTORY 245E/347E. Health and Society in Africa  
 HISTORY 248S/448A. African Societies and Colonial States  
 HISTORY 295J. Chinese Women's History  
 IPS 210. The Politics of International Humanitarian Action  
 IPS 221B. Citizenship and Immigration  
 JAPANGEN 51/251. Japanese Business Culture  
 PHIL 171/271. Justice (Same as ETHICSOC 171, IPS 208, POLISCI 136S, PUBLPOL 207)  
 POLISCI 141. The Global Politics of Human Rights  
 POLISCI 149S. Islam and the West  
 POLISCI 215. Explaining Ethnic Violence  
 SOC 110/210. Politics and Society  
 SOC 111/211. State and Society in Korea  
 SOC 117A/217A. China Under Mao  
 STS 110. Ethics and Public Policy (Same as MS&E 197, PUBLPOL 103B)

#### COMPARATIVE AND INTERNATIONAL POLITICAL ECONOMY (CIPE)

INTNLREL 114D. Democracy, Development, and the Rule of Law  
 INTNLREL 115. Development Issues in South Asia  
 INTNLREL 117. Varieties of Capitalism in East Asia: Politics and Economic Reforms  
 INTNLREL 118. The Political Economy of Modern Iran  
 INTNLREL 122A. The Political Economy of the European Union  
 INTNLREL 130. Science, Technology, and Development  
 INTNLREL 133. Introduction to Comparative and International Political Economy  
 INTNLREL 143. Nongovernmental Organizations and Development in Poor Countries  
 INTNLREL 147. The Political Economy of the Southern Cone of South America  
 INTNLREL 148. Economic Integration of the Americas  
 INTNLREL 149. The Economics and Political Economy of the Multilateral Trade System  
 BIO 147/247. Controlling Climate Change in the Twenty-First Century  
 EASTASN 183C. Doing Business in China  
 EASTASN 185C/285C. Economic Development of Greater China: Past, Present, and Future  
 ECON 106. World Food Economy  
 ECON 111. Money and Banking  
 ECON 113. Technology and Economic Change  
 ECON 115. European Economic History  
 ECON 117. Economic History and Modernization of the Islamic Middle East  
 ECON 118. Development Economics  
 ECON 120. Socialist Economies in Transition  
 ECON 122. Economic Development of Latin America  
 ECON 124. Contemporary Japanese Economy  
 ECON 126. Economics of Health and Medical Care (Same as BIOMEDIN 156/256)  
 ECON 150. Economic Policy Analysis (Same as PUBLPOL 104)  
 ECON 155. Environmental Economics and Policy (Same as EARTHSYS 112)

ECON 162. Monetary Economics  
 ECON 165. International Trade and Finance  
 ECON 166. International Trade  
 ECON 167. European Monetary and Economic Integration  
 ECON 169/269. International Financial Markets and Monetary Institutions  
 HISTORY 279/379. Latin American Development: Economy and Society, 1800-2000  
 HUMBIO 129. Critical Issues in International Women's Health  
 HUMBIO 129S. International Health  
 IPS 222. Economic Development  
 POLISCI 110A. Sovereignty and Globalization  
 POLISCI 110C/110X. America and the World Economy (110C fulfills WIM)  
 POLISCI 140. Political Economy of Development  
 POLISCI 211. Political Economy of East Asia  
 POLISCI 213R. Political Economy of Financial Crisis  
 POLISCI 216. Law, Economics, and Politics of International Trade (Same as LAW 306)  
 POLISCI 242S. Politics of Welfare State Expansion and Reform  
 POLISCI 247R. Politics and Economics in Democracies (WIM)

#### 1- and 2-unit options

INTNLREL 191. International Relations Journal

#### INDEPENDENT STUDY/HONORS

INTNLREL 197. Directed Reading in International Relations—open only to declared International Relations majors.  
 INTNLREL 198. Senior Thesis—open only to declared International Relations majors with approved senior thesis proposals.  
 INTNLREL 199. Honors Research: Democracy, Development, and the Rule of Law in Developing Countries  
 INTNLREL 200A. International Relations Honors Field Research  
 INTNLREL 200B. International Relations Honors Seminar

#### AREA SPECIALIZATION

The area specializations are: Africa, Europe, Latin America, and Russia/East Europe. Students must complete a total of seven courses (35 units) with five courses directly related to their area specialization. Three of these five courses must be in one of the three tracks (CPHA, CCAS, CIPE), one course in a second track, and the final course in the third track. The ten remaining units must be fulfilled by comparative or further area course work.

Students must also demonstrate proficiency in a language, other than English, commonly spoken in the area chosen, by completing two years of language study or by passing a second-year, third-quarter proficiency exam.

Check the IR office for updated information about the area specialization requirements. Area specializations are not declared on Axess.

#### HONORS PROGRAM

The International Relations honors program offers qualified students the opportunity to conduct a major independent research project under faculty guidance. Such a project requires a high degree of initiative and dedication, significant amounts of time and energy, and demonstrated skills in research and writing.

In their junior year, students should consult with prospective honors advisers, choose the courses that provide academic background in their areas of inquiry, and demonstrate an ability to conduct independent research. Students can select from the IR honors option or the CDDRL (Center on Democracy, Development, and the Rule of Law) option which focuses on issues of democracy, development, and the rule of law; for information on the CDDRL, see <http://cddrl.stanford.edu>.

Students should submit their honors thesis proposal late in Winter Quarter of the junior year; check with IR office for the exact deadline.

Prerequisites for participation include a 3.5 grade point average (GPA), a strong overall academic record, good academic standing, successful experience in writing a research paper, and submission

of an acceptable thesis proposal. Students are required to enroll in INTNLREL 200A, International Relations Honors Field Research, in Spring Quarter of their junior year and consider participating in Honors College. CDDRL option students should enroll in INTNLREL 199, Honors Research: Democracy, Development, and the Rule of Law in Developing Countries. In their senior year, honors students must enroll in INTNLREL 200B in Autumn Quarter and in research units each quarter with their faculty adviser. Honors students present a formal defense of their theses in mid-May. Students must receive at least a grade of 'B+' in order to graduate with honors in International Relations.

## MINOR IN INTERNATIONAL RELATIONS

A minor in International Relations is intended to provide an interdisciplinary background allowing a deeper understanding of contemporary international issues. Declaration of the minor must take place no later than the end of the second quarter of the junior year. To declare, complete the application for a minor on Axess.

Students complete the minor by taking seven unduplicated courses (35 units) from the IR curriculum, including the following:

1. POLISCI 1
2. Two of these five courses: POLISCI 110A,B,C,D, or HISTORY 158
3. Four courses from one of the three major tracks (CPHA, CCAS, CIPE), or four courses relating to the same geographic region (Africa, Europe, Latin America, and Russia/East Europe).

## OVERSEAS STUDIES COURSES IN INTERNATIONAL RELATIONS

For course descriptions and additional offerings, see the listings in the *Stanford Bulletin's* ExploreCourses web site (<http://explorecourses.stanford.edu>) or the Bing Overseas Studies web site (<http://bosp.stanford.edu>). Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

### AUTUMN QUARTER

#### BEIJING

- OSPBEIJ 24. China's Economic Development. 5 units, Scott Rozelle, GER:DB:SocSci
- OSPBEIJ 42. Chinese Media Studies. 4 units, Kun Li, GER:DB:SocSci
- OSPBEIJ 66. Essentials of China's Criminal Justice System. 5 units, Shizhou Wang, GER:DB:SocSci, EC:GlobalCom
- OSPBEIJ 67. China-Africa and Middle East Relations. 4 units, Anshan Li, Suolao Wang

#### BERLIN

- OSPBER 34. Science, Medicine, and Technology in Nazi Germany. 3-5 units, David Holloway
- OSPBER 115X. German Economy: Past and Present. 4-5 units, Ingo Klein, GER:DB:SocSci, EC:GlobalCom

#### FLORENCE

- OSPFLOR 35. European Economic and Monetary Integration. 5 units, Pompeo Della Posta, GER:DB:SocSci, EC:GlobalCom
- OSPFLOR 106V. Italy: From an Agrarian to a Post-industrial Society. 5 units, Giuseppe Mammarella, GER:DB:SocSci, EC:GlobalCom

#### MADRID

- OSPMADR 54. Contemporary Spanish Economy and the European Union. 5 units, Miguel Buñuel, GER:DB:SocSci
- OSPMADR 61. Society and Cultural Change: The Case of Spain. 5 units, Antonio Muñoz



**MOSCOW**

- OSPMOSC 62. Economic Reform and Economic Policy in Modern Russia. 5 units, Vladimir Mau, Vadim Novikov, GER:DB:SocSci, EC:GlobalCom
- OSPMOSC 72. Space, Politics and Modernity in Russia. 5 units, Sergei Medvedev, GER:DB:SocSci, EC:GlobalCom
- OSPMOSC 74. Post-Soviet Eurasia and SCO: Society, Politics, Integration. 5 units, Maxim Bratersky, Sergey Kortunov, GER:DB:SocSci, EC:GlobalCom
- OSPMOSC 78. Russian-American Relations: From the War of Independence to the War on Terror. 5 units, Edward A. Ivanian, GER:DB:SocSci

**OXFORD**

- OSPOXFRD 35. Modern UK and European Government and Politics. 4-5 units, Giovanni Cappocia, GER:DB:SocSci
- OSPOXFRD 45. British Economic Policy Since World War II. 5 units, James Forder, GER:DB:SocSci

**PARIS**

- OSPPARIS 29. Colonization, Decolonization and Immigration: An Overview of French Global History in the 20th Century. 5 units, Choukri Hmed, GER:DB:SocSci, EC:GlobalCom
- OSPPARIS 32. Understanding French Politics. 4-5 units, Patrick Chamorel, GER:DB:SocSci
- OSPPARIS 124X. Building the European Economy: Economic Policies and the Challenges Ahead. 5 units, Jacques Le Cacheux, GER:DB:SocSci
- OSPPARIS 153X. Health Systems and Health Insurance: France and the U.S.—a Comparison. 4-5 units, Jean-Marie Fessler, GER:DB:SocSci, EC:GlobalCom

**SANTIAGO**

- OSPSANTG 68. The Emergence of Nations in Latin America. 4-5 units, Ivan Jaksic, GER:DB:SocSci
- OSPSANTG 104X. Modernization and Culture in Latin America. 5 units, Bernardo Subercaseaux, GER:DB:SocSci, EC:GlobalCom
- OSPSANTG 130X. The Chilean Economy in Comparative Perspective. 5 units, Cristóbal Aninat, GER:DB:SocSci
- OSPSANTG 221X. Political Transition and Democratic Consolidation: Chile in Comparative Perspective. 5 units, Sergio Micco, GER:DB:SocSci

**WINTER QUARTER****BERLIN**

- OSPBER 15. Shifting Alliances? The European Union and the US. 4-5 units, Uli Brückner, GER:DB:SocSci, EC:GlobalCom
- OSPBER 26. Germany in Europe. 5 units, Philippe Buc
- OSPBER 62. Shades of Green: Environmental Policy in Germany and the U.S. in Historical Perspective. 5 units, Sylke Tempel, GER:DB:SocSci
- OSPBER 161X. The German Economy in the Age of Globalization. 4-5 units, Ingo Klein, GER:DB:SocSci, EC:GlobalCom

**CAPETOWN**

- OSPCPTWN 32. Adult Learning, Development and Social Change: Service-Learning in the Contemporary South African Context. 4-5 units, Janice McMillan
- OSPCPTWN 33. From Apartheid to Democracy: Namibia and South Africa. 4 units, Chris Saunders
- OSPCPTWN 38. Genocide: The African Experience. 3 units, Mohamed Adhikari

**FLORENCE**

- OSPFLOR 49. The Cinema Goes to War: Fascism and World War II As Represented in Italian and European Cinema. 5 units, Ermelinda Campani, GER:DB:Hum
- OSPFLOR 79. Migrations and Migrants: The Sociology of a New Phenomenon. 5 units, Khaled Fouad Allam, GER:DB:SocSci, EC:GlobalCom

**MADRID**

- OSPMADR 42. A European Model of Democracy: The Case of Spain. 5 units, Francisco Javier Bobillo de la Peña, GER:DB:SocSci
- OSPMADR 72. Issues in Bioethics Across Cultures. 5 units, Pablo de Lora del Toro

**OXFORD**

- OSPOXFRD 13. Politics and Economics of the Euro Zone. 5 units, Judith Goldstein, GER:DB:SocSci
- OSPOXFRD 18. Making Public Policy: An Introduction to Political Philosophy, Politics and Economics. 4-5 units, Robert McMahon, GER:DB:SocSci
- OSPOXFRD 92. Britain in the Second World War. 5 units, Geoffrey Tyack
- OSPOXFRD 117W. Gender and Social Change in Modern Britain. 4-5 units, Amanda Palmer, GER:DB:SocSci, EC:GlobalCom

**PARIS**

- OSPPARIS 57. Human Rights in Comparative Perspective. 4-5 units, Laurie Boussaguet, GER:DB:SocSci, EC:GlobalCom
- OSPPARIS 81. France During the Second World War: Between History and Memory. 5 units, Fabrice Virgili, GER:DB:SocSci
- OSPPARIS 91. Globalization and its Effect on France and the European Union. 5 units, Eloi Laurent, Jacques Le Cacheux, GER:DB:SocSci, EC:GlobalCom

**SANTIAGO**

- OSPSANTG 129X. Latin America in the International System. 4-5 units, Claudio Fuentes, GER:DB:SocSci
- OSPSANTG 130X. The Chilean Economy in Comparative Perspective. 5 units, Cristóbal Aninat, GER:DB:SocSci

**SPRING QUARTER****BEIJING**

- OSPBEIJ 19. Population and Society in East Asia. 4 units, Yun Zhou, GER:DB:SocSci, EC:GlobalCom
- OSPBEIJ 41. Chinese Society and Business Culture. 4 units, Bobai Li, GER:DB:SocSci, EC:GlobalCom
- OSPBEIJ 46. Introduction to Chinese Economy. 5 units, Dong Chen, GER:DB:SocSci, EC:GlobalCom

**BERLIN**

- OSPBER 126X. A People's Union? Money, Markets, and Identity in the EU. 4-5 units, Uli Brückner, GER:DB:SocSci, EC:GlobalCom
- OSPBER 174. Sports, Culture and Gender in Comparative Perspective. 5 units, Wolf-D. Junghanns, GER:DB:SocSci, EC:Gender

**CAPETOWN**

- OSPCPTWN 32. Adult Learning, Development and Social Change: Service-Learning in the Contemporary South African Context. 4-5 units, Janice McMillan
- OSPCPTWN 40. Education in the Post-Apartheid City. 4 units, Aslam Fataar

- OSPCPTWN 44. Negotiating Home, Citizenship and the South African City. 4 units, Sophie Oldfield, GER:DB:SocSci, EC:GlobalCom
- OSPCPTWN 52. The Ethics of Imperialism. 5 units, James Daughton, GER:DB:Hum

#### FLORENCE

- OSPFLOR 78. An Extraordinary Experiment: Politics and Policies of the "New" European Union. 5 units, Leonardo Morlino, GER:DB:SocSci, EC:GlobalCom

#### KYOTO

- OSPKYOTO 60. Japan in World War II: Experience and Memory. 5 units, Peter Duus, Andras Horvat
- OSPKYOTO 215X. Political Economy of Japan. 4-5 units, Toshihiko Hayashi, GER:DB:SocSci

#### MADRID

- OSPMADR 57. Health Care: A Contrastive Analysis between Spain and the U.S. 5 units, Pablo de Lora del Toro, GER:DB:SocSci

#### OXFORD

- OSPOXFRD 24. British and American Constitutional Systems in Comparative Perspective. 4-5 units, Robert McMahon, GER:DB:SocSci

#### PARIS

- OSPPARIS 33. The Economics of Climate Change: Policies in Theory and in Practice in the EU and the US. 5 units, Christian de Perthuis, Benoit Leguet, GER:DB:SocSci, EC:GlobalCom
- OSPPARIS 122X. Challenges of Integration in the European Union. 4-5 units, Sylvie Strudel, GER:DB:SocSci

#### SANTIAGO

- OSPSANTG 68. The Emergence of Nations in Latin America. 4-5 units, Ivan Jaksic, GER:DB:SocSci
- OSPSANTG 116X. Modernization and its Discontents: Chilean Politics at the Turn of the Century. 5 units, Gerrman Correa, GER:DB:SocSci
- OSPSANTG 119X. The Chilean Economy: History, International Relations, and Development Strategies. 5 units, Oscar Munoz, GER:DB:SocSci
- OSPSANTG 141X. Politics and Culture in Chile. 5 units, Bernardo Subercaseaux, GER:DB:Hum, EC:GlobalCom

## JEWISH STUDIES

*Director:* Steven Weitzman

*Academic Advisory Committee:* Zachary Baker (Stanford University Libraries), Joel Beinin (History), Jonathan Berger (Music), Arnold Eisen (Religious Studies, emeritus), Amir Eshel (German Studies), John Felstiner (English, emeritus), Shelley Fisher Fishkin (English), Charlotte Fonrobert (Religious Studies), Avner Greif (Economics), Katherine Jolluck (History), Mark Mancall (History, emeritus), Norman Naimark (History), Reviel Netz (Classics), Jack Rakove (History), Aron Rodrigue (History), Gabriella Safran (Slavic Languages and Literatures), Vered Karti Shemtov (African and Middle Eastern Languages and Literatures), Lee Shulman (Education, emeritus), Peter Stansky (History, emeritus), Amir Weiner (History), Steven Weitzman (Religious Studies), Sam Wineburg (Education), Steven Zipperstein (History), Writer in Residence: Maya Arad

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*Web Site:* <http://jewishstudies.stanford.edu>

The Taube Center for Jewish Studies investigates all aspects of Jewish culture in history, religion, literature, language and

education from biblical times to the present. Courses are offered on the undergraduate and graduate levels in a program complemented by a full range of guest lectures, conferences, and symposia. The Center annually sponsors the Donald and Robin Kennedy Undergraduate Award for the best undergraduate essay on any theme in Jewish Studies, the Dr. Bernard Kaufman Undergraduate Research Award in Jewish Studies to an undergraduate engaged in research on Jews in modernity, and the Koret Award for Best Essay Written in Hebrew by an undergraduate.

Graduate students must apply and enroll in the program through the departments of English, History, Comparative Literature, Religious Studies, or the School of Education, and meet the requirements of those departments. For more information about graduate studies in Jewish Studies, please contact the Center manager or Director.

## UNDERGRADUATE PROGRAMS IN JEWISH STUDIES

The center does not offer an undergraduate program in Jewish Studies. However, the Individually Designed Major in Jewish Studies permits interested students to focus their attention on the broad field of Jewish Studies and, at the same time, to expand their knowledge of one or another related fields.

## INDIVIDUALLY DESIGNED MAJOR IN JEWISH STUDIES

The Individually Designed Major in Jewish Studies permits interested students to focus their attention on the broad field of Jewish Studies and, at the same time, to expand their knowledge of one or another related fields.

Each major should complete at least 75 units, all in courses at or above the 100 level (or their equivalent). A maximum of 15 of these 75 units may be taken on a credit/no credit basis. A maximum of 5 of these 75 units may be taken in individual study or directed reading.

Students must present evidence that demonstrates their ability to do independent work and have at least three full quarters of undergraduate work remaining at Stanford after the date on which the proposal is approved by the committee. Each major must obtain sponsorship from three faculty members, one of whom is the student's primary adviser, and from the Director of the Taube Center for Jewish Studies.

The application deadline for IDM proposals is the fifth week of Spring Quarter of the sophomore year. Applications are reviewed only once a year.

Details about the written procedures and documents necessary for application for an individually designed major in Jewish Studies can be obtained at the Taube Center for Jewish Studies, Bldg. 360, Main Quad, (650) 725-2789. See also the "Individually Design Majors in Humanities and Sciences" section of this bulletin.

## REQUIREMENTS

The faculty members in Jewish Studies have designed the following structure for the individually designed major:

### HISTORY AND SOCIETY:

Students must take one course in each of the three periods: 20 units  
biblical and ancient, medieval and modern, and contemporary

### RELIGION:

Biblical, rabbinic, medieval, modern 20 units

### LITERATURE:

Hebrew, Holocaust, American Jewish, Yiddish, German Jewish, Russian Jewish 15 units

### HEBREW LANGUAGE (SECOND YEAR OR BEYOND):

Students who demonstrate by examination that they have completed the equivalent of at least two years of 12 units

university-level modern Hebrew may apply the 12 units required in this category to more work in another category, with the approval of their primary adviser

**ANCILLARY COURSES:**

Ancient history, medieval history, modern European history, history of philosophy, Islam, Christianity 8-10 units

**WIM COURSE:**

The Writing in the Major (WIM) course can be taken within a subfield (History, Religious Studies or Comparative Literature). 5 units

Total number of units required 75-77 units

No course proposed for the major may be counted as fulfilling more than one required category in the proposed major. Transfer credits from other universities must be approved by the appropriate Stanford authorities.

**HONORS**

Students planning an Individually Designed Major in Jewish Studies are also urged to write an honors thesis. Students interested in declaring an Individually Designed Major in Jewish Studies should discuss this with their adviser(s) when discussing the major itself. Up to 10 honors thesis units may be included in the major.

**COURSES**

Students interested in pursuing an Individually Designed Major in Jewish Studies are advised to consult the following list of courses in preparing their program.

- JEWISHST 102/AMELANG 127. Land and Literature
- JEWISHST 101A/AMELANG 128A. Beginning Hebrew, First Quarter
- JEWISHST 101B/AMELANG 128B. Beginning Hebrew, Second Quarter
- JEWISHST 101C/AMELANG 128C. Beginning Hebrew, Third Quarter
- JEWISHST 102A/AMELANG 129A. Intermediate Hebrew, First Quarter
- JEWISHST 102B/AMELANG 129B. Intermediate Hebrew, Second Quarter
- JEWISHST 102C/AMELANG 129C. Intermediate Hebrew, Third Quarter
- JEWISHST 103A/AMELANG 130A. Advanced Hebrew, First Quarter
- JEWISHST 104/AMELANG 131. Hebrew Forum
- JEWISHST 104A/AMELANG 140A. Beginning Yiddish, First Quarter
- JEWISHST 104B/AMELANG 140B. Beginning Yiddish, Second Quarter
- JEWISHST 104C/AMELANG 140C. Beginning Yiddish, Third Quarter
- JEWISHST 107A/AMELANG 170A. Biblical Hebrew, First Quarter
- JEWISHST 107B/AMELANG 170B. Biblical Hebrew, Second Quarter
- JEWISHST 107C/AMELANG 170C. Biblical Hebrew, Third Quarter
- JEWISHST 139/FEMST 139. Rereading Judaism in Light of Feminism
- JEWISHST 148,248/SLAVLIT 198,298. Writing Between Languages: The Cast of Eastern European Jewish Literature
- JEWISHST 241/COMPLIT 221/GERLIT 246. Memory, History, and the Contemporary Novel
- JEWISHST 153C/ENGLISH 183C/AMSTUD 183C. Feminism and American Literature
- JEWISHST 183,383/HISTORY 137,337. The Holocaust
- JEWISHST 185B/HISTORY 185B. Jews in the Modern World

- JEWISHST 287D,387D/HISTORY 287D,387D. Tel-Aviv: Site, Symbol, City
  - JEWISHST 287E,387E/HISTORY 287E,387E. Jewish Intellectuals and the Crisis of Modernity
  - JEWISHST 289,389/HISTORY 229,329. Poles and Jews
  - JEWISHST 385A/HISTORY 385A. Core in Jewish History, 17th-19th Centuries
  - JEWISHST 385B/HISOTRY 385B. Core in Jewish History, 20th Century
  - JEWISHST 486A/HISTORY 486A. Graduate Research Seminar in Jewish History
  - JEWISHST 486B/HISTORY 486B. Graduate Research Seminar in Jewish History
  - JEWISHST 15A/RELIGST 15A. The Bible and Archaeology\*
  - JEWISHST 15N/RELIGST 15N. Travels Through the Afterlife\*
  - JEWISHST 122B/RELIGST 132B/CLASSGEN 134. Early Christianity, Early Judaism, and Gender
  - JEWISHST 222A/RELIGST 282A. In Search of David and Solomon
- \*Courses below the 100-level cannot be counted towards the major, however, it may be counted towards the minor in Jewish Studies.

**MINOR IN JEWISH STUDIES**

The Jewish Studies minor is open to students in any department who wish to enrich their studies through acquiring knowledge in Jewish history, thought, religion, literature, and society. Students must complete their declaration of the minor no later than the last day of the quarter three quarters before degree conferral. For example, a student graduating in Spring Quarter must declare the minor no later than the last day of Autumn quarter of the same year.

Students must complete six courses for a maximum of 36 units toward the minor. Courses of study should be discussed and approved by a Jewish Studies faculty member in the departments of English, History, Religious Studies, or the Division of Literatures, Cultures, and Languages, and by the center directors. In addition to suggested introductory courses, students are also encouraged to take courses in the Hebrew language as part of their Jewish studies minor, and are granted credit toward the minor for up to 5 units of language study. Any variations on the minor requirements must be approved in advance by one of the directors of the center.

Courses credited toward the minor must be distributed as follows:

1. Three introductory courses at the 100 level or below in the fields of history, religious studies, literature, or Hebrew language (for a maximum of 5 units) or one of the designated introductory courses offered through the Program in Comparative Studies in Race and Ethnicity.
2. Two courses at the 100 level or above from two of three areas of concentration (history, religious studies, or literature).

One seminar or undergraduate colloquium at the 200 level or above in one area of concentration (history, religious studies, or literature). No course credited toward the Jewish Studies minor may be double counted toward major requirements.

# LANGUAGE CENTER

*Director:* Elizabeth Bernhardt

*Associate Director:* Joan Molitoris

*Assistant Director:* Patricia de Castris

## **African and Middle Eastern Languages**

*Senior Lecturers:* Khalil Barhoum (Coordinator, and Minor Adviser: Arabic Language and Literature), Vered Shemtov (Jewish Language and Literature)

*Lecturers:* Ozden Akyol (Fulbright Scholar), Salem Aweiss, Ebru Ergul, Shahla Fahimi, Estee Greif, Eva Hashem-Aramouni, Yasmina Khedhir (Fulbright Scholar), Jon Levitow, Khalid Obeid, Gallia Porat, Merchades Method Rutechura, Ramzi Salti

## **Catalan Language**

*Coordinator:* Joan Molitoris (Associate Director, Language Center)

*Lecturer:* Lena Tahmassian

## **Chinese Language**

*Coordinator:* Chao Fen Sun (Professor, Asian Languages and Cultures, on leave)

*Lecturers:* Marina Chung, Michelle DiBello, Sik Lee Dennig, Nina Lin, Xujing Qian, Yu-hwa Liao Rozelle, Le Tang, Huazhi Wang, Hong Zeng (Acting Coordinator), Youping Zhang, Xiaofang Zhou

## **English for Foreign Students**

*Director and Senior Lecturer:* Philip Hubbard

*Lecturers:* Robyn Brinks Lockwood, Carole Mawson, Andrea Kevech, Andrew Oman, Kenneth Romeo, Constance Rylance, Seth Streichler

## **French Language**

*Lecturers:* Jane Dozer-Rabedeau, Heather Howard (Coordinator), Miranda Kershaw, Marie Lasnier, Vera Shapirshteyn, Suzie Telep

## **German Language**

*Senior Lecturers:* William E. Petig, Kathryn Strachota

*Lecturer:* Paul Nissler (Coordinator)

## **Iberian Languages**

*Coordinator:* Joan Molitoris (Associate Director, Language Center)

*Lecturer:* Joseba Iñaki Lopez de Luzuriaga

## **Italian Language**

*Lecturers:* Marta Baldocchi, Anna Cellinese (Coordinator), Alessandra McCarty, Giovanni Tempesta

## **Japanese Language**

*Coordinator:* Yoshiko Matsumoto (Professor, Asian Languages and Cultures)

*Senior Lecturer:* Kazuko M. Busbin

*Lecturers:* Noriko Knickerbocker, Hisayo O. Lipton, Momoyo K. Lowdermilk, Emiko Yasumoto Magnani, Kiyomi Nakamura, Momoe Saito Fu, Yoshiko Tomiyama

## **Korean Language**

*Lecturers:* Hee-Sun Kim (Coordinator), Sun Young Lee (Fulbright Scholar)

## **Portuguese Language**

*Senior Lecturer:* Lyris Wiedemann (Coordinator)

*Lecturer:* Agripino Silveira

## **Slavic Language**

*Senior Lecturer:* Rima Greenhill

*Lecturer:* Eugenia Khassina (Coordinator)

## **Spanish Language**

*Lecturers:* Vivian Brates, Loreto Catoira, Citlalli del Carpio, Irene Corso, Alice Miano (Coordinator), Joan Molitoris (Associate Director, Language Center), Paul Nissler, Carimer Ortiz Cuevas, Veronika Reinhold, Kara Sanchez, Ana Maria. Sierra, María Cristina Urruela, Hae-Joon Won

## **Special Language Program**

*Lecturers:* Marichelle De Ramos (Fulbright Scholar), Cathy Haas, Dzuong Nguyen, Neeti Roy (Fulbright Scholar), Eva Prionas

(Coordinator, Modern Greek Language and Literature), Pranjali Sirasao

## **Tibetan Language Program**

*Lecturer and Coordinator:* Robert W. Clark

*Language Center Offices:* Building 30

*Mail Code:* 94305-2015

*Department Phone:* (650) 725-9222

*Email:* patricia@stanford.edu

*Web Site:* <http://language.stanford.edu>

Courses offered by the Language Center are listed under the following subject codes on the *Stanford Bulletin's* ExploreCourses web site: AMELANG (African and Middle Eastern Languages and Literatures), CATLANG (Catalan Language), CHINLANG (Chinese Language), EFSLANG (English for Foreign Students), FRENLANG (French Language), GERLANG (German Language), IBERLANG (Iberian Languages), ITALLANG (Italian Language), JAPANLANG (Japanese Language), KORLANG (Korean Language), PORTLANG (Portuguese Language), SLAVLANG (Slavic Language), SPANLANG (Spanish Language), SPECLANG (Special Language), and TIBETLANG (Tibetan Language).

The Stanford Language Center oversees all language instruction at Stanford. The center's charge is to guarantee that Stanford language programs are of the highest quality; to develop and administer achievement and proficiency tests needed to implement the language requirement; to provide technical assistance and support to the graduate students, lecturers, and faculty who deliver Stanford's language instruction; and to take leadership in research and development efforts in language learning. The Language Center is a unit within the Division of Literatures, Cultures, and Languages.

The African and Middle Eastern Languages and Literatures Program (AME) offers classes in Arabic, Hebrew, Swahili, and African languages not regularly taught at Stanford. Based on current funding and student requests, the courses planned for 2011-12 are listed below. Additional languages may still be offered upon request, provided funding is available. Requests for the 2012-13 academic year should be made by Spring Quarter of this year to the AME program office by email to [khalil@stanford.edu](mailto:khalil@stanford.edu). Beginning, intermediate and advanced each refer to an academic year's sequence of language study. Most language courses are offered for a two-year, three quarter sequence: 'A' suffix courses are taught Autumn; 'B' suffix courses are taught Winter; 'C' suffix courses are taught Spring. Those who have taken courses in the relevant language at another institution, or have previous knowledge of the language, can request to be tested. Tests are comprised of two parts, written and oral. Students must display first-year proficiency in the requested language to fulfill the requirement. Testing is guaranteed only for languages currently offered. Students planning to take a test must contact the AME program no later than the Spring Quarter of their sophomore year. To submit a request for language testing or to request that a language be taught, and for further information on the program, see

<https://www.stanford.edu/dept/lc/language/courses/africanMidEastern/index.html>. Language courses may not be repeated for credit and must be taken in sequence.

## **PROFICIENCY IN FOREIGN LANGUAGE NOTATION**

A student who demonstrates levels of achievement equivalent to those expected at the end of the third quarter of the third year of study in a language may be awarded the notation "proficiency in" that language on the official transcript. Successful candidates tend to have completed the third year or beyond of language study at Stanford and spent considerable time studying abroad in the foreign language.

In order to receive the proficiency notation, the student must complete the following oral and written requirements according to

the time to appear on the official transcript, the student must complete below. Successful completion of the oral component is required before proceeding with the written component.

Both oral and written components must be completed no later than the quarter preceding the graduating quarter.

For more information contact Patricia de Castries (patricia@stanford.edu).

## APPLICATION AND ORAL COMPONENT: TWO QUARTERS PRIOR TO GRADUATION

1. Notify the Language Center via email of the intent to pursue the notation and request an official Oral Proficiency Interview (OPI). Since this is a formal interview conducted according to national academic and professional standards, at least two quarters of lead time are essential for scheduling.
2. Complete the 30 minutes Oral Proficiency Interview as scheduled through the Language Center and conducted by a certified OPI tester. The interview must take place no later than one quarter prior to graduation and be administered on campus.

## WRITING COMPONENT: ONE QUARTER PRIOR TO GRADUATION

1. Once approved to continue with the writing component, schedule a Writing Proficiency Test (WPT) through the Language Center. As an official writing assessment, the 90 minute exam must take place no later than one quarter prior to graduation and as soon as possible after the interview. The WPT is administered on campus and rated by a certified rater.
2. Receive an official rating of Advanced Low or higher on the Foreign Service Institute/American Council on the Teaching of Foreign Languages (FSI/ACTFL) scale of the oral and writing proficiency, except in the non-cognate languages which require a minimum rating of Intermediate High. Students who do not meet the minimum levels for the notation will nonetheless receive an official OPI (or OPI and WPT) rating, which carries national recognition of their oral and writing proficiencies.

## PROFICIENCY NOTATION TIMETABLE

1. Graduating Spring/Summer: Apply Autumn. Interview Autumn/Winter: writing Winter.
2. Graduating Autumn: Apply Winter, interview Winter/Spring: writing Spring.
3. Graduating Winter: Apply Spring, interview Spring/Autumn: writing Autumn.

## MINOR IN MIDDLE EASTERN LANGUAGES, LITERATURES, AND CULTURES

The undergraduate minor in Middle Eastern Languages, Literatures, and Cultures has been designed to give students majoring in other departments an opportunity to gain a substantial introduction to Middle Eastern and African languages, and to the cultures and civilizations of the Middle East and Africa. Contact the minors adviser before declaring at khalil@stanford.edu.

Students declaring a minor must do so no later than the last day of the fourth quarter before degree conferral. For example, students graduating in June (Spring Quarter) must declare the minor no later than the last day of Spring Quarter of their junior year. If a student is not able to meet this deadline, he or she may petition the Language Center director and request a revised declaration date, which may be granted at the director's discretion.

The requirements for a minor in Middle Eastern Languages, Literatures, and Cultures are:

1. Courses for the minor must be taken for a letter grade unless only offered for faculty-elected satisfactory/no credit.
2. All courses must be completed with a letter grade of 'C' or better.

3. Courses may not overlap with those taken for a major course of study.
4. Relevant courses taken to fulfill a GER may count toward fulfilling both minor and GER requirements.

## CULTURAL STUDIES TRACK

Requirements are:

1. Completion of the language prerequisite at the beginning level, or a demonstrated equivalent competence.
2. In the case of Arabic, completion of six non-language courses, including three from the AME program.
3. In the case of Hebrew and African languages, completion of six non-language related courses. Consult minor adviser for course options.

## LANGUAGE TRACK

- Option one:
  1. Completion of prerequisite language study at the beginning level, or a demonstrated equivalent competence.
  2. Completion of one year of language study at the intermediate level.
  3. Completion of three related non-language courses, including one of the AMELANG 30-36 series in the case of Arabic. Consult the minor adviser (khalil@stanford.edu) for course options.
- Option two:
  1. Completion of prerequisite language study at the advanced level in Arabic, Hebrew, or an African language, for the equivalent of three years of language study.
  2. Completion of one African and Middle Eastern literature and culture course relevant to the language studied in the case of Arabic or Hebrew; or, in the case of African languages, completion of one non-language African Studies course relevant to the language studied. Consult the minor adviser (khalil@stanford.edu) for course options.
- Option Three:
 

Completion of four years of language study, at least two of which must be concluded at Stanford.

## MINOR IN MODERN LANGUAGES

An undergraduate minor in Modern Languages is offered through the Division of Literatures, Cultures, and Languages and includes courses offered through the Language Center. Students should consult the "Division of Literatures, Cultures, and Languages" section of this bulletin for further details about the minor and its requirements.

## SPECIAL LANGUAGE PROGRAM

The Special Language Program (SLP) offers foreign languages not otherwise taught at Stanford. Based on current funding and student requests, the courses planned for 2011-12 are listed in the "Explore Courses" section of this Bulletin under the Special Languages (SPECLANG) Program; however, not every course listed is taught. Additional languages may still be offered upon request, provided funding is available. Requests for the 2012-13 academic year should be made by Spring Quarter of this year at the Special Language Program office (epriomas@stanford.edu).

Beginning-level courses are offered for 3, 4 or 5 units, as listed. The 3-unit beginning courses are offered on a satisfactory/no credit basis only. The 4 and 5-unit beginning level courses are offered with a letter grade option. Intermediate-level as well as advanced-level courses are offered with a grade option. Beginning, intermediate and advanced each refer to an academic year's sequence of language study. Most 3-unit language courses are offered for a two-year, three quarter sequence:

'A' suffix courses are typically taught Autumn.

'B' suffix courses are typically taught Winter.

'C' suffix courses are typically taught Spring.

In some circumstances, a beginning or intermediate course may be offered in alternate years. For more information, see <http://www.stanford.edu/dept/SLP>. Language courses may not be repeated for credit, and must be taken in sequence.

#### **FULFILLING THE LANGUAGE REQUIREMENT**

Students can fulfill the language requirement by taking courses offered by the Special Language Program. At least 12 units are needed to complete the requirement. Students who have already taken courses in the relevant language at another institution, or who have previous knowledge of the language, can request to be tested. Tests are comprised of written and oral parts. A student must display first-year level proficiency in the requested language in order to fulfill the requirement. Testing is guaranteed only for these languages currently offered. Students planning to take a test must contact the Special Language Program no later than the Spring Quarter of sophomore year. To submit a request for language testing, or to request a language, apply via the web at <http://www.stanford.edu/dept/SLP>.

#### **BEGINNING-LEVEL, FIRST-YEAR COURSES**

Beginning-level, first-year language courses require no previous knowledge of the language. The beginning-level sequence emphasizes development of the full range of language skills—reading, listening comprehension, the use of grammatical structures, and oral and written communication—through a variety of learning themes. Individual, small group, interactive work and multimedia-based activities reinforce language skills and provide the platform for adapting the curriculum to specific student learning goals. Cultural awareness is a strong component of the curriculum.

#### **INTERMEDIATE-LEVEL, SECOND-YEAR COURSES**

Intermediate-level, second-year language courses require completion of the beginning sequence, or consent of instructor. The intermediate-level sequence focuses on continuous mastery and development of learning skills that help students to converse accurately and more fluently, incorporate more advanced grammatical structures in their oral and written work, use idiomatic expressions in the right context, and write simple compositions. Curricular objectives and enhanced understanding of the culture are built into the courses through a multimodal approach.

#### **ADVANCED-LEVEL, THIRD-YEAR COURSES**

Advanced-level, third-year language courses require completion of the intermediate-year sequence and consent of the program coordinator. The advanced-level sequence focuses on accurate understanding and use of structures through authentic texts and multimedia materials, and readings from various genres. Individual learning goals and student proficiency are taken into account to provide a learning environment that helps students become more autonomous learners.

### **AFRICAN AND MIDDLE EASTERN LANGUAGES AND LITERATURES PROGRAM**

The African and Middle Eastern Languages and Literatures Program offers classes in Arabic, Hebrew, Swahili, and African languages not regularly taught at Stanford. Based on current funding and student requests, the courses planned for 2011-12 are listed below. Additional languages may still be offered upon request, provided funding is available. Requests for the 2012-13 academic year should be made by Spring Quarter of this year at the AME program office, email: [khalil@stanford.edu](mailto:khalil@stanford.edu).

Beginning, intermediate and advanced each refer to an academic year's sequence of language study. Most language courses are offered for a two-year, three quarter sequence:

- All 'A' suffix courses are taught Autumn.
- All 'B' suffix courses are taught Winter.
- All 'C' suffix courses are taught Spring.

All beginning, intermediate, and advanced courses are 4 units except Arabic, Hebrew, Swahili and Turkish. In some circumstances, a beginning or intermediate course may be offered in alternate years.

#### **FULFILLING THE LANGUAGE REQUIREMENT**

Students can fulfill the language requirement by taking an African or Middle Eastern language. At least 12 units are needed to complete the requirement. Normally, the requirement is completed after the first quarter of intermediate-level language. In the case of African or Middle Eastern languages taught only at the beginning level, students may petition the Language Center to fulfill the requirement by taking a directed reading course in the fourth quarter. Contact [patricia@stanford.edu](mailto:patricia@stanford.edu) for more information.

#### **BEGINNING-LEVEL, FIRST-YEAR COURSES**

Beginning-level, first-year language courses require no previous knowledge of the language. The beginning-level sequence emphasizes development of the full range of language skills, reading, listening comprehension, the use of grammatical structures, and oral and written communication, through a variety of learning themes. Individual, small group, interactive work and multimedia-based activities reinforce language skills and provide the platform for adapting the curriculum to specific student learning goals. Cultural awareness is a strong component of the curriculum.

#### **INTERMEDIATE-LEVEL, SECOND-YEAR COURSES**

Intermediate-level, second-year language courses require completion of the beginning sequence, or consent of instructor. The intermediate-level sequence focuses on continuous mastery and development of learning skills that help students to converse accurately and more fluently, incorporate more advanced grammatical structures in their oral and written work, use idiomatic expressions in the right context, and write simple compositions. Curricular objectives and enhanced understanding of the culture are built into the courses through a multimodal approach.

#### **ADVANCED-LEVEL, THIRD-YEAR COURSES**

Advanced-level, third-year language courses require completion of the intermediate-year sequence and consent of the program coordinator. The advanced-level sequence focuses on accurate understanding and use of structures through authentic texts and multimedia materials, and readings from various genres. Individual learning goals and student proficiency are taken into account to provide a learning environment that helps students become more autonomous learners.

### **OVERSEAS STUDIES COURSES IN THE LANGUAGE CENTER**

For course descriptions and additional offerings, see the listings in the *Stanford Bulletin's* ExploreCourses web site (<http://explorecourses.stanford.edu>) or the Bing Overseas Studies web site (<http://bosp.stanford.edu>). Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

#### **AUTUMN QUARTER**

##### **BEIJING**

- OSPBEIJ 1C. First-Year Modern Chinese. 5 units, Yan Wang, Xiaoya Zhu
- OSPBEIJ 6C. Beginning Conversational Chinese. 2 units, Staff
- OSPBEIJ 21C. Second-Year Modern Chinese. 5 units, Li Chen
- OSPBEIJ 101C. Third-Year Modern Chinese. 5 units, Xiaoya Zhu
- OSPBEIJ 211C. Advanced Modern Chinese. 5 units, Yan Wang

**BERLIN**

OSPBER 1Z. Accelerated German 1st and 2nd Quarter. 8 units, Jari Spletstoesser, Jochen Wohlfeil  
 OSPBER 21B. Intermediate German. 5 units, Sylvia Kloetzer  
 OSPBER 100B. Berlin Heute. 2 units, Dubravka Friesel  
 OSPBER 101B. Advanced German. 5 units, Maria Biege

**FLORENCE**

OSPFLO 21F. Accelerated Second Year Italian, Part A. 5 units, Fiorenza Quercioli  
 OSPFLO 22F. Accelerated Second-Year Italian, Part B. 5 units, Fiorenza Quercioli  
 OSPFLO 31F. Advanced Oral Communication: Italian. 3 units, Fiorenza Quercioli

**MADRID**

OSPMADR 12M. Accelerated Second-Year Spanish I. 5 units, Maria Teresa Cambor Portilla  
 OSPMADR 13M. Accelerated Second-Year Spanish II. 5 units, Maria Teresa Cambor Portilla  
 OSPMADR 102M. Composition and Writing Workshop for Students in Madrid. 3-5 units, Maria Teresa Cambor Portilla

**MOSCOW**

OSPMOSC 10M. Intensive First-Year Russian. 9 units, Liza Kurganova  
 OSPMOSC 51M. Second Year Russian I. 5 units, Tatyana Boldyreva  
 OSPMOSC 111M. Third Year Russian I. 5 units, Galina Filatova  
 OSPMOSC 177M. Fourth Year Russian I. 5 units, Staff

**PARIS**

OSPPARIS 22P. Intermediate French I. 4 units, Pauline Reyman  
 OSPPARIS 23P. Intermediate French II. 4 units, Florence Mercier  
 OSPPARIS 124P. Advanced French I. 4 units, Patrick Guedon

**SANTIAGO**

OSPSANTG 12S. Accelerated Second-Year Spanish I. 5 units, Mabel Abad  
 OSPSANTG 13S. Accelerated Second-Year Spanish II. 5 units, Mabel Abad  
 OSPSANTG 102S. Composition and Writing Workshop for Students in Santiago. 3-5 units, Andres Bobbert

**WINTER QUARTER****BERLIN**

OSPBER 1Z. Accelerated German 1st and 2nd Quarter. 8 units, Jari Spletstoesser, Jochen Wohlfeil  
 OSPBER 21B. Intermediate German. 5 units, Sylvia Kloetzer  
 OSPBER 100B. Berlin Heute. 2 units, Dubravka Friesel  
 OSPBER 101B. Advanced German. 5 units, Maria Biege

**FLORENCE**

OSPFLO 21F. Accelerated Second Year Italian, Part A. 5 units, Fiorenza Quercioli  
 OSPFLO 22F. Accelerated Second-Year Italian, Part B. 5 units, Fiorenza Quercioli  
 OSPFLO 31F. Advanced Oral Communication: Italian. 3 units, Fiorenza Quercioli

**MADRID**

OSPMADR 12M. Accelerated Second-Year Spanish I. 5 units, Maria Teresa Cambor Portilla  
 OSPMADR 13M. Accelerated Second-Year Spanish II. 5 units, Maria Teresa Cambor Portilla  
 OSPMADR 102M. Composition and Writing Workshop for Students in Madrid. 3-5 units, Maria Teresa Cambor Portilla

**PARIS**

OSPPARIS 22P. Intermediate French I. 4 units, Florence Mercier  
 OSPPARIS 23P. Intermediate French II. 4 units, Elizabeth Molkou  
 OSPPARIS 125P. Advanced French II. 4 units, Marie-Christine Ricci

**SANTIAGO**

OSPSANTG 12S. Accelerated Second-Year Spanish I. 5 units, Mabel Abad  
 OSPSANTG 13S. Accelerated Second-Year Spanish II. 5 units, Mabel Abad  
 OSPSANTG 102S. Composition and Writing Workshop for Students in Santiago. 3-5 units, Staff

**SPRING QUARTER****BEIJING**

OSPBEIJ 3C. First-Year Modern Chinese. 5 units, Li Chen  
 OSPBEIJ 23C. Second-Year Modern Chinese. 5 units, Xiaoya Zhu  
 OSPBEIJ 103C. Third-Year Modern Chinese. 5 units, Yan Wang

**BERLIN**

- OSPBER 2Z. Accelerated German 2nd and 3rd Quarters. 8 units, Jochen Wohlfeil
- OSPBER 21B. Intermediate German. 5 units, Sylvia Kloetzer
- OSPBER 100B. Berlin Heute. 2 units, Dubravka Friesel
- OSPBER 101B. Advanced German. 5 units, Maria Biege

**FLORENCE**

- OSPFLO 21F. Accelerated Second Year Italian, Part A. 5 units, Fiorenza Quercioli
- OSPFLO 22F. Accelerated Second-Year Italian, Part B. 5 units, Fiorenza Quercioli
- OSPFLO 31F. Advanced Oral Communication: Italian. 3 units, Fiorenza Quercioli

**KYOTO**

- OSPKYOTO 9K. First Year Japanese Language, Culture, Communication B. 5 units, Staff
- OSPKYOTO 17K. Second Year Japanese Language, Culture, Communication B, First Quarter. 5 units, Staff
- OSPKYOTO 19K. Second Year Japanese Language, Culture, Communication B, Third Quarter. 5 units, Staff
- OSPKYOTO 129K. Third Year Japanese Language, Culture, Communication B. 5 units, Staff
- OSPKYOTO 211K. Advanced Japanese. 5 units, Staff

**MADRID**

- OSPMADR 12M. Accelerated Second-Year Spanish I. 5 units, Maria Teresa Cambor Portilla
- OSPMADR 13M. Accelerated Second-Year Spanish II. 5 units, Maria Teresa Cambor Portilla
- OSPMADR 102M. Composition and Writing Workshop for Students in Madrid. 3-5 units, Maria Teresa Cambor Portilla

**PARIS**

- OSPPARIS 22P. Intermediate French I. 4 units, Pauline Reyman
- OSPPARIS 23P. Intermediate French II. 4 units, Sonia Gourevitch
- OSPPARIS 125P. Advanced French II. 4 units, Elizabeth Molkou

**SANTIAGO**

- OSPSANTG 12S. Accelerated Second-Year Spanish I. 5 units, Mabel Abad
- OSPSANTG 13S. Accelerated Second-Year Spanish II. 5 units, Mabel Abad
- OSPSANTG 102S. Composition and Writing Workshop for Students in Santiago. 3-5 units, Andres Bobbert

**LATIN AMERICAN STUDIES**

*Director of the Center: Rodolfo Dirzo*

*Associate Director:* Megan Gorman

*Tinker Visiting Professors:* Enrique Casanovas, Mauricio Fontes, Miguel A. Garcés, Roberto Ierusalimsky, Iris Kantor, Pablo Neumeyer

**Affiliated Faculty and Staff:**

*Anthropology:* Clifford Barnett (emeritus), George Collier (emeritus), Lisa Curran, Carolyn Duffey, William Durham, James Fox, John Rick, Ian Robertson

*Art and Art History:* Barbaro Martinez-Ruiz

*Biology:* Gretchen Daily, Rodolfo Dirzo, Harold Mooney, Peter Vitousek, Virginia Walbot

*Carnegie Institution for Science:* Gregory Asner

*Comparative Literature:* Roland Greene, Hans Ulrich Gumbrecht, José David Saldívar

*Dance:* Susan Cashion (emerita)

*Earth Sciences, School of:* Pamela Matson

*Economics:* Roger Noll (emeritus)

*Education, School of:* Martin Carnoy, Amado Padilla, Guadalupe Valdés

*Engineering, School of:* Jenna Davis, Bruce Lusignan (emeritus), Leonard Ortolano

*English:* Ramón Saldívar (also Comparative Literature)

*Freeman Spogli Institute for International Studies:* Rosamond Naylor

*History:* Zephyr Frank, Tamar Herzog

*Hoover Institute:* Herbert Klein

*Human Biology:* Anne Firth Murray

*Iberian and Latin American Cultures:* Héctor Hoyos, Marília Librandi Rocha, Michael Predmore, Joan Ramon Resina, Jorge Ruffinelli, Lisa Surwillo, Yvonne Yarbro-Bejarano

*International Relations:* Thomas O'Keefe

*Language Center:* José Carlos Fajardo, Alice Miano, Ana Sierra, Lyris Wiedemann

*Law, School of:* Jonathan Greenberg, Thomas Heller (emeritus)

*Linguistics:* John Rickford

*Medicine, School of:* Evaleen Jones, Grant Miller, Paul Wise

*Political Science:* Stephen Haber, Terry Karl, Beatriz Magaloni, Robert Packenham (emeritus), Gary Segura, Michael Tomz

*Religious Studies:* Thomas Sheehan

*Sociology:* Tomás Jiménez, Michael Rosenfeld

*Stanford University Libraries:* Adán Griego, Sergio Stone, Robert Trujillo

*Center Offices:* Bolívar House, 582 Alvarado Row

*Mail Code:* 94305-8545

*Department Phone:* (650) 723-4444

*Email:* latinamerica@stanford.edu

*Web Site:* <http://las.stanford.edu>

Courses offered by the Interdisciplinary Program in Latin American Studies are listed under the subject code LATINAM on the *Stanford Bulletin's* ExploreCourses web site.

The Center for Latin American Studies (CLAS) supports research and teaching in all fields of study as they relate to Latin America. Academic programs encourage interdisciplinary approaches and draw on the expertise of nearly sixty active affiliated faculty members representing Stanford's various schools and departments. Stanford University Libraries' substantial Latin American collections are valuable resources for students, faculty, and visiting researchers alike. Each year CLAS hosts a number of Tinker Visiting Professors, highly distinguished Latin American and Iberian scholars who come to Stanford to teach a course in their field of specialization. The Center for Latin American Studies maintains a highly active public events calendar and provides funding to students and faculty for a variety of research, teaching, internship, and conference activities. Stanford offers three formal academic programs in Latin American Studies: an Undergraduate Minor, Interdisciplinary Honors, and a Master of Arts degree. The Center is a U.S. Department of Education Title VI National Resource Center for Latin America.

## UNDERGRADUATE PROGRAMS IN LATIN AMERICAN STUDIES

Currently, Stanford University does not offer an undergraduate major in Latin American Studies; however, undergraduates may pursue a minor or interdisciplinary honors in Latin American Studies. In addition, students may concentrate on Latin America through other departmental and interdisciplinary degree programs, such as Anthropology, History, Political Science, Iberian and Latin American Cultures, or International Relations. Interested students should consult the relevant departmental web sites and sections of this bulletin for further information.

Undergraduates can obtain a coterminal M.A. degree in Latin American Studies while concurrently working on their undergraduate major by applying during the regular admissions cycle no later than their senior year.

*Financial Aid*—Each summer, CLAS awards grants to a small number of undergraduates to complete internships in Latin America. Applications include a proposal, academic transcript, and letters of recommendation. Students from any department are eligible to apply. See <http://las.stanford.edu>.

Students in undergraduate programs who plan to enroll in Portuguese or Quechua language and area or international studies courses may be eligible for Academic Year and Summer Foreign Language and Area Studies (FLAS) fellowships. Recipients of FLAS fellowships must be American citizens or permanent residents. For detailed program information and eligibility, see <http://las.stanford.edu>.

## GRADUATE PROGRAMS IN LATIN AMERICAN STUDIES

The one-year master's program in Latin American Studies is designed for students who have experience working, living, or studying in Latin America or Iberia and little prior course work on Latin America.

Stanford University does not offer a Ph.D. program in Latin American Studies; however, doctoral candidates may concentrate on Latin America through other departmental programs, such as Anthropology, History, Political Science, or Iberian and Latin American Cultures. Interested applicants should consult the relevant departmental web sites and sections of this bulletin for admissions information and further details.

*Admission*—The application deadline for the 2012-13 academic year is January 10, 2012. Applicants submit an online application, including a 500-word statement of purpose, resumé, 10-15 page double-spaced academic writing sample, and three letters of recommendation. In addition, all applicants must submit official transcripts and GRE general test scores. TOEFL scores are required of applicants whose first language is not English or who did not earn a degree from an undergraduate institution where English is the primary language of instruction. For information on university graduate admissions and to access the online application, visit <http://gradadmissions.stanford.edu>.

Applicants must meet the University admission requirements, have a working knowledge of Spanish or Portuguese at the university third-year level or higher, and have experience working, living, or studying in Latin America or Iberia prior to admission.

CLAS takes a broad approach to evaluating applications for admission. As important as GRE scores and grades are the applicant's essay, letters of recommendation, academic writing sample, and the experiences and goals conveyed through the personal statement and resume.

Students interested in pursuing the joint degree program in Latin American Studies and Law (J.D.) or a dual degree in Latin American Studies and Business (M.B.A.) or Medicine (M.D.) must apply to each program separately and be accepted by both. Details about the joint and dual degree programs can be found in the "Master of Arts in Latin American Studies" section of this bulletin.

*Financial Aid*—The Center for Latin American Studies



provides several graduate fellowships as well as limited course assistantships with the Tinker Visiting Professors each quarter.

Students in graduate programs who plan to enroll in Portuguese or Quechua language and area or international studies courses may be eligible for Academic Year and Summer Foreign Language and Area Studies (FLAS) fellowships. Recipients of FLAS fellowships must be American citizens or permanent residents. Applicants to the M.A. program have priority in the annual FLAS competition; in recent years CLAS has also awarded FLAS fellowships to students enrolled in the School of Engineering and the School of Law. For detailed program information and eligibility, see <http://las.stanford.edu>.

CLAS awards Working Group grants to graduate students across the University who wish to organize events such as lectures, speaker series, symposia, exchange of working papers, and collaborative research efforts. For detailed program information and eligibility, see <http://las.stanford.edu>.

## MINOR IN LATIN AMERICAN STUDIES

The Minor in Latin American Studies is open to students in any major. Students who wish to complete the minor must declare online (through Axess) and submit a proposal of course work no later than the second quarter of their junior year. The minor must be completed by the second quarter of the senior year. Units taken for a student's major cannot be double-counted towards the minor.

Requirements for the minor include:

1. Completion of 25 units as follows:
  - a. A 5-unit course surveying Latin America: either HISTORY 170B, Culture, Society and Politics in Latin America or an approved substitute.
  - b. 20 additional units in a number of courses which together comprise a coherent focus on a theoretical problem or issue of the region, such as (but not limited to) culture and identity, political economy, or sustainable development. All courses, with the exception of Overseas Studies courses, must be at the 100-level or higher. For approved courses, see the "Latin American Studies Cognate Courses" section of this bulletin.
  - c. At least 10 of the 25 units must be completed at Stanford. All courses to be counted toward the minor must be taken for a letter grade.
2. Fulfill the Foreign Language Requirement. The minimum requirement for completion of the minor in Latin American Studies is advanced proficiency in Spanish or Portuguese by any one of the following means:
  - a. Successful completion of seven quarters of college-level study of Spanish or Portuguese.
  - b. Completion of a course taught in Spanish or Portuguese at the 100-level or higher, with a letter grade of 'B' (3.0) or higher. This may be a course on Spanish or Portuguese language or literature, or some other subject, as long as it fulfills the above criteria.
  - c. Achievement of the advanced proficiency level on the ACTFL scale in a test administered by the Stanford Language Center. Contact the Language Center for test dates and procedures.
3. Recommended: experience in Latin America such as study abroad, field research, or an internship.

Upon completion of all requirements, the CLAS subcommittee on undergraduate programs authorizes the designation of the Minor in Latin American Studies on the student's transcript.

## HONORS IN LATIN AMERICAN STUDIES

The Honors Program in Latin American Studies is open to undergraduate students in any major. The aim of the honors program is to prepare students to pursue individualized research on Latin America, culminating in an honors thesis completed under the supervision of a faculty adviser. The honors program is particularly suited to the student who wishes to go on to graduate

school or pursue employment in an institution emphasizing research and independent work. Although not required, students are encouraged to undertake independent field research in Latin America for their thesis. It is strongly recommended that students enroll in HISTORY 299X, Design and Methodology for International Field Research (1 unit), during their sophomore or junior year for an overview of research design and methods for international field research.

Admission to the honors program is by application by the end of the junior year. Applications are reviewed and approved by the CLAS director and associate director. Applicants must have a cumulative grade point average (GPA) of 3.3 (B+) or higher and maintain this average in courses taken to satisfy the requirements. Courses must be taken for a letter grade where that option is available. Courses credited toward LAS honors may be double-counted toward the student's major requirements.

To graduate with interdisciplinary honors in Latin American Studies a student must:

1. Complete a total of 35 units in courses certified for honors by the Center for Latin American Studies, distributed as follows:
  - a. A 5-unit survey course, normally taken in the sophomore year: either HISTORY 170B, Culture, Society and Politics in Latin America or an approved substitute.
  - b. For breadth: two 4-5-unit courses at the 100-level or higher with a focus on Latin America. These courses are normally taken during the sophomore and junior years. For approved courses, see the "Latin American Studies Cognate Courses" section of this bulletin.
  - c. For depth: one 4-5-unit course, approved by the honors adviser, at the 100-level or higher with a focus on Latin America that explores in depth an issue of particular interest to the student. See the "Latin American Studies Cognate Courses" section of this bulletin.
  - d. LATINAM 198, Honors Thesis (1-10 units), under the supervision of the honors adviser. Normally these units are spread over two or three quarters of the senior year and are devoted to the completion of the honors thesis.
  - e. Honors Seminar in Latin American social history, taken in the senior year. Please consult the Center for Latin American Studies website for the 2012-13 honors seminar.
  - f. Additional courses at the 100-level or higher focusing on Latin America to bring the total to 35 units. Up to 5 units may come from study of Spanish or Portuguese beyond the seventh quarter. For approved courses, see the "Latin American Studies Cognate Courses" section of this bulletin.
  - g. Of the courses applied to 'b' and 'c' above, up to 10 units may be completed in Overseas Studies, and up to 5 units may be taken as directed individual study. For approved Overseas Studies courses, see the "Latin American Studies Cognate Courses" section of this bulletin.
  - h. All courses to be counted toward the honors program must be taken for a letter grade.
2. Fulfill the Foreign Language Requirement. The minimum requirement for completion of the honors program in Latin American Studies is advanced proficiency in Spanish or Portuguese by any one of the following means:
  - a. Successful completion of seven quarters of college-level study of Spanish or Portuguese.
  - b. Completion of a course taught in Spanish or Portuguese at the 100-level or higher, with a letter grade of 'B' (3.0) or higher. This may be a course on Spanish or Portuguese language or literature, or another subject, as long as it fulfills the above criteria.
3. Achievement of the advanced proficiency level on the ACTFL scale in a test administered by the Stanford Language Center. Contact the Language Center for test dates and procedures.
4. Submit an honors thesis that meets standards of scholarly excellence and is approved by the thesis adviser. If graduating in June, participate in the LAS honors symposium in late May or early June.

## COTERMINAL BACHELOR'S AND MASTER'S DEGREES IN LATIN AMERICAN STUDIES

Undergraduates at Stanford may apply for admission to the coterminal master's program in Latin American Studies when they have earned a minimum of 120 units toward graduation, including advanced placement and transfer credit, and no later than the quarter prior to the expected completion of their undergraduate degree. The application deadline for the 2012-13 academic year is January 10, 2012.

Coterminal applicants must submit:

- an application form
- a 500-word statement of purpose
- a resumé
- a 10-15 page double-spaced academic writing sample
- three letters of recommendation
- a Stanford transcript
- GRE general test scores

Coterminal applicants must have a minimum cumulative GPA of 3.5 and a working knowledge of Spanish or Portuguese at a university third-year level or higher.

University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees" section of this bulletin. For University coterminal degree program rules and University application forms, see <http://studentaffairs.stanford.edu/registrar/publications#Coterm>.

Requirements for the coterminal master's degree are outlined in the "Master of Arts in Latin American Studies" section of this bulletin.

## MASTER OF ARTS IN LATIN AMERICAN STUDIES

The Master of Arts in Latin American Studies is an interdisciplinary program. The curriculum consists of a core set of courses surveying the history, politics, society, ecology, and culture of the Latin American region; advanced language training; and in-depth course work. In consultation with a faculty adviser, students select a course of study suited to their individual interests.

## JOINT DEGREE PROGRAM IN LATIN AMERICAN STUDIES AND LAW

The joint degree program in Latin American Studies and Law allows students to pursue the M.A. degree in Latin American Studies concurrently with the Doctor of Jurisprudence (J.D.) degree, with a significant number of courses that may apply to both degrees. It is designed to train students interested in a career in teaching, research, or the practice of law related to Latin American legal affairs. Students must apply separately to the Latin American Studies M.A. program and to the Stanford School of Law and be accepted by both. Completing this combined course of study requires approximately four academic years, depending on the student's background and level of language training. For more information, see the "Joint Degree Programs" section of this bulletin and consult with the program offices for the two programs.

## DUAL MASTER'S DEGREE WITH MEDICINE OR BUSINESS

Stanford offers dual degree programs that grant an M.A. degree in Latin American Studies and a Master of Business Administration degree or a Medical Doctor degree. Students must apply separately to and be accepted by both the Latin American Studies M.A. program and the Graduate School of Business or School of Medicine.

## DEGREE REQUIREMENTS

University requirements for the master's degree are described in the "Graduate Degrees General Requirements" section of this bulletin.

The program requires completion of a minimum of 45 graduate units. Each student is assigned a faculty adviser who works with the student to develop a customized program of study. All courses for the M.A. degree must be at the 100-level or higher, with at least half being at the 200-level or higher.

Candidates to the M.A. in Latin American Studies must complete the following:

1. *Core courses* (15 units): one core 5-unit course in each of three fields of specialization:
  - a. Culture and Society: HISTORY 372B (same as ILAC 372B), *Frontiers of Iberian and Latin American Culture and History* (Autumn)
  - b. Political Economy: POLISCI 248S, *Latin American Politics* (Winter)
  - c. Environment and Ecology: ANTHRO 259 (same as ANTHRO 159), *Conservation and Development Dilemmas in Latin America: Galapagos as a Microcosm* (Spring)
2. *Cognate courses* (15 units): three courses (5 units each), one from each of the three fields of specialization listed in '1' above. For approved courses, see the "Latin American Studies Cognate Courses" section of the Bulletin.
3. *Elective courses* (10-15 units): three elective courses (3-5 units each) in one of the three fields of specialization (see '1' above) from across the University's offerings, selected with guidance and approval from the faculty adviser.
4. *Language requirement*: at least 3 units of course work on a second Latin American language. Students proficient in both Spanish and Portuguese must take an advanced third-year language course in either Spanish or Portuguese; students proficient in only Spanish or only Portuguese must take a basic course in the language in which they are not already proficient. Up to 6 units of foreign language coursework may be applied toward the MA degree. All foreign language coursework must be taken at the 100-level or higher.
5. *Seminar requirement*: 3 units (1 per quarter) of LATINAM 200, *Contemporary Issues in Latin American Studies*.
6. *Thesis option*: students may elect to write a master's thesis; they may register for LATINAM 398 for up to 10 units of thesis research under the guidance of an Academic Council faculty member. Thesis units may be counted toward the elective field unit requirements (requirement number 3, above).
7. *Grade requirements*: All courses to be counted toward the MA (with the only exception being LATINAM 200) must be taken for a letter grade and earn a B- or better. M.A. candidates must maintain a cumulative GPA of 3.0 or higher.

## LATIN AMERICAN STUDIES COGNATE COURSES

The following courses may be used to satisfy requirements for the M.A. degree, honors, or minor in Latin American Studies. Consult the *Stanford Bulletin's* ExploreCourses web site for full course descriptions and class schedules.

When selecting courses from this list, please be aware of the following:

1. Overseas Studies courses, denoted by the subject codes OSPMADR or OSPSANTG, apply only to the undergraduate minor or honors programs and are not options for M.A. students.
2. Courses with numbers ending in the letter N or Q are Introductory Seminars for undergraduates and are not options for M.A. students. Courses ending in N give preference to freshmen; courses ending in Q give preference to sophomores.
3. All courses to be counted toward the M.A., minor, or honors in Latin American Studies must be taken at the 100-level or higher, with the exception of Overseas Studies courses included on this list (see also note 1, above).
4. All courses to be counted toward the M.A., minor, or honors in Latin American Studies must be taken for a letter grade.

5. For the M.A. degree, cognate courses must be taken for 5 units each. M.A. elective courses may be taken for 3-5 units each.
6. Some courses have prerequisites or special enrollment requirements. Students are responsible for making sure they have completed any prerequisites and/or secured an instructor's permission, as needed.

## CULTURE AND SOCIETY

- ANTHRO 100C. Chavin de Huantar Research Seminar
- ANTHRO 101. The Aztecs and Their Ancestors: Introduction to Mesoamerican Archaeology
- ANTHRO 120. The Maya
- ARTHIST 494. Caribbean and Latin American Art
- COMPLIT 121. Poems, Poetry, Worlds: An Introductory Course
- COMPLIT 142. The Literature of the Americas (same as AMSTUD 142, ENGLISH 172E)
- COMPLIT 332. The Transatlantic Renaissance (same as ENGLISH 310)
- EDUC 178X. Latino Families, Languages, and Schools
- HISTORY 70. Culture, Politics, and Society in Latin America
- HISTORY 106B. Global Human Geography: Europe and Americas
- HISTORY 170. Colonial Latin America
- HISTORY 170B. Culture, Society and Politics in Latin America (minor/honors survey course)
- HISTORY 175. Modern Mexico
- HISTORY 203E. Global Catholicism
- HISTORY 208C. History of Death and Dying
- HISTORY 273G. Geographical Imagination & the Making of Brazil & the Hispanic-American States, 1750-1850
- HISTORY 275G. Religion in Colonial Latin America and the Iberian World (same as HISTORY 375G)
- HISTORY 372B. Frontiers of Iberian and Latin American Culture and History (same as HISTORY 272B, ILAC 272B, ILAC 372B) (M.A. core course and honors seminar)
- ILAC 106N. Contemporary Latin American Literature in Translation
- ILAC 114N. Lyric Poetry
- ILAC 118N. Slavery and Freedom, Madness and Reason in Brazil; the Fiction of Machado de Assis
- ILAC 121. Narratives of Affect
- ILAC 131. Cultural Perspectives in the Luso-Hispanic Americas
- ILAC 161. Modern Latin American Literature
- ILAC 193Q. Spaces and Voices of Brazil through Film (same as PORTLANG 193Q)
- ILAC 212. Cuban Cinema since the Revolution
- ILAC 239. Borges and Translation
- ILAC 258. New Latin American Short Stories and Films (1980-2009): a Survey (same as ILAC 158)
- ILAC 262. The Literature of Elena Poniatowska
- ILAC 264. Visions of the Andes (same as ILAC 364)
- ILAC 271. Brazilian Presence: Landscape, Life and Literature
- ILAC 280. Latina/o Literature (same as CHICANST 200, CSRE 200, ILAC 382)
- OSPMADR 50. Flirting with Spanish Metafiction: Cervantes, Velázquez, Fuentes, Almodóvar
- OSPSANTG 10. Borges and Argentina
- OSPSANTG 11. Dance and Culture in Latin America
- OSPSANTG 14. Women Writers of Latin America in the 20th Century
- OSPSANTG 15. Dances of Latin America
- OSPSANTG 62. Topics in Chilean History
- OSPSANTG 68. The Emergence of Nations in Latin America

- OSPSANTG 104X. Modernization and Culture in Latin America
- OSPSANTG 116X. Modernization and its Discontents: Chilean Politics at the Turn of the Century
- OSPSANTG 118X. Artistic Expression in Latin America
- SOC 264. Immigration and the Changing United States (same as CHICANST 164, CSRE 164, SOC 164)

## ENVIRONMENT AND ECOLOGY

- ANTHRO 259. Conservation and Development Dilemmas in Latin America: Galapagos as Microcosm (same as ANTHRO 159) (M.A. core course)
- ANTHRO 260. Social and Environmental Sustainability: The Costa Rican Case (same as ANTHRO 160)
- ANTHRO 277. Environmental Change and Emerging Infectious Diseases (same as ANTHRO 177, HUMBIO 114)
- BIO 175. Tropical Ecology and Conservation
- CEE 265A. Sustainable Water Resources Development
- CEE 265D. Water and Sanitation in Developing Countries
- EARTHSYS 173. Aquaculture and the Environment: Science, History, and Policy (EARTHSYS 273, EESS 173, EESS 273)
- EARTHSYS 253. Soils and Nutrient Cycling in the Amazon Rainforest (same as EARTHSYS 153, EESS 153, EESS 253)
- OSPSANTG 58. Living Chile: A Land of Extremes
- OSPSANTG 71. Santiago: Urban Planning, Public Policy, and the Built Environment
- OSPSANTG 85. Marine Ecology of Chile and the South Pacific

## POLITICAL ECONOMY

- ECON 106. World Food Economy (EARTHSYS 106, EESS 106)
- ECON 127. Economics of Health Improvement in Developing Countries (same as MED 262)
- ECON 217. Topics in Latin American Macroeconomics and Development
- EDUC 306A. Economics of Education in the Global Economy
- INTNLREL 141A. Camera as Witness: International Human Rights Documentaries
- INTNLREL 147. The Political Economy of the Southern Cone of South America
- INTNLREL 148. Economic Integration of the Americas
- LAW 584. Comparative and International Freedom of Press: US, Latin America, and Inter-American System
- LAW 658A. International Human Rights and Conflict Resolution Clinic: Clinical Practice
- OSPSANTG 119X. The Chilean Economy: History, International Relations, and Development Strategies
- OSPSANTG 129X. Latin America in the International System
- OSPSANTG 130X. The Chilean Economy in Comparative Perspective
- OSPSANTG 221X. Political Transition and Democratic Consolidation: Chile in Comparative Perspective
- POLISCI 248S. Latin American Politics (M.A. core course)
- POLISCI 327. Minority Behavior and Representation
- POLISCI 440B. Political Economy of Development (same as HISTORY 378E)

## OVERSEAS STUDIES COURSES IN LATIN AMERICAN STUDIES

For course descriptions and additional offerings, see the listings in the *Stanford Bulletin's* ExploreCourses web site (<http://explorecourses.stanford.edu>) or the Bing Overseas Studies web site (<http://bossp.stanford.edu>). Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

**AUTUMN QUARTER****SANTIAGO**

- OSPSANTG 14. Women Writers of Latin America in the 20th Century. 4-5 units, Sergio Missana, GER:DB:Hum, EC:Gender
- OSPSANTG 58. Living Chile: A Land of Extremes. 5 units, Reid, GER:DB:EngrAppSci
- OSPSANTG 68. The Emergence of Nations in Latin America. 4-5 units, Ivan Jaksic, GER:DB:SocSci
- OSPSANTG 104X. Modernization and Culture in Latin America. 5 units, Bernardo Subercaseaux, GER:DB:SocSci, EC:GlobalCom
- OSPSANTG 130X. The Chilean Economy in Comparative Perspective. 5units, Luders, GER:DB:SocSci
- OSPSANTG 221X. Political Transition and Democratic Consolidation: Chile in Comparative Perspective. 5 units, Sergio Micco, GER:DB:SocSci

**WINTER QUARTER****SANTIAGO**

- OSPSANTG 14. Women Writers of Latin America in the 20th Century. 4-5 units, Sergio Missana, GER:DB:Hum, EC:Gender
- OSPSANTG 58. Living Chile: A Land of Extremes. 5 units, Staff, GER:DB:EngrAppSci
- OSPSANTG 62. Topics in Chilean History. 4-5 units, Ivan Jaksic
- OSPSANTG 118X. Artistic Expression in Latin America. 5 units, César Albornoz, GER:DB:SocSci, EC:GlobalCom
- OSPSANTG 129X. Latin America in the International System. 4-5 units, Claudio Fuentes, GER:DB:SocSci

**SPRING QUARTER****MADRID**

- OSPMADRD 50. Flirting with Spanish Metafiction: Cervantes, Velázquez, Fuentes, Almódovar. 4-5 units, Santiago Tejerina-Canal, GER:DB:Hum

**SANTIAGO**

- OSPSANTG 10. Borges and Argentina. 4-5 units, Sergio Missana, GER:DB:Hum
- OSPSANTG 68. The Emergence of Nations in Latin America. 4-5 units, Ivan Jaksic, GER:DB:SocSci
- OSPSANTG 85. Marine Ecology of Chile and the South Pacific. 5 units, Alvaro Palma, GER:DB:NatSci
- OSPSANTG 116X. Modernization and its Discontents: Chilean Politics at the Turn of the Century. 5 units, German Correa, GER:DB:SocSci

**LINGUISTICS**

*Emeriti (Professors)* Joan Bresnan, Clara N. Bush, Shirley Brice Heath, William R. Leben, Stanley Peters, Elizabeth C. Traugott  
*Chair:* Thomas A. Wasow

*Professors:* Eve V. Clark, Penelope Eckert, Daniel Jurafsky (on leave Autumn), Martin Kay, Paul Kiparsky, Beth Levin, John R. Rickford, Ivan A. Sag, Thomas A. Wasow

*Associate Professors:* Arto Anttila, Christopher Manning, Christopher Potts

*Assistant Professors:* Vera Gribova, Robert Podesva, Meghan Sumner (on leave)

*Courtesy Professors:* Herbert H. Clark, Kenji Hakuta, James McClelland, Orrin W. Robinson III, Chao Fen Sun

*Courtesy Associate Professors:* H. Samy Alim, James A. Fox, Miyako Inoue, Yoshiko Matsumoto

*Courtesy Assistant Professor:* Michael C. Frank

*Senior Lecturer:* Philip L. Hubbard

*Visiting Associate Professor:* Gerald Penn

*Lecturers:* Philip Hofmeister (Autumn), Asya Pereltsvaig (Autumn and Spring)

*Consulting Professors:* Ronald Kaplan, Lauri Karttunen, Annie Zaenen, Arnold Zwicky

*Consulting Associate Professors:* Jared Bernstein, Cleo Condoravdi

*Department Offices:* Margaret Jacks Hall, Building 460

*Mail Code:* 94305-2150

*Phone:* (650) 723-4284

*Email:* linguistics@lists.stanford.edu

*Web site:* <http://linguistics.stanford.edu>

Courses offered by the DEPARTMENT of Linguistics are listed under the subject code LINGUIST on the *Stanford Bulletin's* ExploreCourses web site.

Linguistics concerns itself with the fundamental questions of what language is and how it is related to the other human faculties. In answering these questions, linguists consider language as a cultural, social, and psychological phenomenon and seek to determine what is unique in languages, what is universal, how language is acquired, and how it changes. Linguistics is, therefore, one of the cognitive sciences; it provides a link between the humanities and the social sciences, as well as education, and hearing and speech sciences.

The department offers courses at the undergraduate and graduate levels in the areas central to linguistic theory and analysis. Many of them deal with the analysis of structural patterns in the different components that make up language, including sounds (phonetics and phonology), meanings (semantics and pragmatics), words (morphology), sentences (syntax), and the way they vary and change over time. Other courses integrate the analysis of linguistic structure with phenomena that directly concern other disciplines. These include courses in computational linguistics, language acquisition, the philosophy of language, psycholinguistics, and sociolinguistics.

A variety of open forums provide for the discussion of linguistic issues, including colloquia and regularly scheduled workshops in child language, computational linguistics, phonology, psycholinguistics, semantics, sociolinguistics, and syntax.

**MISSION OF THE UNDERGRADUATE PROGRAM IN LINGUISTICS**

The mission of the undergraduate program in Linguistics is to provide students with the skills necessary to analyze the structure of human languages including sounds (phonetics and phonology), meanings (semantics and pragmatics), words (morphology), sentences (syntax), and the way in which these structural patterns vary and change over time. Courses in the major also integrate the analysis of linguistic structure with phenomena that directly

concern other disciplines including computer science, psychology, cognitive science, communication, anthropology, and foreign language. The program provides students with excellent preparation for further study in graduate or professional schools as well as careers in business, social services, government agencies, and teaching.

## LEARNING OUTCOMES

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. the ability to formulate theoretically interesting and tractable research questions.
2. the ability to identify sources of data relevant to answering their research questions.
3. facility with methods of collecting data relevant to their research questions.
4. knowledge of analytical methods to apply to the data they have collected.
5. the ability to bring the results of their data analysis to bear on their research questions.

## GRADUATE PROGRAMS IN LINGUISTICS

The department offers an M.A., Ph.D., and Ph.D. minor in Linguistics.

## COGNITIVE SCIENCE

Linguistics is participating with the departments of Computer Science, Philosophy, and Psychology in an interdisciplinary program in Cognitive Science for doctoral students. The program is intended to provide an interdisciplinary education as well as a deeper concentration in linguistics. Students who complete the Linguistics and Cognitive Science requirements receive a special designation in Cognitive Science along with the Ph.D. in Linguistics. To receive this field designation, students must complete 30 units of approved courses, to be determined in consultation with the graduate studies adviser.

## LINGUISTICS COURSE CATALOG NUMBERING SYSTEM

Courses numbered under 100 are designed primarily for pre-majors. Courses with 100-level numbers are designed for majors, minors, and M.A. and Ph.D. minor candidates in Linguistics. Those with numbers 200 and above are primarily for graduate students, but with consent of instructor some of them may be taken for credit by qualified undergraduates. At all levels, the course numberings indicate a special area, as follows:

00-04	General
05-09	Phonetics
10-14	Phonology
15-19	Morphology
20-29	Syntax
30-39	Semantics, Pragmatics, Discourse
40-49	Language Acquisition, Psycholinguistics
50-61	Sociolinguistics, Language Variation, Change
62-73	Language and Culture, Structure of a Language
74-79	Methods, Mathematical Linguistics, Statistics
80-89	Computational Linguistics
90-99	Directed Work, Theses, Dissertations

## BACHELOR OF ARTS IN LINGUISTICS

The undergraduate major stresses the study of language both as a fundamental human faculty and as a changing social institution. At the core of the program is a set of departmental courses on the nature of human language; the major also draws on courses offered by other departments and programs.

The Linguistics major cuts across the humanities and the social and physical sciences. It provides a solid general education as a background for advanced studies in such disciplines as anthropology, cognitive science, communication, computer science, education (language, literacy, and culture), hearing and speech sciences, languages, law, linguistics, philosophy, and psychology.

## REQUIREMENTS

Requirements for the B.A. include at least 50 units of course work in Linguistics and approved courses in related fields. Of the 50 units required for the major, no more than 12 may be below the 100 level. No more than two courses, neither of which can be a core course, may be taken on a credit/no credit basis. Students must receive a 'C-' or better in courses used towards the requirements.

*Core Courses*—The core courses are:  
 LINGUIST 1. Introduction to Linguistics  
 LINGUIST 110. Introduction to Phonetics and Phonology  
 LINGUIST 120. Introduction to Syntax  
 LINGUIST 130A. Introduction to Linguistic Meaning  
 or LINGUIST 130B. Introduction to Lexical Semantics  
 LINGUIST 150. Language in Society, which fulfills the Writing in the Major requirement (WIM)  
 LINGUIST 160. Introduction to Language Change, or, in advance consultation with the Linguistics undergraduate studies adviser, a course in historical linguistics or the history of a language.

All majors must complete at least five core courses, including LINGUIST 150, Language and Society.

*Other Courses*—Other courses counting toward the unit requirement should form a coherent program with emphases from among the areas of concentration listed below. Students should consult with the Linguistics undergraduate studies adviser when declaring the major, and maintain regular contact during the remainder of their Stanford career. Each student's major program must be approved by the Linguistics undergraduate studies adviser, or approved department adviser.

Students in the major must also take:

1. At least two 200-level Linguistics courses, typically in their area of concentration.
2. LINGUIST 197, Undergraduate Research Seminar, in the junior year. Special arrangements can be made for transfer students and others who start the major late.

*Other Requirements*—

1. *Foreign language*: majors must have competence in at least one language other than English as part of their understanding of the field of linguistics and its study. This is usually demonstrated by the completion of six quarters of language study at Stanford or equivalent; level of proficiency is determined by the Language Center or the relevant language department. Students may petition to be exempted from the Language Requirement if they have grown up speaking a language other than English and can use it for everyday purposes and for linguistic analysis.
2. *Junior research paper*: this requirement is typically fulfilled by providing an additional stage of revision on a research paper previously submitted in a Linguistics course. It must be approved by both the instructor of the course and the Linguistics undergraduate studies adviser by the end of the junior year.

## AREAS OF CONCENTRATION

Students select an area of concentration or develop one themselves in advance consultation with the Linguistics undergraduate studies adviser. These areas of concentration are not declared on Axess, and they do not appear on the transcript or diploma.

## HONORS PROGRAM

Students who wish to undertake a more intensive program of study, including independent research, should pursue departmental honors. Students should apply for honors by the end of Spring Quarter of their junior year. As part of the application, the student must write a research proposal describing the honors project which must be approved by the faculty adviser. Approval is given only to students who have maintained a grade point average (GPA) of 3.3 (B+) or better in the courses required for the major.

Honors students complete a total of 60 units including the 50 units for the major, plus 10 additional units of independent study and Honors Research. In addition, they must complete an honors thesis based on research conducted with a principal adviser who must be a member of the Linguistics faculty, and a secondary faculty adviser who may, with the approval of the Undergraduate Studies Committee, be a member of another department. In the Autumn Quarter of the senior year, honors students enroll in LINGUIST 199, Independent Study, to work closely with one of their advisers on the research project. In Winter and Spring quarters, honors students enroll in LINGUIST 198, Honors Research, with the student's principal adviser for close supervision of the honors thesis. The thesis must be submitted in final, acceptable, form by May 15. The thesis topic is presented orally at a department Honors Colloquium late in Spring Quarter.

## MINOR IN LINGUISTICS

Requirements for the minor include at least 28 units of course work (typically seven courses) in Linguistics and related fields, approved in advance by the Linguistics undergraduate studies adviser. No more than two courses, neither of which can be a core course, may be taken on a credit/no credit basis. The courses counting towards the minor must be incremental units beyond those needed to satisfy the student's major course of study. The minor consists of:

1. LINGUIST 1. Introduction to Linguistics
2. Two out of the following Linguistics core courses:  
LINGUIST 110. Introduction to Phonetics and Phonology  
LINGUIST 120. Introduction to Syntax  
LINGUIST 130A. Introduction to Linguistic Meaning  
LINGUIST 150. Language in Society  
or LINGUIST 160. Introduction to Language Change  
or, in advance consultation with the Linguistics undergraduate studies adviser, a course in historical linguistics or the history of a language.
3. At least four other courses determined in advance consultation with the Linguistics undergraduate studies adviser. Students are encouraged to take at least one 200-level Linguistics course. Students may also choose to do independent work with a faculty member of their choice.

## COTERMINAL BACHELOR'S AND MASTER'S DEGREE PROGRAM IN LINGUISTICS

The Department of Linguistics admits a limited number of undergraduates to the coterminal degree program. Students are required to submit to the department a complete application, which includes a statement of purpose identifying a thesis topic, a Stanford transcript, three letters of recommendation (at least one of which must be from a faculty member in Linguistics), and a proposed course of study (worked out in advance with a Linguistics adviser). Applicants for the coterminal degree may apply as early as their eighth quarter and no later than early in the eleventh quarter of undergraduate study. Decisions on admission to the coterminal degree program rest with the Graduate Admissions Committee of the Department of Linguistics. For further application information, see the department's web pages.

For University coterminal degree program rules and University application forms, see <http://registrar.stanford.edu/shared/publications.htm#Coterm>.

## MASTER OF ARTS IN LINGUISTICS

The University's basic requirements for the master's degree are discussed in the "Graduate Degrees" section of this bulletin. The following are additional departmental requirements. Candidates should review the department's *Guidelines for the M.A. Degree in Linguistics* for further particulars concerning these requirements.

1. *Courses*: candidates must complete 45 units of graduate work in Linguistics, including at least four courses in the student's area of specialization. No more than two courses should be at the 100 level.  
Individual programs should be worked out in advance with an adviser to ascertain that the necessary courses in the area of specialization are offered over the course of the year of anticipated enrollment. The overall grade point average (GPA) must be at least 3.0 (B) for all degree program coursework.
2. *Language*: reading knowledge of a non-native language in which a substantial linguistic literature is written, with sufficient facility to understand and interpret linguistic research published in that language, or in-depth research on the structure of a non-native language.
3. *Thesis or Thesis Project*: a research paper supervised by a committee of three faculty (normally fulfilled by up to 6 units of LINGUIST 398, Directed Research).

## DOCTOR OF PHILOSOPHY IN LINGUISTICS

The following requirements are in addition to the basic University requirements for the degree sought; see the "Graduate Degrees" section of this bulletin. Candidates should review the department's *Guidelines for the Degree of Ph.D. in Linguistics*, downloadable at <http://www-linguistics.stanford.edu/graduate/phd-guidelines.pdf>, for further particulars concerning these requirements.

1. *Language*—candidates must demonstrate the ability to read at least one foreign language in which a substantial linguistic literature is written, with sufficient facility to understand and to interpret linguistic research published in that language. (Particular areas of specialization may require additional research languages.)  
In addition, each candidate must demonstrate an explicit in-depth knowledge of the structure of at least one language (normally neither the candidate's native language nor the language used for the reading exam). This requirement is fulfilled by writing an original research paper on a language.
2. *Courses*—a minimum of 135 units of graduate work beyond the bachelor's degree, or 90 units beyond the master's degree. The course requirements detailed in the *Guidelines for the Degree of Ph.D. in Linguistics* guarantee that each student covers a sufficient set of subareas within the field.  
Candidates must maintain a satisfactory record in the number and distribution of units completed. The overall course work GPA must be at least 3.0 (B), and all of the basic courses should be completed with at least a 'B.'
3. *Research*—the prospective Ph.D. candidate is expected to complete two substantial qualifying papers. The deadline for completion of the first qualifying paper is the end of Autumn Quarter of the second year; the deadline for completion of the second qualifying paper is the end of Autumn Quarter of the third year. The subject matter of the two papers, although it may be related (for example, same language), must be clearly distinct. The requirement is fulfilled by two quarters of LINGUIST 395, Research Workshop (1-2 units each), and by oral discussion with a committee of at least three faculty members selected by the student and the faculty.
4. *Candidacy*—students must complete a prescribed portion of the basic course requirement (see item 2 above), one foreign language requirement (see item 1 above), and one qualifying paper (see item 3 above) by the end of their second year.

5. *Teaching*—at least three quarters serving as a teaching assistant in Linguistics courses.
6. *Colloquia*—two oral presentations exclusive of the public portion of the University oral (see item 7b below). This requirement is satisfied by class presentations, conference papers, or colloquium talks. Normally, both should be given during the first four years of study.
7. *Dissertation*—
  - a. appointment of a dissertation committee.
  - b. an approved written dissertation proposal is required by the end of Autumn Quarter of the fourth year.
  - c. oral discussion of the dissertation proposal with an augmented dissertation committee.
  - d. passing a University oral examination on the dissertation and related areas which includes a public presentation of the dissertation research.
  - e. dissertation (up to 15 units of LINGUIST 399).

## PH.D. MINOR IN LINGUISTICS

1. *Courses*: the candidate must complete 30 units of course work in linguistics. The University requires that at least 20 of these units be at the 200 level or above; the remaining 10 units must be at the 100 level or above. The course work for the minor must include LINGUIST 110, 120, and either 130A or 130B or 200-level introductory courses in the same areas and at least three courses related to the area of specialization. Courses submitted for the minor must be incremental units beyond those used to satisfy the major. Individual programs should be worked out in advance with the student's Ph.D. minor adviser in Linguistics.
2. *Research Project* (optional): the candidate may elect to present a paper which integrates the subject matter of linguistics into the field of specialization of the candidate.
3. The Linguistics minor adviser or designee serves on the candidate's University oral examination committee and may request that up to one-third of the examination be devoted to the minor subject.

## OVERSEAS STUDIES COURSES IN LINGUISTICS

For course descriptions and additional offerings, see the listings in the *Stanford Bulletin's* ExploreCourses web site (<http://explorecourses.stanford.edu>) or the Bing Overseas Studies web site (<http://bosp.stanford.edu>). Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

## WINTER QUARTER

### PARIS

OSPPARIS 37. Gesture. 3 units, Eve Clark, GER:DB:SocSci  
 OSPPARIS 38. First Language Acquisition, with Emphasis on French. 4 units, Eve Clark

# DIVISION OF LITERATURES, CULTURES, AND LANGUAGES

*Division Chair*: Gabriella Safran  
*Division Offices*: Building 260, Rooms 114-119  
*Mail Code*: 94305-2005  
*Phone*: (650) 724-1333; Fax: (650) 725-9306  
*Email*: dlcl@stanford.edu  
*Web Site*: <http://dlcl.stanford.edu>

Courses offered by the Division of Literatures, Cultures, and Languages are listed under the subject code DLCL on the *Stanford Bulletin's* ExploreCourses web site.

The Division of Literatures, Cultures, and Languages consists of five academic departments (Comparative Literature, French and Italian, German Studies, Iberian and Latin American Cultures, and Slavic Languages and Literatures), five focal groups (Humanities Education, Performance, Philosophy and Literature, Poetics, and Renaissance) as well as the Language Center, which oversees language instruction at Stanford. All the departments of the division offer academic programs leading to B.A., M.A., and Ph.D. degrees. The division brings together scholars and teachers dedicated to the study of literatures, cultures, and languages from humanistic and interdisciplinary perspectives. The departments in the division are distinguished by the quality and versatility of their faculty, a wide variety of approaches to cultural traditions and expressions, and the intense focus on the mastery of languages. This wealth of academic resources, together with small classes and the emphasis on individual advising, creates a superior opportunity for students who wish to be introduced to or develop a deeper understanding of non-English speaking cultures.

The division's departments and the Language Center offer instruction at all levels, including introductory and general courses that do not require knowledge of a language other than English. These courses satisfy a variety of undergraduate requirements and can serve as a basis for developing a minor or a major program in the member departments. The more advanced and specialized courses requiring skills in a particular language are listed under the relevant departments, as are descriptions of the minor and major programs.

The DLCL itself offers one undergraduate minor program, an undergraduate multimedia laboratory course, and several graduate courses focused on the teaching of second languages, the teaching of literature, and academic professionalization.

## MINOR IN MODERN LANGUAGES

The Division of Literatures, Cultures, and Languages offers an undergraduate minor that draws upon courses in literature and language within the division's departments and elsewhere in the University.

Course work in this minor may not duplicate work counted toward other majors or minors. Advanced Placement credit and transfer credit do not apply to this minor. All courses must be taken for a letter grade. By University policy, no more than 36 units may be awarded in this minor.

Students declare the minor in Modern Languages through Axess.

## MINOR IN MODERN LANGUAGES

The minor in Modern Languages is offered to students who want to supplement the course work in their major with course work in modern languages and literatures. The minor must be approved by the chairs of undergraduate studies of the respective language departments. Students in any field qualify for the minor by meeting the following requirements:

1. A minimum of 20 units (10 units per language) at the intermediate level (second year) or beyond, not including

conversation, in two languages other than English offered by the DLCL.

- At least one additional course, at the 100 level or above, whose subject code ends in -LIT or -GEN in each modern language in '1' above. These courses should be taught by Academic Council members or other senior members of the faculty.

Students are recommended to study, work, or intern abroad for at least eight weeks at a location where one of the languages is spoken.

## FOCAL GROUPS

While the five departments in the Division of Literatures, Cultures, and Languages serve common interests in literary and cultural traditions and their languages, the DLCL's focal groups bring together faculty members and graduate students who share topics and approaches that range across languages and national literatures. These groups are designed to respond directly to the research interests of the faculty as a community, and reflect long-term commitments by the participants. They are conceived as portals that open from the Division outward to the wider community of literary and humanities scholars at Stanford. The membership may include any member of the Stanford faculty or any Ph.D. student with an interest in the topic. Most Focal Groups include participants from several humanities departments outside the DLCL.

Thus the DLCL is characterized by two axes of intellectual inquiry:

- the departmental axis, which is organized by language, nation, and culture
- the focal axis, which may be organized by genre, period, methodology, or other criteria.

The convergence of the two axes, departments and focal groups, locates faculty members and graduate students in at least two intersecting communities. The DLCL believes that this convergence gives institutional form to the intellectual conditions under which many scholars of literature and culture presently work.

Each focal group maintains a standing research workshop at which both faculty and graduate student members discuss their work. Some focal groups offer formal courses; and all groups are responsible for overseeing research-oriented activities and extracurricular events in the relevant area, including sponsoring conferences, publications, podcasts, and other activities that disseminate the outcomes of their research.

## HUMANITIES EDUCATION

*Chairs:* Jenny Bergeron (Institutional Research and Decision Support), Russell A. Berman (Comparative Literature, German Studies)

*Faculty Members:* Elizabeth Bernhardt (German Studies, Language Center), Eamonn Callan (School of Education), Adrian Daub (German Studies), Marisa Galvez (French and Italian), Orrin Robinson (German Studies), Gabriella Safran (Slavic Languages and Literatures), Mitchell Stevens (School of Education), Jennifer Summit (English), Guadalupe Valdés (School of Education)

*Web Site:* <http://dlcl.stanford.edu/groups/humanities-education>

The focal group on Humanities Education explores issues concerning teaching and learning in the humanities, including research on student learning, innovation in pedagogy, the role of new technologies in humanities instruction, and professional issues for humanities teachers at all educational levels.

## PERFORMANCE

*Chairs:* Monika Greenleaf (Comparative Literature, Slavic Languages and Literatures), Peggy Phelan (Drama, English)

*Faculty Members:* Julie Draskoczy (Slavic Languages and Literatures), Jean Ha (History), Branislav Jakovljevic (Drama), Indra Levy (East Asian Languages and Cultures), Marília Librandi Rocha (Iberian and Latin American Cultures),

Gabriella Safran (Slavic Languages and Literatures), Lisa Surwillo (Iberian and Latin American Cultures)

*Web Site:* <http://dlcl.stanford.edu/groups/performance>

The Performance group brings together departments of the DLCL with other disciplines, such as Drama, to achieve a cross-pollination and to reinvigorate performance theory through consciously re-mediated research interests, methodologies, and forms of scholarly expression. Each year of a three-year program focuses on a distinct goal:

- Discussion of seminal texts and topics with key guests, extended through a blog on Arcade.
- A writing colloquium culminating in a conference and guest performances by invited artists at the Bing Concert Hall opening (2012).
- Joint publication.

## PHILOSOPHY AND LITERATURE

*Chairs:* R. Lanier Anderson (Philosophy), Joshua Landy (French and Italian)

*Faculty Members:* Keith Baker (History), Russell Berman (Comparative Literature, German Studies), Alexis Burgess (Philosophy), Martón Dornbach (German Studies), Jean-Pierre Dupuy (French and Italian), Amir Eshel (Comparative Literature, German Studies), Gregory Freidin (Slavic Languages and Literatures), Robert Harrison (French and Italian), David Hills (Philosophy), Héctor Hoyos (Iberian and Latin American Cultures), Michelle Karnes (English), Marília Librandi Rocha (Iberian and Latin American Cultures), Joan Ramon Resina (Iberian and Latin American Cultures, Comparative Literature), Nariman Skakov (Slavic Languages and Literatures), Blakey Vermeule (English), Laura Wittman (French and Italian), Lee Yearley (Religious Studies)

*Web Site:* <http://dlcl.stanford.edu/groups/philosophy-literature>

The focal group on Philosophy and Literature brings together faculty and students from nine departments to investigate questions in aesthetics and literary theory, philosophically-inflected literary texts, and the form of philosophical writings. Fields of interest include both continental and analytic philosophy, as well as cognitive science, political philosophy, rational choice theory, and related fields. The group offers undergraduate tracks within eight majors, a graduate workshop, and a lecture series.

## WORKSHOP IN POETICS

*Chairs:* Roland Greene (Comparative Literature, English), Nicholas Jenkins (English)

*Faculty Members:* Marisa Galvez (French and Italian), Michael Predmore (Iberian and Latin American Cultures)

*Web Site:* <http://dlcl.stanford.edu/groups/workshop-poetics>

The Workshop in Poetics focal group is concerned with the theoretical and practical dimensions of the reading and criticism of poetry. During the four years of its existence, the Workshop has become a central venue at Stanford enabling participants to share their individual projects in a general conversation outside of disciplinary and national confinements. The two dimensions that the workshop sees as urgent are:

- poetics in its specificity as an arena for theory and interpretive practice.
- historical poetics as a particular set of challenges for the reader and scholar.

The core mission is to offer Stanford graduate students a space to develop and critique their current projects.

## RENAISSANCES

*Chairs:* Vincent Barletta (Iberian and Latin American Cultures), Roland Greene (Comparative Literature, English)

*Faculty Members:* Cécile Alduy (French and Italian), Shahzad Bashir (Religious Studies), Paula Findlen (History), Tamar Herzog (History), Bissera Pentcheva (Art and Art History), Morten Steen Hansen (Art and Art History), Jennifer Summit (English)



Web Site: <http://dlcl.stanford.edu/groups/renaissances>

The Renaissance focal group discusses the present and future of early modern studies, drawing different fields of literature into conversation. In addition to sponsoring lectures and seminars focused primarily on methods and modes of research in the field, the group organizes the Renaissance/Early Modern seminar (taught this year in Spring Quarter 2012) and is currently developing a web-based project on the Renaissance.

## MATHEMATICAL AND COMPUTATIONAL SCIENCE

*Co-Directors:* Bradley Efron, Susan Holmes

*Committee in Charge:* Takeshi Amemiya (Economics, emeritus), Emmanuel Candes (Mathematics, Statistics), Gunnar Carlsson (Mathematics), Richard Cottle (Management Science and Engineering, emeritus), Thomas M. Cover (Electrical Engineering, Statistics), Bradley Efron (Statistics), J. Michael Harrison (Graduate School of Business), Susan Holmes (Statistics), Parviz Moin (Engineering), George Papanicolaou (Mathematics), Eric Roberts (Computer Science), David Rogosa (Education), Tim Roughgarden (Computer Science), Amin Saberi (Management Science and Engineering), David Siegmund (Statistics), Jonathan Taylor (Statistics), Arthur F. Veinott, Jr. (Management Science and Engineering, emeritus), Brian White (Mathematics).

*Program Offices:* Sequoia Hall, 390 Serra Mall

*Mail Code:* 94305-4065

*Phone:* (650) 723-2620

*Email:* helnnn@stanford.edu

*Web Site:* <http://stanford.edu/group/mathcompsci>

Courses offered by the Program in Mathematical and Computational Science are listed under the subject code MCS on the *Stanford Bulletin's* ExploreCourses web site.

This interdepartmental interschool undergraduate program provides a major for students interested in the mathematical and computational sciences, or in the use of mathematical ideas and analysis in problems in the social or management sciences. It provides a core of mathematics basic to all the mathematical sciences and an introduction to concepts and techniques of computation, optimal decision making, probabilistic modeling, and statistical inference. It also provides an opportunity for elective work in any of Stanford's mathematical science disciplines.

The program uses the faculty and courses of the departments of Computer Science, Management Science and Engineering, Mathematics, and Statistics. It prepares students for graduate study or employment in the mathematical and computational sciences or in those areas of applied mathematics which center around the use of computers and are concerned with the problems of the social and management sciences.

A biology option is offered for students interested in applications of mathematics, statistics, and computer science to the biological sciences (bioinformatics, computational biology, statistical genetics, neurosciences); and in a similar spirit, an engineering option.

### UNDERGRADUATE MISSION STATEMENT FOR MATHEMATICAL AND COMPUTATIONAL SCIENCE

The mission of the Mathematical and Computational Science Program is to provide students with a core of mathematics basic to all the mathematical sciences and an introduction to concepts and techniques of computation, optimal decision making, probabilistic modeling and statistical inference. The program is interdisciplinary in its focus, and students are required to complete course work in mathematics, computer science, statistics, and management science and engineering. A computational biology track is available for

students interested in biomedical applications. The program prepares students for careers in academic, financial and government settings as well as for study in graduate or professional schools.

### LEARNING OUTCOMES

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to be able to demonstrate:

1. understanding of principles and tools of statistics.
2. command of optimization and its applications and to be able to analyze and interpret problems from various disciplines.
3. an understanding of computer applications emphasizing modern software engineering principles.
4. an understanding of multivariate calculus, linear algebra, and algebraic and geometric proofs.

### BACHELOR OF SCIENCE IN MATHEMATICAL AND COMPUTATIONAL SCIENCE

The requirement for the bachelor's degree, beyond the University's basic requirements, is an approved course program of 72-77 units, distributed as follows:

**Mathematics (MATH):** 28-31 units

	<i>Qtr. and Units</i>
MATH 41. Calculus	A 5
and MATH 42. Calculus	A,W 5
MATH 51. Linear Algebra and Differential Calculus of Several Variables	A,W,S 5
or MATH 51H. Honors Advanced Calculus	A 5
MATH 52. Integral Calculus of Several Variables	A,W,S 5
or MATH 52H. Honors Advanced Calculus	W 5
MATH 53. Ordinary Differential Equations with Linear Algebra	A,W,S 5
or MATH 53H. Honors Advanced Calculus	S 5
MATH 109. Applied Group Theory (WIM)	W 3
or MATH 110. Applied Number Theory and Field Theory (WIM)	S 3
or MATH 120. Modern Algebra (WIM)	A,S 3
or MATH 171. Fundamental Concepts of Analysis (WIM)	A,S 3
MATH 104. Applied Matrix Theory	A,W 3
or MATH 113. Linear Algebra and Matrix Theory	W,S 3

**Computer Science (CS):** 18-24 units

CS 103. Mathematical Foundations of Computing	A,S 5
CS 106X. Programming Methodology and Abstractions (Accel)	A,W 3-5
or CS 106A. Programming Methodology	A,W,S 3-5
and CS 106B. Programming Abstractions	A,W,S 3-5
And two of the following (CS or CME):	
CME 108. Introduction to Scientific Computing	S 3-4
CS 107. Programming Paradigms	A,S 3-5
CS 154. Introduction to Automata and Complexity Theory	W,S 3-4
CS 161. Design and Analysis of Algorithms	A,W 3-4
CS 181. Computers, Ethics and Public Policy (WIM)	A,S 3-4

**Management Science and Engineering (MS&E):** 7-9 units

<b>Both:</b>	
MS&E 211. Linear and Nonlinear Optimization	A 4
and MS&E 221. Stochastic Modeling	W 3
<b>Or 3 of the following:</b>	
MS&E 111. Introduction to Optimization (same as ENGR 62)	A,S 4
MS&E 121. Introduction to Stochastic Modeling	S 3
MS&E 211. Linear and Nonlinear Optimization	A 4
MS&E 212. Mathematical Programming and Combinatorial Optimization	W 3
MS&E 221. Stochastic Modeling	W 3

MS&E 251. Stochastic Decision Models	W	3
<b>Statistics (STATS): (11 units)</b>		
STATS 116. Theory of Probability	A,S	3-5
STATS 191. Introduction to Applied Statistics	W	3-4
or STATS 203. Introduction to Regression Models and Analysis of Variance	W	3
STATS 200. Introduction to Statistical Inference	W	3

**HONORS PROGRAM**

The honors program is designed to encourage a more intensive study of mathematical sciences than the B.S. program. In addition to meeting all requirements for the B.S., the student must:

- Maintain an average letter grade equivalent to at least a 3.5 in all academic work.
- Prepare a statement describing major area of concentration for honors work.
- Complete at least 15 units in mathematical sciences in addition to the requirements for the major listed above. Include in these 15 units at least one of the following:
  - An approved higher-level graduate course
  - Participation in a small group seminar
  - At least 3 units of directed reading
- Describe how each course selected added to the student's knowledge and understanding in area chosen for concentration.
- Students interested in honors should consult with their adviser by last quarter of their junior year to prepare their program of study. Honors work may be concentrated in fields such as biological sciences, environment, physics, etc.

**MATHEMATICAL AND COMPUTATIONAL SCIENCE ELECTIVES (9 UNITS)**

Three courses in mathematical and computational science, 100-level or above, at least 3 units each. At least one must be chosen from the following:

	<i>Qtr. and Units</i>	
ECON 102C. Advanced Topics in Econometrics	S	5
ECON 140. Introduction to Financial Economics	S	5
ECON 160. Game Theory and Economic Applications (prerequisite ECON 51)	S	5
ECON 179. Experimental Economics	W	5
EE 261. The Fourier Transform and its Applications	A,W	3
EE 263. Introduction to Linear Dynamical Systems	A	3
EE 278. An Introduction to Statistical and Signal Processing	A,W,S	3
MS&E 211. Linear and Nonlinear Optimization	A	3-4
MS&E 212. Mathematical Programming and Combinatorial Optimization	W	3
MS&E 221. Stochastic Modeling	W	3
MS&E 251. Stochastic Decision Models	W	3
MCS 100. Mathematics of Sports (same as STATS 50)	A	3
MATH 104. Applied Matrix Theory	A, W	3
MATH 106. Functions of a Complex Variable	W	3
MATH 108. Introduction to Combinatorics and its Applications	S	3
MATH 113. Linear Algebra & Matrix Theory	W,S	3
MATH 115. Functions of a Real Variable	A,S	3
MATH 116. Complex Analysis	S	3
MATH 131. Partial Differential Equations I	A,W	3
MATH 132. Partial Differential Equations II	S	3
MATH 136. Stochastic Processes (same as STATS 219)	A	3
MATH 171. Fundamental Concepts of Analysis	A,S	3
MATH 172. Lebesgue Integration and Fourier Analysis	W	3
PHIL 151. First-Order Logic	W	4
STATS 202. Data Mining and Analysis	A	3
STATS 208. Introduction to the Bootstrap (not given 2011-12)		3
STATS 215. Statistical Models in Biology	W	3
STATS 217. Introduction to Stochastic Processes	W	3

For Computer Science (CS), electives can include courses not taken as units under the CS list above and the following:

CME 302. Numerical Linear Algebra	A	3
CS 108. Object-Oriented Systems Design	A,W	3-4
CS 110. Principles of Computer Systems	A,W	5
CS 140. Operating Systems and Systems Programming	A	3-4
CS 143. Compilers	A	3-4
CS 157. Logic and Automated Reasoning	A	3-4
CS 161. Design and Analysis of Algorithms	A,W	3-4
CS 164. Computing with Physical Objects		3
CS 194. Software Project (prerequisite CS 108)	S	3
CS 221. Artificial Intelligence: Principles and Techniques	W	3-4
CS 223A. Introduction to Robotics	W	3
CS 223B. Introduction to Computer Vision		3
CS 225A. Experimental Robotics	S	3
CS 228. Probabilistic Models in Artificial Intelligence	W,S	3
CS 229. Machine Learning	A	3
CS 243. Advanced Compiling Techniques	W	3-4
EE 282. Computer Systems Architecture	S	3

With the adviser's approval, courses other than those offered by the sponsoring departments may be used to fulfill part of the elective requirement. These may be in fields such as biology, economics, electrical engineering, industrial engineering, and medicine, that might be relevant to a mathematical sciences major, depending on a student's interests.

- At least three quarters before graduation, majors must file with their advisers a plan for completing degree requirements.
- All courses used to fulfill major requirements must be taken for a letter grade with the exception of courses offered satisfactory/no credit only.
- A course used to fulfill the requirements of one section of the program may not be applied toward the fulfillment of the requirements of another section.
- The student must have a grade point average (GPA) of 2.0 or better in all course work used to fulfill the major requirement.

**MATHEMATICAL AND COMPUTATIONAL SCIENCE BIOLOGY OPTION**

	<i>Qtr. and Units</i>	
Replace STATS 191/203 with		
STATS/BIO 141. Biostatistics	A	3-5
Take at least 2 courses from the Biology core:		
BIO 41. Genetics and Biochemistry	A	5
BIO 42. Cell Biology and Animal Physiology	W	5
BIO 43. Plant Biology, Evolution, and Ecology	S	5
Take a third course either from the core or:		
STATS 166. Statistical Methods in Computational Genetics (WIM)	S	3
BIO 102. Population Biology	S	3
BIO 136. Evolutionary Paleobiology		4
BIO 143/243. Evolution		4
BIO 144. Conservation Biology	W	3-4
BIO 160A. Developmental Biology I	A	4
BIO 160B. Developmental Biology II	A	4
BIO 183. Theoretical Population Genetics	S	3
BIO 203. Advanced Genetics	A	4
BIO 230. Molecular and Cellular Immunology	A	4-5
Honors students should take 3 of the following:		
STATS 166. Statistical Methods in Computational Genetics (WIM)	S	3
ANTHRO 178. Introduction to Anthropological Genetics		5
ANTHRO 187. The Genetic Structure of Populations		5
ANTHRO 188. Research in Anthropological Genetics		5
BIO 113. Fundamentals of Molecular Evolution		4
BIO 146. Population Studies	W	1

**MATHEMATICAL AND COMPUTATIONAL SCIENCE ENGINEERING OPTION**

Students in the Engineering option take the introductory courses for the Mathematics and Computational Sciences major with the following allowable substitutions.

**The MATH 51-53 series may be replaced by:**

CME 100/ENGR 154. Vector Calculus for Engineers	A	5
CME 102/ENGR 155A. Ordinary Differential Equations for Engineers	W	5
CME 104/ENGR 155B. Linear Algebra and Partial Differential Equations for Engineers	S	5
MATH 115. Functions of a Real Variable	A,S	3

**STATS 116 may be replaced by either one of the following:**

STATS 110. Statistical Methods in Engineering and Physical Sciences	A	4-5
or CME 106/ENGR 155C. Introduction to Probability and Statistics for Engineers	W	3-4

**STATS 191/STATS 203 may be replaced by:**

STATS 202. Data Analysis	A	3
<i>Electives—</i>		

**Take at least one course from the following list:**

MATH 106. Introduction to Theory of Functions of a Complex Variable	W	3
MATH 108. Introduction to Combinatorics Applications	S	3
MATH 116. Complex Analysis	S	3
MATH 132. Partial Differential Equations II	S	3
PHIL 151. First-Order Logic	W	4

**Take at least two courses from the following list:**

ENGR 15. Dynamics	A,S	3
ENGR 20. Introduction to Chemical Engineering	S	3
ENGR 25. Biotechnology	W,S	3
ENGR 30. Engineering Thermodynamics	A,W	3
ENGR 40. Introductory Electronics	A, S	5
ENGR 50. Introductory Science Materials	A,W, S	4
ENGR 105. Feedback Control Design	W	3

**MINOR IN MATHEMATICAL AND COMPUTATIONAL SCIENCE**

The minor in Mathematical and Computational Science is intended to provide an experience of the four constituent areas: Computer Science, Mathematics, Management Science and Engineering, and Statistics. Five basic courses are required:

CS 106X. Programming Methodology and Abstractions (Accelerated)

or CS 106A,B. Programming Methodology

MATH 51. Linear Algebra and Differential Calculus of Several Variables

or MATH 104. Applied Matrix Theory

MS&E 211. Linear and Nonlinear Optimization

or MS&E 221. Stochastic Modeling

STATS 116. Theory of Probability, and either

STATS 191. Introduction to Applied Statistics

or STATS 200. Introduction to Statistical Inference

In addition to the above, the minor requires three courses from the following, two of which must be in different departments:

CME 108. Introduction to Scientific Computing

CS 103. Mathematical Foundations of Computing

CS 107. Programming Paradigms

CS 154. Introduction to Automata and Complexity Theory

CS 161. Design and Analysis of Algorithms

EE 261. The Fourier Transform and its Applications

ECON 102C. Advanced Topics in Econometrics

ECON 160. Game Theory and Economic Applications (prerequisite ECON 51)

ECON 181. Optimization and Economic Analysis

MS&E 211. Linear and Nonlinear Optimization

MS&E 212. Mathematical Programming and Combinatorial Optimization

MS&E 221. Stochastic Modeling

MS&E 251. Stochastic Decision Models

MATH 104. Applied Matrix Theory

MATH 106. Functions of a Complex Variable

MATH 108. Introduction to Combinatorics and its Applications

*Qtr. and Units*

MATH 109. Applied Group Theory		
MATH 110. Applied Number Theory and Field Theory		
MATH 115. Functions of a Real Variable		
MATH 131. Partial Differential Equations I		
MATH 132. Partial Differential Equations II		
MATH 171. Fundamental Concepts of Analysis		
PHIL 151. First-Order Logic		
STATS 191. Introduction to Applied Statistics		
STATS 200. Introduction to Statistical Inference		
STATS 202. Data Analysis		
STATS 203. Introduction to Regression Models and Analysis of Variance		
STATS 217. Introduction to Stochastic Processes		

Other upper-division courses appropriate to the program major may be substituted with consent of the program director. Undergraduate majors in the constituent programs may not count courses in their own departments.

**MATHEMATICS**

*Emeriti:* Solomon Feferman, Robert Finn, Yitzhak Katznelson, Joseph Keller, Georg Kreisel, Harold Levine, Tai-Ping Liu, R. James Milgram, Donald Ornstein, Robert Osserman

*Chair:* Steven Kerckhoff

*Professors:* Simon Brendle, Gregory Brumfiel, Daniel Bump, Emmanuel Candes, Gunnar Carlsson, Ralph L. Cohen, Brian Conrad, Amir Dembo, Persi Diaconis, Yakov Eliashberg, Eleny Ionel, Steven Kerckhoff, Jun Li, Rafe Mazzeo, Maryam Mirzakhani, George Papanicolaou, Lenya Ryzhik, Richard Schoen, Leon Simon, Kannan Sundararajan, Ravi Vakil, Andras Vasy, Akshay Venkatesh, Brian White

*Associate Professor:* Soren Galatius

*Szegö Assistant Professors:* Ricardo Andrade, Isabelle Camilier, Jose Cantarero Lopez, Thomas Church, Jian Ding, Pierre Garapon, Martin Luu, Peter McNamara, Ronan Mukamel, Yi Wang

*Lecturers:* Eric Bahuaud, Mark Lucianovic, Jeremy Van Horn-Morris, Wojciech Wieczorek

*Courtesy Professors:* Renata Kallosh, Grigori Mints

*Consulting Professors:* Brian Conrey, David Hoffman

*Simons Fellows:* Richard Bamler, Alexander Subotic

*Web site:* <http://math.stanford.edu>

Courses offered by the Department of Mathematics are listed under the subject code MATH on the *Stanford Bulletin's* ExploreCourses web site.

The Department of Mathematics offers programs leading to the degrees of Bachelor of Science, Master of Science, and Doctor of Philosophy in Mathematics, and participates in the program leading to the B.S. in Mathematical and Computational Science. The department also participates in the M.S. and Ph.D. degree programs in Scientific Computing and Computational Mathematics and the M.S. degree program in Financial Mathematics.

**MISSION OF THE UNDERGRADUATE PROGRAM IN MATHEMATICS**

The mission of the undergraduate program in Mathematics is to provide students with a broad understanding of mathematics encompassing logical reasoning, generalization, abstraction, and formal proof. Courses in the program teach students to create, analyze, and interpret mathematical models and to communicate sound arguments based on mathematical reasoning and careful data analysis. The mathematics degree prepares students for careers in the corporate sector and government agencies, and for graduate programs in mathematics.

**LEARNING OUTCOMES**

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These

learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. the ability to comprehend mathematical arguments.
2. problem solving skills.
3. the ability to formulate proofs and to structure mathematical arguments.
4. the ability to communicate mathematical ideas.

### ADVANCED PLACEMENT IN MATHEMATICS FOR FRESHMEN

Students of unusual ability in mathematics often take one or more semesters of college-equivalent courses in mathematics while they are still in high school. Under certain circumstances, it is possible for such students to secure both advanced placement and credit toward the bachelor's degree. A decision as to placement and credit is made by the department after consideration of the student's performance on the Advanced Placement Examination in Mathematics (forms AB or BC) of the College Entrance Examination Board, and also after consideration of transfer credit in mathematics from other colleges and universities.

The department does not give its own advanced placement examination. Students can receive either 5 or 10 units of advanced placement credit, depending on their scores on the CEEB Advanced Placement Examination. Entering students who have credit for two quarters of single variable calculus (10 units) are encouraged to enroll in MATH 51-53 in multivariable mathematics, or the honors version 51H-53H. These three-course sequences, which can be completed during the freshman year, supply the necessary mathematics background for most majors in science and engineering. They also serve as excellent background for the major or minor in Mathematics, or in Mathematical and Computational Science. Students who have credit for one quarter of single variable calculus (5 units) should take MATH 42 in Autumn Quarter and 51 in Winter Quarter. Options available in Spring Quarter include MATH 52, or 53. For proper placement, contact the Department of Mathematics.

### BACHELOR OF SCIENCE IN MATHEMATICAL AND COMPUTATIONAL SCIENCE

The Department of Mathematics participates with the departments of Computer Science, Management Science and Engineering, and Statistics in a program leading to a B.S. in Mathematical and Computational Science. See the "Mathematical and Computational Science" section of this bulletin.

### INTRODUCTORY AND UNDERGRADUATE COURSES

The department offers two sequences of introductory courses in single variable calculus.

1. MATH 41, 42 present single variable calculus. Differential calculus is covered in the first quarter, integral calculus in the second.
2. MATH 19, 20, 21 cover the material in 41, 42 in three quarters instead of two.

There are options for studying multivariable mathematics:

1. MATH 51, 52, 53 cover differential and integral calculus in several variables, linear algebra, and ordinary differential equations. These topics are taught in an integrated fashion and emphasize application. MATH 51 covers differential calculus in several variables and introduces matrix theory and linear algebra; 52 covers integral calculus in several variables and vector analysis; 53 studies further topics in linear algebra and applies them to the study of ordinary differential equations. This sequence is strongly recommended for incoming freshmen with 10 units of advanced placement credit.
2. MATH 51H, 52H, 53H cover the same material as 51, 52, 53, but with more emphasis on theory and rigor.

The department offers three classes on linear algebra: 51 (or 51H), 104, and 113.

## GRADUATE PROGRAMS IN MATHEMATICS

### TEACHING CREDENTIALS

For information concerning the requirements for teaching credentials, see the "School of Education" section of this bulletin or address inquiries to Credential Secretary, School of Education.

### BACHELOR OF SCIENCE IN MATHEMATICS

The following department requirements are in addition to the University's basic requirements for the bachelor's degree:

Students wishing to major in Mathematics must satisfy the following requirements:

1. Department of Mathematics courses (other than MATH 100) totaling at least 49 units credit; such courses must be taken for a letter grade. For the purposes of this requirement, STATS 116, PHIL 151, and PHIL 152 count as Department of Mathematics courses.
2. Additional courses taken from Department of Mathematics courses numbered 101 and above or from approved courses in other disciplines with significant mathematical content, totaling at least 15 units credit. At least 9 of these units must be taken for a letter grade.
3. A Department of Mathematics adviser must be selected, and the courses selected under items '1' and '2' above must be approved by the department's director of undergraduate study, acting under guidelines laid down by the department's Committee for Undergraduate Affairs. The Department of Mathematics adviser can be any member of the department's faculty.
4. To receive the department's recommendation for graduation, a student must have been enrolled as a major in the Department of Mathematics for a minimum of two full quarters, including the quarter immediately before graduation. Students are encouraged to declare as early as possible, preferably by the end of the sophomore year.

Students are normally expected to complete either the sequence 19, 20, 21 or the sequence 41, 42 (but not both). Students with an Advanced Placement score of at least 4 in BC math or 5 in AB math may receive 10 units credit and fulfill requirement '1' by taking at least 39 units of Department of Mathematics courses numbered 51 and above. Students with an Advanced Placement score of at least 3 in BC math or at least 4 in AB math may receive 5 units credit and fulfill requirement '1' by taking at least 44 units of Department of Mathematics courses numbered 42 and above.

Sophomore seminar courses may be counted among the choice of courses under item '1'. Other variations of the course requirements laid down above (under items '1' and '2') may, in some circumstances, be allowed. For example, students transferring from other universities may be allowed credit for some courses completed before their arrival at Stanford. However, at least 24 units of the 49 units under item '1' above and 9 of the units under item '2' above must be taken at Stanford. In all cases, approval for variations in the degree requirements must be obtained from the department's Committee for Undergraduate Affairs. Application for such approval should be made through the department's director of undergraduate studies. The policy of the Mathematics Department is that no courses other than the MATH 50 series and below may be double-counted toward any other University major or minor.

It is to be emphasized that the above regulations are minimum requirements for the major; students contemplating graduate work in mathematics are strongly encouraged to include the courses 116, 120, 121, 147 or 148, and 171 in their selection of courses, and in addition, take at least three Department of Mathematics courses over and above the minimum requirements laid out under items '1' and '2' above, including at least one 200-level course. Such

students are also encouraged to consider the possibility of taking the honors program, discussed below.

To help develop a sense of the type of course selection (under items '1' and '2' above) that would be recommended for math majors with various backgrounds and interests, see the following examples. These represent only a few of a very large number of possible combinations of courses that could be taken in fulfillment of the Mathematics major requirements:

*Example 1*—A general program (a balanced program of both pure and applied components, without any particular emphasis on any one field of mathematics or applications) as follows:

- A. either MATH 19, 20, and 21, or 41 and 42 (or satisfactory Advanced Placement credit); 51, 52, 53; 104 or 113; 106; 109; 110; 115;
- B. plus any selection of at least eight of the following courses, including three Department of Mathematics courses: MATH 108, 131, 132, 143, 146, 147, 148, 152, 161; CS 137; ECON 50; PHYSICS 41, 43, 45; STATS 116. These courses from other departments are only meant as examples; there are many suitable courses in several departments that can be taken to fulfill part or all of requirement '2.'

*Example 2*—A theoretical program recommended for those contemplating possible later graduate work providing an introduction to the main areas of mathematics both broader and deeper than the general program outlined above:

- A. either MATH 19, 20 and 21, or 41 and 42 (or satisfactory Advanced Placement credit)
- B. either the sequence 51, 52, 53, or the sequence 51H, 52H, 53H; 106 or 116; 113; 120; 171
- C. plus nine or more 3-unit math courses numbered 121 or higher (the logic courses PHIL 151 and PHIL 152 are considered to be such courses), including at least one algebra course, one analysis course, and one geometry/topology course. (See the description of the honors program below.)

In addition, those contemplating eventual graduate work in Mathematics should consider including at least one graduate-level math course such as MATH 205A, 210A, or 215A or B. Such students should also consider the possibility of entering the honors program.

*Example 3\**—An applied mathematics program:

- A. either MATH 19, 20, and 21; or 41 and 42 (or satisfactory Advanced Placement credit); 51, 52, 53; 104; 106; 108; 109; 110; 115; 131; 132; STATS 116
- B. plus at least 15 units of additional courses in Applied Mathematics, including, for example, suitable courses from the departments of Physics, Computer Science, Economics, Engineering, and Statistics.

\* Students with interests in applied mathematics, but desiring a broader-based program than the type of program suggested in Example 3, including significant computational and/or financial and/or statistical components, are encouraged to also consider the Mathematics and Computational Science program.

## HONORS PROGRAM

The honors program is intended for students who have strong theoretical interests and abilities in mathematics. The goal of the program is to give students a thorough introduction to the main branches of mathematics, especially analysis, algebra, and geometry. Through the honors thesis, students may be introduced to a current or recent research topic, although occasionally more classical projects are encouraged. The program provides an excellent background with which to enter a master's or Ph.D. program in Mathematics. Students completing the program are awarded a B.S. in Mathematics with Honors.

It is recommended that the sequence 51H, 52H, 53H be taken in the freshman year. To graduate with a B.S. in Mathematics with Honors, the following conditions apply in addition to the usual requirements for math majors:

1. The selection of courses under items '1' and '2' above must contain MATH 106 or 116, MATH 120, and MATH 171 and must also include seven additional 3-unit Math courses

numbered 121 or higher. (The logic courses PHIL 151 and 152 can also be used.) These seven courses must include at least one algebra course (121, 122, 152, 154, or 155), one analysis course (131P, 132, 136, 151, 172, 173, or 175), and one geometry/topology course (143, 145, 146, 147, or 148).

2. Students in the honors program must write a senior thesis. In order to facilitate this, the student must, by the end of the junior year, choose an undergraduate thesis adviser from the Department of Mathematics faculty, and map out a concentrated reading program under the direction and guidance of the adviser. During the senior year, the student must enroll in MATH 197 for a total of 6 units (typically spread over two quarters), and work toward completion of the thesis under the direction and guidance of the thesis adviser. The thesis may contain original material, or be a synthesis of work in current or recent research literature. The 6 units of credit for MATH 197 are required in addition to the course requirements laid out under items '1' and '2' above and in addition to all other requirements for math majors.

In addition to the minimum requirements laid out above, it is strongly recommended that students take at least one graduate-level course (that is, at least one course in the 200 plus range). MATH 205A, 210A, and 215A or B are especially recommended in this context.

Students with questions about the honors program should see the director of undergraduate advising.

## MINOR IN MATHEMATICS

To qualify for the minor in Mathematics, a student should complete, for a letter grade, at least six Department of Mathematics courses (other than MATH 100) numbered 51 or higher, totaling a minimum of 24 units. For the purposes of this requirement, STATS 116, PHIL 151, and PHIL 152 count as Department of Mathematics courses. No other courses from outside the Department of Mathematics may be used towards the minor in Mathematics. It is recommended that these courses include either the sequence 51, 52, 53 or the sequence 51H, 52H, 53H. At least 12 of the units applied toward the minor in Mathematics must be taken at Stanford. The policy of the Mathematics Department is that no courses other than the MATH 50 series and below may be double-counted toward any other University major or minor.

## MASTER OF SCIENCE IN MATHEMATICS

The University's basic requirements for the master's degree are discussed in the "Graduate Degrees" section of this bulletin. Students should pay particular attention to the University's course requirements for graduate degrees. The following are specific departmental requirements:

Candidates must complete an approved course program of 45 units of courses beyond the department requirements for the B.S. degree, of which at least 36 units must be Mathematics Department courses, taken for a letter grade. The Mathematics courses must include at least 18 units numbered 200 or above. The candidate must have a grade point average (GPA) of 3.0 (B) over all course work taken in Mathematics, and a GPA of 3.0 (B) in the 200-level courses considered separately. Course work for the M.S. degree must be approved during the first quarter of enrollment in the program by the department's Director of Graduate Studies.

For the M.S. degree in Financial Mathematics, see the "Financial Mathematics" section of this bulletin.

## DOCTOR OF PHILOSOPHY IN MATHEMATICS

The University's basic requirements for the doctorate (residence, dissertation, examinations, etc.) are discussed in the "Graduate Degrees" section of this bulletin. The following are specific departmental requirements.

To be admitted to candidacy, the student must have successfully completed 27 units of graduate courses (that is, courses numbered 200 and above). In addition, the student must pass qualifying examinations given by the department.

Beyond the requirements for candidacy, the student must complete a course of study approved by the Graduate Affairs Committee of the Department of Mathematics and submit an acceptable dissertation. In accordance with University requirements, Ph.D. students must complete a total of 135 course units beyond the bachelor's degree. These courses should be Department of Mathematics courses or approved courses from other departments. The course program should display substantial breadth in mathematics outside the student's field of application. The student must receive a grade point average (GPA) of 3.0 (B) or better in courses used to satisfy the Ph.D. requirement. In addition, the student must pass the Department area examination and the University oral examination.

Experience in teaching is emphasized in the Ph.D. program. Each student is required to complete nine quarters of such experience. The nature of the teaching assignment for each of those quarters is determined by the department in consultation with the student. Typical assignments include teaching or assisting in teaching an undergraduate course or lecturing in an advanced seminar.

For further information concerning degree programs, fellowships, and assistantships, inquire of the academic associate of the department.

## PH.D. MINOR IN MATHEMATICS

The student should complete both of the following:\*

1. MATH 106 *or* 116, 131, 132
2. MATH 113, 114, 120 *or* 152

These courses may have been completed during undergraduate study, and their equivalents from other universities are acceptable.

In addition, the student should complete 21 units of 200-level courses in Mathematics. These must be taken at Stanford and approved by the Department of Mathematics Ph.D. minor adviser.

\* A third coherent sequence designed by the student, subject to the approval of the graduate committee, may be considered as a substitute for items '1' or '2'.

## MEDIEVAL STUDIES

*Affiliated Faculty:* Cecile Alduy (French and Italian), Vincent Barletta (Iberian and Latin American Cultures), Shahzad Bashir (Religious Studies), Carl Bielefeldt (Religious Studies), George H. Brown (English), Steven Carter (Asian Languages), Paula Findlen (History), Charlotte Fonrobert (Religious Studies), Hester Gelber (Religious Studies), Avner Greif (Economics), Hans Ulrich Gumbrecht (French and Italian), Robert Harrison (French and Italian), Michelle Karnes (English), Nancy S.Kollmann (History), Mark E. Lewis (History), William Mahrt (Music), Patricia Parker (Comparative Literature), Bissera Pentcheva (Art and Art History), Orrin W. Robinson (German Studies), Jesse Rodin (Music), Behnam Sadeki (Religious Studies), Carolyn Springer (French and Italian), Jennifer Summit (English)

The Program in Medieval Studies draws together a wide range of disciplines: art and architecture; literature and languages; music; philosophy; religious studies; and economic, social, and political history. Faculty interests bridge Western, Islamic, and Asian cultures, and encompass both traditional and innovative materials and methods.

Undergraduates interested in completing a major in the field of medieval studies may apply to the Individually Designed Majors Program in the School of Humanities and Sciences. For information about this option, contact the Office of Graduate and Undergraduate Studies in the School of Humanities and Sciences.

The minor in Medieval Studies is not available at this time.

## MODERN THOUGHT AND LITERATURE

*Director:* Paula M. L. Moya

*Steering Committee:* Paula M.L. Moya (Chair), Joshua Cohen, Shelley Fisher Fishkin, Zephyr Frank, Sean Hanretta, Pavle Levi, Andrea A. Lunsford, Barbaro Martinez-Ruiz, Jisha Menon, José David Saldívar, Alex Woloch

*Affiliated Faculty:* Lanier Anderson (Philosophy), Eamonn Callan (Education), Russell Berman (German Studies), Joshua Cohen (Political Science, Philosophy, Law), Jean-Pierre Dupuy (French and Italian), Paulla Ebron (Anthropology), Harry Elam (Drama), Michele Elam (English), Shelley Fisher Fishkin (English), James Ferguson (Anthropology), Zephyr Frank (History), Gregory Freidin (Slavic Languages and Literatures), Hans U. Gumbrecht (French and Italian, Comparative Literature), Sean Hanretta (History), Ursula K. Heise (English), Matthew Kohrman (Anthropology), Aishwary Kumar (History), Pam Lee (Art and Art History), Pavle Levi (Art and Art History), Helen Longino (Philosophy), Andrea A. Lunsford (English), Saikat Majumdar (English), Liisa Malkki (Anthropology), Barbaro Martinez-Ruiz (Art and Art History), Dourlas McAdam (Sociology), Robert McGinn (Management Science and Engineering; Science, Technology, and Society), Jisha Menon (Drama), Franco Moretti (English, Comparative Literature), Paula Moya (English), Elisabeth Mudimbe-Boyi (French and Italian), Josiah Ober (Political Science), David Palumbo-Liu (Comparative Literature), Peggy Phelan (Drama), Richard Roberts (History), José David Saldívar (Comparative Literature), Ramón Saldívar (English, Comparative Literature), Priya Satia (History), Debra Satz (Philosophy), Londa Schiebinger (History), Stephen Sohn (English), Helen Stacy (Law), Elizabeth Tallent (English), Fred Turner (Communication), Richard White (History), Bryan Wolf (Art and Art History), Alex Woloch (English), Yvonne Yarbro-Bejarano (Iberian and Latin American Cultures)

*Program Offices:* Building 460, Room 219

*Mail Code:* 94305-2022

*Phone:* (650) 723-3413

*Email:* monica.moore@stanford.edu

*Web Site:* <http://www.stanford.edu/dept/MTL>

Courses offered by the Program in Modern Thought and Literature are listed under the subject code MTL on the *Stanford Bulletin's* ExploreCourses web site.

The program in Modern Thought and Literature admits students for the Ph.D. and a limited number for a coterminal B.A./M.A. Program.

## UNDERGRADUATE PROGRAMS IN MODERN THOUGHT AND LITERATURE

Although Modern Thought and Literature has no formal undergraduate degree granting program, undergraduates interested in completing a major in this field may apply to the Individually Designed Majors Program in the School of Humanities and Sciences. Students interested in this option should consult the Director of the Program in Modern Thought and Literature and the Dean's Office in the School of Humanities and Sciences, which administers the IDM Programs.

## GRADUATE PROGRAMS IN MODERN THOUGHT AND LITERATURE

Modern Thought and Literature (MTL) is an interdisciplinary graduate program advancing the study of critical issues in the modern world. Since 1971, MTL students have helped to redefine the cutting edge of many interdisciplinary fields and to reshape the ways in which disciplinary scholarship is understood and practiced. MTL graduates are leaders in fields such as American

studies, ethnic studies, film studies, social and cultural studies, and women's studies, as well as disciplines such as English, cultural anthropology, and comparative literature.

The program trains students to understand the histories and methods of disciplines and to test their assumptions. It considers how disciplines shape knowledge and, most importantly, how interdisciplinary methods reshape objects of study. MTL students produce innovative analyses of diverse texts, forms, and practices, including those of literature, history, philosophy, anthropology, law, and science; film, visual arts, popular culture, and performance; and material culture and technology.

Each student constructs a unique program of study suited to his or her research. Students have focused on such areas as gender and sexuality; race and ethnicity; science, technology, and medicine; media and performance; legal studies; and critical and social theory. The program's faculty is drawn from fields in the humanities and social sciences, as well as from education, law, and medicine. As interdisciplinary study is impossible without an understanding of the disciplines under consideration, each student is expected to master the methods of one discipline and to gain a foundation in a second field.

## MASTER OF ARTS

The Master of Arts is available to students who are admitted to the doctoral program. Students are not admitted into the program for the purpose of earning a terminal Master of Arts degree. Candidates for the Ph.D. who satisfy the committee of their progress and satisfactorily complete 45 units of course work forming a coherent program of study, may apply for an M.A. in Modern Thought and Literature.

## COTERMINAL BACHELOR'S AND MASTER'S PROGRAM IN MODERN THOUGHT AND LITERATURE

Each year, one or two undergraduates who are exceptionally well prepared in literature and at least one foreign language and whose undergraduate course work includes a strong interdisciplinary component, may petition to be admitted to the program for the purpose of completing a coterminal M.A. degree. Admission to this program is granted only on condition that in the course of working on their master's degrees they do not apply to enter the Ph.D. program in Modern Thought and Literature. The deadline for application is early February.

To apply, applicants submit:

1. An unofficial grade transcript from Axess.
2. A Petition for Admission to the Coterminal Program from the Registrar's Office.
3. A statement giving the reasons the student wishes to pursue this program and its place in his or her future plans. This statement should pay particular attention to the reasons why the student could not pursue the studies he or she desires in some other way.
4. An initial plan of study listing, quarter by quarter, each course by name, units, and instructor, to be taken in order to fulfill the requirements for the degree for a total of 45 units, including at least 20 units of advanced work in one literature, and at least 20 units in a coherent interdisciplinary program of courses taken in non-literature departments. (Changes in the course list are to be expected.)
5. A writing sample of critical or analytical prose, 20 pages maximum.
6. Two letters of recommendation from members of the faculty who know the applicant well and who can speak directly to the question of his or her ability to do graduate-level work.
7. A designated adviser from among the Stanford faculty; normally one letter of recommendation will be from this faculty member.

University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees" section of this bulletin. For University coterminal degree program rules and

University application forms, see <http://studentaffairs.stanford.edu/registrar/publications#Coterm>.

## REQUIREMENTS

The candidate for the M.A. must complete at least 45 units of graduate work, to be divided in the following manner:

1. The introductory seminar, MTL 334A, Concepts of Modernity 1, 5 units; students may substitute 334B, Concepts of Modernity 2, with the director's permission.
2. At least 20 units of advanced course work in literature, to be approved by the director.
3. At least 20 units of course work in a coherent and individually arranged interdisciplinary program, to be approved by the director.

By the end of the course of study, each candidate must also demonstrate a reading knowledge of at least one foreign language.

## DOCTOR OF PHILOSOPHY IN MODERN THOUGHT AND LITERATURE

University requirements for the Ph.D. are discussed in the "Graduate Degrees" section of this bulletin.

A candidate for the Ph.D. degree in Modern Thought and Literature must complete three years (nine quarters) of full-time work, or the equivalent, in graduate study beyond the B.A. degree. He or she is expected to complete at least 18 courses of graduate work in addition to the dissertation. Students may spend one year of graduate study abroad.

Requirements for the Ph.D. in Modern Thought and Literature are:

1. MTL 334A,B. Concepts of Modernity 1 and 2 (5 units each).
2. MTL 299. Edgework: New Directions in the Study of Culture (2 units, Spring Quarter), required of all first-year students.
3. A coherent program of eight courses of advanced work in literary studies to be worked out with the adviser, of which at least six must be regularly scheduled courses in literature. Courses in the teaching of composition (ENGLISH 396, 397), ad hoc graduate seminars (MTL 395), research courses (MTL 398), and thesis registration (MTL 802) may not be counted among these six courses; MTL 396L, 397, 399, 802 may not be counted toward these requirements under any circumstances.
4. Eight courses of advanced work in non-literature departments, the core of which is completion of either a departmental minor or an interdepartmental concentration, typically consisting of six courses. Departmental minors are available from the departments of Anthropology, Art and Art History, Communication, History, Philosophy, Political Science, Religious Studies, and Sociology (see the relevant information in those sections of this bulletin). Approved interdepartmental concentrations have been established in popular culture, ethnic studies, feminist and gender studies, and science and technology studies (specific course requirements are available from the program office). Individually designed concentrations may be approved by petition to the director. In addition to the required six courses in a minor or a concentration, two additional courses from non-literature departments are chosen in consultation with the student's academic adviser. Course restrictions noted above in item 2 also apply.
5. *Qualifying Paper*: This certifies that students are likely to be able to undertake the quality of research, sustained argumentation, and cogent writing demanded in a doctoral dissertation. The qualifying paper must be a substantial revision of a seminar paper written at Stanford during the first year and should embody a substantial amount of independent research, develop an intellectual argument with significant elements of original thinking, and demonstrate the ability to do interdisciplinary work. Each paper is evaluated by two or three readers (designated before the end of the first year of graduate study), one of whom must be a member of the Committee in Charge. Qualifying papers must be submitted to the program

office no later than the end of the third week of the fifth quarter of enrollment, normally, Winter Quarter of the second year.

6. *Teaching*, an essential part of the program, is normally undertaken in conjunction with the Department of English. Candidates are required to demonstrate competence in teaching.
7. Students must demonstrate, by the end of the third quarter of the first year, a reading knowledge of one foreign language and, by the beginning of the first quarter of the third year, a reading knowledge of one other foreign language. Reading knowledge means the ability to make a genuine scholarly use of the language: that is, to read prose of ordinary difficulty. Students may not take the University oral examination before completion of the foreign language requirement.
8. *Candidacy*: At the end of the second year, students apply for candidacy. The following qualifications are required before candidacy can be certified: the earlier submission of a satisfactory qualifying paper; demonstration of a reading knowledge of one foreign language; satisfactory progress in course work; a list of courses applicable to the degree, distinguishing between courses appropriate to the literary component and courses appropriate to the non-literary component; designation of a departmental minor or an interdisciplinary concentration; and the submission of a statement outlining the scope and coherence of the interdisciplinary component of the program in relation to the literary component, and noting the relevance of the course work to that program.
9. *Annual Review*: The program and progress of each student must be approved by the Committee in Charge at the end of each academic year.
10. *University Oral Examination*: This examination, covering the student's areas of concentration, is normally taken in the third year of graduate study. It is a two-hour oral examination administered by four faculty members specializing in the student's areas of concentration, and a chair from another department. The exam is based on a substantial reading list prepared by the student in conjunction with the faculty committee and designed to cover the areas of expertise pertinent to the student's dissertation project.
11. *Dissertation Proposal and Colloquium*: Within one quarter after the University oral examination, the student writes up the dissertation proposal: 15-20 pages with a general description of the project and a chapter breakdown plus a bibliography. The proposal is submitted to the program director and the dissertation committee for approval. After completion of the first chapter of the dissertation, the student sets up a meeting with the dissertation committee for one hour to discuss the work accomplished in the first chapter and plans for completing the rest of the dissertation.
12. *Dissertation*: The fourth and fifth years are devoted to the dissertation, which should be a substantial and original contribution acceptable to the Committee in Charge of Modern Thought and Literature. The subject is drawn from the literature of specialization and the area of nonliterary studies. The dissertation project will conclude with a two-hour defense. The first hour is open to the public and includes a brief presentation of the dissertation project on the part of the Ph.D. candidate. The second hour is reserved to the candidate and his/her Dissertation Committee.

## PH.D. IN MODERN THOUGHT AND LITERATURE AND HUMANITIES

The department participated in the Graduate Program in Humanities leading to a Ph.D. degree in Modern Thought and Literature and Humanities. At this time, the option is available only to students already enrolled in the Graduate Program in Humanities; no new students are being accepted. The University remains committed to a broad-based graduate education in the humanities; the courses, colloquium, and symposium continue to

be offered, and the Division of Literatures, Cultures, and Languages provides advising for students already enrolled who may contact Denise Winters at 650-724-1333 for further information. Courses are listed under the subject code HUMNTIES and may be viewed on the *Stanford Bulletin's* ExploreCourses web site.

## MUSIC

*Emeriti (Professors)* John M. Chowning, Albert Cohen, George Houle, William H. Ramsey, Leonard G. Ratner, Leland C. Smith; *(Professors, Performance)* Arthur P. Barnes, Marie Gibson

*Chair*: Stephen M. Sano

*Professors*: Jonathan Berger, Karol Berger (on leave), Chris Chafe, Brian Ferneyhough, Thomas Grey, Stephen Hinton, Julius O. Smith (on leave Autumn)

*Associate Professors*: Mark Applebaum, Heather Hadlock, William P. Mahrt

*Assistant Professors*: Jaroslaw Kapuscinski, Jesse Rodin (on leave), Anna Schultz, Ge Wang

*Professors (Teaching)*: George Barth (Piano), Stephen M. Sano (Director of Choral Studies)

*Associate Professor (Performance)*: Jindong Cai (Director of Orchestral Studies)

*Courtesy Professor*: Paul DeMarinis

*Senior Lecturers*: Giancarlo Aquilanti (Director of Theory; Wind Ensemble), Talya Berger (Theory), Stephen Harrison (Violoncello), Thomas Schultz (Piano), Gregory A. Wait (Voice; Director of Vocal Studies), Frederick R. Weldy (Piano)

*Lecturers*: Kumaran Arul (Piano), Fredrick Berry (Jazz Ensemble), Mark Brandenburg (Clarinet), Marie-Louise Catsalis (Voice), Marjorie Chauvel (Harp), Jonathan Clark (Mariachi), Tony Clements (Tuba), Laura Dahl (Resident Collaborative Pianist), Anthony Doheny (Violin), John Dornenburg (Viola da Gamba), Charles A. Ferguson (Guitar), Debra Fong (Violin), Claire Giovannetti (Voice), Dawn Harms (Violin, Viola), Alexandra Hawley (Flute), David Henderson (Classical Saxophone), Wendy Hillhouse (Voice), Robert Hubbard (Oboe), Joyce Johnson-Hamilton (Trumpet), Wendy Ju (HCI theory), Jay Kadis (Audio Recording), McDowell Kenley (Trombone), Mary Linduska (Voice, Summer only), Murray Low (Jazz Piano), Janet Maestre (Flute), Anthony Martin (Baroque Violin), James Matheson (Oboe), Seward McCain (Jazz Bass), Charles McCarthy (Jazz Saxophone), Robert Huw Morgan (University Organist, Organ), Bruce Moyer (Contrabass), Herbert Myers (Early Winds), James Nadel (Jazz), Rufus Olivier (Bassoon), Larry S. Ragent (French Horn), Joseph Sargent (Musicology, Autumn only), Melody Schaeffle (Flute), Amy Schneider (Voice, on leave), Robin Sharp (Violin), Livia Sohn (Violin), Elaine Thornburgh (Harpsichord), Erik Ulman (Composition, Theory), Linda Uyechi (Taiko), Rick Vandivier (Jazz Guitar), Mark Veregge (Percussion), Sharon Wei (Viola), John Worley (Jazz Trumpet), Hui (Daisy) You (Guzheng), Timothy Zerlang (University Carillonneur, Piano)

*Consulting Professors*: Jonathan Abel (CCRMA), David Berners (CCRMA), Marina Bosi-Goldberg (CCRMA), Walter Hewlett (Computer-Assisted Research in the Humanities), Eleanor Selfridge-Field (Computer-Assisted Research in the Humanities), Malcolm Slaney (CCRMA)

*Visiting Professor*: Thomas Rossing (CCRMA)

*Acting Assistant Professor*: Charles Kronengold

*Artists-in-Residence (St. Lawrence String Quartet)*: Geoff Nuttall (Violin), Scott St. John (Violin), Lesley Robertson (Viola), Christopher Costanza (Violoncello)

*Department Offices*: Braun Music Center, Room 101

*Mail Code*: 94305-3076

*Phone*: (650) 723-3811

*Email*: musicdept@stanford.edu



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

Courses offered by the Department of Music are listed under the subject code MUSIC on the *Stanford Bulletin's* ExploreCourses web site.

## MISSION OF THE DEPARTMENT OF MUSIC

The Department of Music's aims are to provide specialized training for those who plan careers in music as composers, performers, teachers, and research scholars, and to promote the understanding and enjoyment of music in the University at large through its courses and performance offerings.

### LEARNING OUTCOMES

Students majoring in music pursue foundational theoretical and historical coursework before moving on to this in-depth, writing intensive musical analysis course. This course provides the requisite skills needed to continue in advanced work for the major. Students must demonstrate an understanding of tonal music and facility in discussing it.

1. the ability to select and outline an appropriate topic area and select appropriate methodologies for tonal music analysis.
2. an appropriate mastery of the principles underpinning tonal music analysis, referencing appropriate authors and analytical tools and methodologies.
3. appropriate mastery of the use of primary source materials in written and oral presentations.
4. appropriate mastery of the use of secondary source materials in written and oral presentations.
5. the analytical writing skills necessary for the execution of the course papers.
6. the skills necessary to present a musical analysis to an audience in a coherent manner.

## BACHELOR OF ARTS IN MUSIC

The undergraduate major in Music is built around a series of foundation courses in theory, musicianship, and music history, in addition to performance and the proficiency requirements outlined below. Majors must complete a minimum of 66 units within the department. All required courses for the B.A. in any concentration must be taken for a letter grade. Electives may be taken credit/no credit, but any courses taken towards concentration requirements must carry a letter grade.

### SUGGESTED PREPARATION FOR THE MAJOR

Because of the sequence of courses, it takes more than two years to complete the requirements for the major. Students are required to meet with the undergraduate student services officer in the department prior to declaring the major. It is recommended that prospective majors schedule this consultation with the undergraduate student services officer as early as possible in their careers in order to plan a program that allows sufficient time for major course work, practice, and University requirements outside the major. Early planning is especially important for students wishing to double-major, for those contemplating overseas study during their undergraduate years, for those wishing to do an in-depth concentration in the Music major, and for those with particular musical talents and interests. It is recommended that music majors complete MUSIC 21, 22, and 23 in the freshman year; the series should be completed by Autumn Quarter of the junior year. It is recommended that music majors complete MUSIC 40, 41, and 42 in the sophomore year; the series should be completed by the end of the junior year.

*Suggested Preparatory Course*—MUSIC 19. Introduction to Music Theory.

### FIELDS OF STUDY OR DEGREE OPTIONS

Concentrations are offered in: performance; conducting; composition; history and theory; or music, science, and technology. Each concentration is declarable in Axxss as a

subplan; guidelines and further information are available from the Department of Music office. In order to complete requirements in a timely manner, students are urged to select this option no later than the middle of the junior year for single-area concentrators and the middle of the sophomore year for multiple-area concentrators. Students pursuing multiple concentrations must fulfill all the requirements of each.

### DEGREE REQUIREMENTS

In conjunction with the undergraduate student services officer, the student is assigned a departmental adviser with whom the student is required to meet at least once each quarter. Total units and courses required to graduate for each concentration are specified in the relevant section following.

*Required Courses*—The following courses are required of all majors.

1. *Theory*—  
MUSIC 21. Elements of Music I (4 units)  
MUSIC 22. Elements of Music II (4 units)  
MUSIC 23. Elements of Music III (4 units)
2. *History*—  
MUSIC 40. Music History to 1600 (4 units)  
MUSIC 41. Music History 1600-1830 (4 units)  
MUSIC 42. Music History Since 1830 (4 units)
3. *Analysis*—  
MUSIC 121. Analysis of Tonal Music (4 units)  
and two at the 4-unit level, from:  
MUSIC 122A. Renaissance and Baroque Counterpoint  
MUSIC 122B. Harmonic Materials of the 19th Century  
MUSIC 122C. Introduction to 20th-Century Composition
4. *Writing in the Major (WIM)*—Three (at least two at the 4-unit level) from:  
MUSIC 140. Studies in Medieval Music  
MUSIC 141. Studies in Renaissance Music  
MUSIC 142. Studies in Baroque Music  
MUSIC 143. Studies in Classical Music  
MUSIC 144. Studies in Romantic Music  
MUSIC 145. Studies in Modern Music  
MUSIC 146. Music and Urban Film  
MUSIC 147. The Soul Tradition in African American Music  
MUSIC 147A. Music Ethnography of the Bay Area  
MUSIC 148. Musical Shakespeare: Theater, Song, Opera, and Film  
MUSIC 149. Reactions to the Record: Early Recordings, Lost Styles, and Music's Future  
MUSIC 251. Psychophysics and Music Cognition
5. *Applied*—
  - a. A minimum of five quarters totaling 15 units of private instruction in instrumental and/or vocal performance (MUSIC 172/272-177/277); students who do not qualify for private instruction at the intermediate or advanced level, but who wish to pursue the major may take introductory voice (MUSIC 65 and 73), piano (MUSIC 12 and 72A), or guitar (MUSIC 74C) to reach the minimum proficiency levels required to be accepted into a private studio and then complete their 5 quarters. Requirements for the minimum levels of proficiency in each instrument for private instruction are posted at: <http://music.stanford.edu/Academics/Auditions.html>.
  - b. A minimum of five quarters totaling at least 5 units of work in one or more of the department's organizations or chamber groups. To fulfill the ensemble requirement, Music majors need at least three quarters of participation in the department's traditional large ensembles (MUSIC 159-167), with the exception of students whose primary instrument is harp, keyboard, or guitar, who need to participate at least one quarter in the ensembles above, but who may fulfill the rest of the requirement with chamber music (MUSIC 171). MUSIC 181 and MUSIC 156 may count for up to two of the ensemble-unit requirements for the Music major.

*Note*—MUSIC 128, Composition, Coding, and Performance with SLOrk; MUSIC 157, Mariachi Band; MUSIC 158, Soundwire Ensemble; MUSIC 160A, Stanford Philharmonia Orchestra; MUSIC 160B, Stanford New Ensemble; MUSIC 161C, Red Vest Band; and MUSIC 161D, Stanford Brass Ensemble, do not satisfy this requirement.

6. *Additional requirements*—
  - a. Majors are required to pass a Piano Proficiency examination as part of the music theory core (MUSIC 21, 22, 23). The examination is given in the first two weeks of MUSIC 21. Students who do not pass the Piano Proficiency examination are required to enroll in MUSIC 12 concurrently with the music theory core until they are able to pass the examination. The examination consists of scales and arpeggios, performance of a simple tune to be set by the examiner, sight-reading, and the performance of prepared pieces. Information regarding the proficiency examination may be downloaded at <http://music.stanford.edu/private/downloads/PIANO%20PROFICIENCY%20EXAM.doc>
  - b. Majors must also pass an ear-training proficiency examination, which is one of the requirements to complete MUSIC 23. It may be taken by arrangement and demonstrates a student's ability to hear music accurately and to perform it at sight.

*Electives*—

1. *Concentration in Performance*—In addition to degree requirements required of majors listed above, students in the Performance concentration must:
    - a. Complete at least 6 additional, graded course units in one area of performance. Acceptable courses are described under "Applied" in the section describing private instruction and ensemble course work above. Additional courses might include, but are not limited to:
      - MUSIC 126. Introduction to Thoroughbass
      - MUSIC 154. Composition and Performance of Instrumental Music with Electronics
      - MUSIC 182. Diction for Singers
      - MUSIC 183. Art Song Interpretation
      - MUSIC 269. Research in Performance Practices
    - a. Register for an independent project (MUSIC 198, 4 units) in the senior year under faculty supervision, leading to a senior recital.
  2. *Concentration in Conducting*—In addition to degree requirements required of majors listed above, students in the Conducting concentration must:
    - a. Complete at least 6 additional, graded course units in conducting. Additional courses might include, but are not limited to:
      - MUSIC 127. Instrumentation and Orchestration
      - MUSIC 130. Elementary Conducting
      - MUSIC 230. Advanced Orchestral Conducting
      - MUSIC 231. Advanced Choral Conducting
    - a. Register for an independent project (MUSIC 198, 4 units) in the senior year under faculty supervision, leading to a senior conducting project.
  3. *Concentration in Composition*—In addition to degree requirements required of majors listed above, students in the Composition concentration must:
    - a. Complete at least 6 additional, graded course units in composition. Additional courses might include, but are not limited to:
      - MUSIC 123. Undergraduate Seminar in Composition
      - MUSIC 125. Individual Undergraduate Projects in Composition
      - MUSIC 127. Instrumentation and Orchestration
      - MUSIC 150. Musical Acoustics
      - MUSIC 154. Composition and Performance of Instrumental Music with Electronics
- MUSIC 220A, B, or C—any of the series in computer-generated sound, music, and composition
- a. Register for an independent project (MUSIC 198, 4 units) in the senior year under faculty supervision, leading to a composition.
4. *Concentration in History and Theory*—In addition to degree requirements required of majors listed above, students in the History and Theory concentration must:
    - a. Complete at least 6 additional, graded course units in history and theory. Additional courses might include, but are not limited to:
      - MUSIC 122A, B, or C—any course not taken in fulfillment of the major requirement
      - MUSIC 140-149/240-249, 251—any courses not taken in fulfillment of the major requirement
      - MUSIC 221. Topics in the History of Theory
    - MUSIC 220A, B, or C—any of the series in computer-generated sound, music, and composition
    - a. Register for an independent project (MUSIC 198, 4 units) in the senior year under faculty supervision, leading to a senior research paper.
  5. *Concentration in Music, Science, and Technology*—Requires completion of 66 units of course work that differs from that of the major and is delineated below. This field of study is designed for those students interested in the musical ramifications of rapidly evolving computer technology and digital audio, and in the acoustic and psychoacoustic foundations of music. This program can serve as a complementary major to students in the sciences and engineering. Students in the program are required to include the following courses in their studies:
    - a. *Theory and Analysis*—
      - MUSIC 21. Elements of Music I (4 units)
      - MUSIC 22. Elements of Music II (4 units)
      - MUSIC 23. Elements of Music III (4 units; includes passing the piano and ear-training proficiency examinations, as described for the major)
      - MUSIC 121. Analysis of Tonal Music (4 units)
      - MUSIC 150. Musical Acoustics (3 units)
      - MUSIC 251. Psychophysics and Music Cognition (WIM) (4 units)
      - MUSIC 220A. Fundamentals of Computer-Generated Sound (4 units)
      - MUSIC 220B. Compositional Algorithms, Psychoacoustics, and Spatial Processing (4 units)
      - MUSIC 220C. Research Seminar in Computer-Generated Music (4 units)
      - MUSIC 220D. Research in Computer-Generated Music (4 units)
      - MUSIC 250A. Human-Computer Interface Theory and Practice (4 units)
    - a. *Applied*—
      - Individual studies in performance, MUSIC 171/272-177/277, (6 units), or MUSIC 192A, Foundations of Sound Recording Technology and MUSIC 192B, Advanced Sound-Recording Technology (3 units each).
      - Ensemble as described above for the major (5 units) or MUSIC 192C. Session Recording (5 units).
    - b. *History*—Two at the 4-unit level from:
      - MUSIC 40. Music History to 1600
      - MUSIC 41. Music History 1600–1830
      - MUSIC 42. Music History Since 1830
    - a. The program requires a senior research project (4 units) completed under faculty guidance. May be completed in conjunction with enrollment in any of the following: MUSIC 220D; MUSIC 199; MUSIC 198.

### HONORS PROGRAM

Honors in Music are awarded by the faculty to Majors who have produced an independent project of exceptional quality through the Concentration program. Students who wish to pursue

Honors must declare their Concentration(s) by May 31 of the Junior year (see the Undergraduate Student Services Officer for concentration-specific requirements). To receive Honors students must also have earned an overall GPA of 3.60 or higher and a GPA of 3.70 or higher in courses required for the Music Major. Honors are conferred solely through faculty adjudication. For students concentrating in multiple areas, a single jury will be convened.

### OVERSEAS STUDY OR STUDY ABROAD

Courses in Music are often available at Stanford overseas programs, especially in Berlin, Paris, Florence, and Oxford. See the "Overseas Studies Program" section of this bulletin for this year's listings. Music majors and minors should talk to the Department of Music undergraduate administrator prior to going overseas.

### MINOR IN MUSIC

Minors in Music in the concentration areas of performance, conducting, composition and history and theory, as well as in the concentration in music, science, and technology provide the student with a core of essential Music courses in the disciplines that establish both a foundation for informed appreciation of music and a basis for more advanced study, should the student wish to pursue it.

*Requirements*—Total of 36 units required course work as delineated below. Students in either minor must also pass the piano and ear-training proficiency examinations required of Music majors.

*Required Courses for the Minor in Music with concentrations in performance, conducting, composition, and history and theory—*

1. *Theory*—
  - MUSIC 21. Elements of Music I (4 units)
  - MUSIC 22. Elements of Music II (4 units)
  - MUSIC 23. Elements of Music III (4 units)
2. *History*—
  - MUSIC 40. Music History to 1600 (4 units)
  - MUSIC 41. Music History 1600–1830 (4 units)
  - MUSIC 42. Music History Since 1830 (4 units)
3. *Applied (two quarters)*—
  - MUSIC 159-171. Ensemble (2 units, total)
  - MUSIC 172-177. Individual Instruction (6 units, total)
4. *Choice of one (WIM)*—
  - MUSIC 140-149, 190H, 251 (4 units)

*Required Courses for the Minor in Music with a concentration in music, science, and technology—*

1. *Theory*—
  - MUSIC 21. Elements of Music I (4 units)
  - MUSIC 22. Elements of Music II (4 units)
  - MUSIC 23. Elements of Music III (4 units)
  - MUSIC 150. Musical Acoustics (3 units)
  - MUSIC 251. Psychophysics and Music Cognition (WIM) (4 units)
  - MUSIC 220A. Fundamentals of Computer-Generated Sound (4 units)
  - MUSIC 220B. Compositional Algorithms, Psychoacoustics, and Spatial Processing (4 units)
2. *Applied*—
  - MUSIC 192A. Foundations of Sound-Recording Technology (3 units)
  - MUSIC 192B. Advanced Sound-Recording Technology (3 units)
  - MUSIC 192C. Session Recording (two quarters; 3 units total)

### MASTER OF ARTS IN MUSIC

University requirements for the M.A. are described in the "Graduate Degrees" section of this bulletin.

None of Stanford's required undergraduate courses may be credited toward an advanced degree unless specifically required

for both degrees. Only work that receives a grade of 'A,' 'B,' or 'Satisfactory' (a passing grade in an instructor-mandated credit/no credit course) in Music courses numbered 100 or higher taken as a graduate student is recognized as fulfilling the advanced-degree requirements. Students may need to devote more than the minimum time in residence if preparation for graduate study is inadequate.

### ADMISSION

Applicants are required to submit evidence of accomplishment (scores, recordings, and/or research papers) when they complete the application form. Applicants should arrange to take the Graduate Record Examination (GRE) well in advance of the December 14 application deadline. All components of the application are due by December 14. International students whose first language is not English are also required to take the TOEFL exam (with certain exceptions: see <http://studentaffairs.stanford.edu/gradadmissions>).

### FIELDS OF STUDY OR DEGREE OPTIONS

All of the above fields of study are declarable as subplans in Axxess:

- Master of Arts degree (M.A.)—in Composition.
- Master of Arts degree (M.A.)—in Music History.
- Master of Arts degree (M.A.)—in Computer-Based Music Theory and Acoustics.
- Master of Arts degree (M.A.)—in Music, Science, and Technology (M.A./M.S.T.) Note: The MA/MST program is the only terminal master's degree; it is two years in duration.

### DEGREE REQUIREMENTS

A minimum of 45 academic units is required for the master's degree in Music. The Department of Music does not accept students for study only towards the M.A. degree except in the Music, Science, and Technology program, described below.

*Required Courses—*

I. *Composition*—Students are not admitted into the M.A. as a terminal degree for composition: rather, students in the D.M.A. program in composition who enter directly from the bachelor's level may, upon completing 45 graduate-level units and advancing to candidacy by passing the qualifying examination, be recommended for the M.A. degree in composition.

II. *Music History*—Students are not admitted into the M.A. as a terminal degree for music history: rather, students in the Ph.D. program in musicology who enter directly from the bachelor's level may, upon completing 45 graduate-level units and advancing to candidacy by passing the qualifying examination, be recommended for the M.A. degree in music history.

III. *Computer-Based Music Theory and Acoustics*—Students are not admitted into the M.A. as a terminal degree for computer-based music theory and acoustics: rather, students in the Ph.D. program in computer-based music theory and acoustics who enter directly from the bachelor's level may, upon completing 45 graduate-level units and advancing to candidacy by passing the qualifying examination, be recommended for the M.A. degree in computer-based music theory and acoustics.

IV. *Music, Science, and Technology (M.S.T.)*—The M.A. in music, science, and technology is the department's only terminal master's degree. This is a two-year program of 45 graduate-level units focusing on the integration of music perception, music-related signal processing and controllers, synthesis, performance and composition. The program is designed for students who have an undergraduate music, engineering or science degree. Required course work is listed below. A complete program with an individually-tailored list of electives will be formed in consultation with the student's adviser.

1. Required:
  - MUSIC 155. Intermedia Workshop (4 units)
  - MUSIC 201. CCRMA Colloquium (1 unit)

- MUSIC 220A. Fundamentals of Computer-Generated Sound (4 units)
  - MUSIC 251. Psychophysics and Music Cognition (4 units)
  - MUSIC 256A. Music Software Design (4 units)
  - MUSIC 320. Introduction to Digital Audio Signal Processing (4 units)
2. Electives: students are required to complete an additional 24 units of graduate level work determined in consultation with the student's adviser and will include CCRMA electives, and may include courses taken outside the department.

## DOCTOR OF MUSICAL ARTS (D.M.A.) AND DOCTOR OF PHILOSOPHY (PH.D.) IN MUSIC

University requirements for the D.M.A and Ph.D. are described in the "Graduate Degrees" section of this bulletin. The following statements apply to all the graduate degrees described below, unless otherwise indicated.

**Department Examinations**—All entering doctoral graduate students are required to take: (1) a diagnostic examination testing the student in theory (counterpoint, harmony, and analysis) and (for musicologists only) the history of Western art music; and, (2) a proficiency examination in sight-singing and piano sight-reading. These exams are given at the beginning of study in the department (usually the week before school begins). Teaching Assistant assignments and the funding associated with this portion of a graduate student's financial aid package are determined based upon successful completion of these exams.

None of Stanford's required undergraduate courses may be credited toward an advanced degree unless specifically required for both degrees. Only work that receives a grade of 'A,' 'B,' or 'Satisfactory' (a passing grade in an instructor-mandated credit/no credit course) in music courses numbered 100 or higher taken as a graduate student is recognized as fulfilling the advanced-degree requirements. Students may need to devote more than the minimum time in residence if preparation for graduate study is inadequate.

The following may be taken as electives for graduate credit:

- a. any course in another department numbered 100 or over (with adviser's consent)
- b. any course in the Music department numbered 100 or over except those required for the B.A. degree. A letter grade of 'A,' 'B,' or 'S' (in an instructor-mandated pass/fail course) is required.
- c. Music department group instruction: MUSIC 72–77.

### ADMISSION

Applicants are required to submit evidence of accomplishment (scores, recordings, and/or research papers, according to the proposed field of concentration) when they complete the application form. Applicants should arrange to take the Graduate Record Examination (GRE) well in advance of the December 14 application deadline. All components of the application are due by December 14. International students whose first language is not English are also required to take the TOEFL exam (with certain exceptions: see <http://studentaffairs.stanford.edu/gradadmissions>).

### FIELDS OF STUDY OR DEGREE OPTIONS

All of the following fields of study are declarable as subplans in Axxes:

**Doctor of Musical Arts degree (D.M.A.) in Composition**—The D.M.A. is offered to a limited number of students who demonstrate substantial training in the field and high promise of attainment as composers. Students may work in traditional and/or electronic forms. Breadth is given through studies in other branches of music and in relevant fields outside music, as desirable. The final project for this degree is a large-scale composition.

**Doctor of Philosophy degree (Ph.D.) in Musicology**

**Doctor of Philosophy degree (Ph.D.) in Computer-Based Music Theory and Acoustics**—The Ph.D. is offered in areas of the

research of Stanford's graduate faculty: Musicology, including specialties in musical aesthetics, history of music theory, and performance practice; and Computer-Based Music Theory and Acoustics (CBMTA), specializing in research in musical acoustics at the Center for Computer Research in Music and Acoustics (CCRMA). The department seeks students who demonstrate substantial scholarship, high promise of attainment, and the ability to do independent investigation and present the results of such research in a dissertation.

### DEGREE REQUIREMENTS

**Residence**—The candidate must complete a minimum of 135 academic units (see Residency under the "Graduate Degrees" section of this bulletin). Doctoral candidates working on Ph.D. dissertations or Doctor of Musical Arts (D.M.A.) final projects that require consultation with faculty members continue enrollment in the University under Terminal Graduate Registration (TGR), after they have reached the required 135 academic units and have completed their Special Area examinations.

**Qualifying Examination**—A written and oral examination for admission to candidacy is given just prior to the fourth quarter of residence for D.M.A. students and Ph.D. students in the Computer-Based Music Theory and Acoustics programs; for Ph.D. students in Musicology, the exams are given just prior to the eighth quarter of residence. This exam tests knowledge of history, theory, repertory, and analysis.

**Teaching**—All students in the Ph.D. or D.M.A. degree programs, regardless of sources of financial support, are required to complete six quarters of supervised teaching at half time. Music 280 (given in Spring Quarter and taken at the end of the first year) is a required course for Teaching Assistants. Additional quarters of teaching may be required by the department.

**Required Courses**—

MUSIC 200. Graduate Proseminar (4 units)—required of all composition and computer-based music theory and acoustics students entering directly from the bachelor's degree and of all students in musicology, regardless of entering degree level.

MUSIC 280. TA Training (1 unit)

MUSIC 301A. Analysis of Music: Modal (4 units)

MUSIC 301B. Analysis of Music: Tonal (4 units)

MUSIC 301C. Analysis of Music: Post-Tonal (4 units)

**I. Composition**—The Doctor of Musical Arts (D.M.A.) degree in Composition is given breadth through collateral studies in other branches of music and in relevant studies outside music as seems desirable. In addition to degree requirements required of all doctoral graduate students and listed above, students must complete at least 24 units of:

1. MUSIC 323. Doctoral Seminar in Composition
2. Besides those requirements listed above, candidates are expected to produce a number of works demonstrating their ability to compose in a variety of forms and for the common media: vocal, instrumental, and electronic music. If possible, the works submitted are presented in public performance prepared by the composer. Annual progress is reviewed by the composition faculty with a major portfolio review conducted at the conclusion of the second year.
3. **Foreign Language Requirement**—At the time of advancement to candidacy, all D.M.A. students are required to have demonstrated a reading knowledge of one language other than English and the ability to translate it into idiomatic English.
4. **Special-Area Examination**—A written examination in the candidate's field of concentration, including a final project proposal, is required to be completed during the fourth year of study, no later than the last day of classes in Autumn Quarter of that year.
5. **Final Project Presentation**—Required during the last quarter of residence, the purpose of the presentation is to demonstrate the ability of the candidate to organize and present the topic of the final project for public review. It should be two hours in length, treating aspects of the final project. Details regarding the D.M.A. final project presentation may be found in the

*Department of Music Graduate Handbook* available at: <http://music.stanford.edu/Academics/gradStudies.html>

6. *Final Project*—Candidate's work culminates in a required Final Project. The final project in composition must be a substantial composition, the scope of which shall be agreed upon by the members of the committee. Typically, work on the final project encompasses several quarters. Usually, smaller works, for specific performances, are composed at the same time.
7. *Reading Committee*—The membership of the reading committee is the principal final project adviser and a minimum of two additional members. The notice of appointment of a D.M.A. Final Project Reading Committee should be submitted to the department at the same time as the approved final project proposal and the completion of the special area exam. It is the responsibility of the student, with the advice of his or her adviser, to approach appropriate faculty members and obtain their consent to serve on the reading committee. Obtain the D.M.A. reading committee form from the department office; fill it out; obtain committee members' signatures; return to the department office.

II. *Musicology*—In addition to degree requirements required of all doctoral graduate students and listed above, students must complete at least 43 units of approved courses including:

1. *Required:*
  - MUSIC 221. Topics in the History of Theory (3–5 units)
  - MUSIC 300A. Medieval Notation (4 units)
  - MUSIC 300B. Renaissance Notation (4 units)
  - MUSIC 310. Research Seminar in Musicology (24–40 units); the requirement is for eight seminars of 3–5 units each. Students may petition to take up to two graduate seminars in other departments, in consultation with their adviser.
  - MUSIC 312A. Aesthetics and Criticism of Music, Ancients and Moderns: Plato to Nietzsche (4 units)
  - MUSIC 312B. Aesthetics and Criticism of Music, Contemporaries: Heidegger to Today (4 units)
  - MUSIC 330. Musicology Dissertation Colloquium (1–4 units); the requirement is for enrollment each spring beginning in year four and continuing to graduation.
2. *Foreign Language Requirement*—At the time of advancement to candidacy, all Ph.D. students in Musicology must have passed a Ph.D. Language examination in German and in a second language, chosen from French, Italian, or Latin (or, on a case-by-case basis, another language, if it has significant bearing on the candidate's field of study). If one of these languages is the student's native language, the student may be exempted from an examination.
3. *Special-Area Examination*—A written and oral examination testing the student's knowledge of music and research in the student's field of concentration is completed during the fourth year of study, no later than the last day of classes in Autumn Quarter of that year. This includes an oral defense of the dissertation proposal. The examining committee comprises prospective readers of the dissertation.
4. *University Oral Examination*—Taken once the dissertation is substantially under way; an oral presentation is a defense of dissertation research methods and results.
5. *Dissertation*—After the first two years of graduate study, the student concentrates on research and writing of the dissertation. The dissertation demonstrates the student's ability to work systematically and independently to produce an essay of competent scholarship.
6. *Reading Committee*—The minimum membership of the reading committee is 1) the principal dissertation adviser, 2) a second member from the department, and 3) a third member from the major department or another department. If a third member is from another institution, a fourth member must be appointed from the department. The principal dissertation adviser and all other members of the committee must belong to the Academic Council. The notice of appointment of a Reading Committee should be submitted to the department at

the same time as the approved dissertation proposal and the completion of the Special-Area Exam. It is the responsibility of the student, with the advice of his or her adviser, to approach appropriate faculty members and obtain their consent to serve on the reading committee.

III. *Computer-Based Music Theory and Acoustics*—In addition to degree requirements required of all doctoral graduate students and listed above, students must complete at least 28 units of approved courses including:

1. *Required:*
  - MUSIC 220A. Fundamentals of Computer-Generated Sound (4 units)
  - MUSIC 220B. Compositional Algorithms, Psychoacoustics, and Spatial Processing (4 units)
  - MUSIC 220C. Research Seminar in Computer-Generated Music (4 units)
  - MUSIC 220D. Research in Computer-Generated Music (12 units total)
  - MUSIC 320. Introduction to Digital Audio Signal Processing (4 units)
2. *Foreign Language Requirement*—At the time of advancement to candidacy, all Ph.D. students in computer-based music theory and acoustics are required to have demonstrated a reading knowledge of one language other than English and the ability to translate it into idiomatic English.
3. *Special-Area Examination*—A written and oral examination testing the student's knowledge of music and research in the student's field of concentration is completed during the fourth year of study, no later than the last day of classes in Autumn Quarter of that year. This includes an oral defense of the dissertation proposal. The examining committee comprises prospective readers of the dissertation.
4. *University Oral Examination*—Taken once the dissertation is substantially under way; an oral presentation is a defense of dissertation research methods and results.
5. *Dissertation*—After the first two years of graduate study, the student concentrates on research and writing of the dissertation. The dissertation demonstrates the student's ability to work systematically and independently to produce an essay of competent scholarship.
6. *Reading Committee*—The minimum membership of the reading committee is 1) the principal dissertation adviser, 2) a second member from the department, and 3) a third member from the major department or another department. If a third member is from another institution, a fourth member must be appointed from the department. The principal dissertation adviser and all other members of the committee must belong to the Academic Council. The notice of appointment of a Reading Committee should be submitted to the department at the same time as the approved dissertation proposal and the completion of the Special-Area Exam. It is the responsibility of the student, with the advice of his or her adviser, to approach appropriate faculty members and obtain their consent to serve on the reading committee.

IV. *Ph.D. in Music and Humanities*—The department participated in the Graduate Program in Humanities leading to a Ph.D. degree in Music and Humanities. At this time, the option is available only to students already enrolled in the Graduate Program in Humanities; no new students are being accepted. The University remains committed to a broad-based graduate education in the humanities; the courses, colloquium, and symposium continue to be offered, and the Division of Literatures, Cultures, and Languages provides advising for students already enrolled who may contact DLCL Student Affairs at 650-724-1333 or [dcl@stanford.edu](mailto:dcl@stanford.edu) for further information. Courses are listed under the subject code HUMNTIES and may be viewed on the *Stanford Bulletin's* ExploreCourses web site.

# PHILOSOPHY

*Emeriti (Professors):* Fred Dretske, Solomon Feferman, Dagfinn Føllesdal, Georg Kreisel, John Perry, David S. Nivison, Patrick Suppes, James O. Urmson, Allen Wood, Rega Wood; (*Courtesy Professor*) Denis Phillips

*Chair:* Helen Longino

*Director of Graduate Study:* Michael Bratman

*Director of Undergraduate Study:* Chris Bobonich

*Professors:* Chris Bobonich, Michael Bratman, Alan Code, Joshua Cohen, John Etchemendy, Michael Friedman, Helen Longino, Grigori Mints, Debra Satz, Brian Skyrms (Spring), Kenneth Taylor, Johan van Benthem (Spring), Thomas Wasow

*Associate Professors:* Lanier Anderson, Mark Crimmins, Graciela De Pierris, David Hills (Teaching), Nadeem Hussain, Krista Lawlor, Tamar Schapiro (on leave)

*Assistant Professors:* Alexis Burgess (on leave), Anna-Sara Malmgren

*Courtesy Professors:* Reviel Netz, Josiah Ober, Rob Reich

*Lecturers:* Enrique Casanovas, Jorah Dannenberg, Shane Duarte, James Genone, Jennifer Lockhart, John Mumma, Thomas Ryckman, Richard Sommer, Donovan Wishon

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*Department Phone:* (650) 723-2547

*Email:* philosophy@stanford.edu

*Web Site:* <http://philosophy.stanford.edu>

Courses offered by the Department of Philosophy are listed under the subject code PHIL on the *Stanford Bulletin's* ExploreCourses web site.

Philosophy concerns itself with fundamental problems. Some are abstract and deal with the nature of truth, justice, value, and knowledge; others are more concrete, and their study may help guide conduct or enhance understanding of other subjects. Philosophy also examines the efforts of past thinkers to understand the world and people's experience of it.

Although it may appear to be an assortment of different disciplines, there are features common to all philosophical inquiry. These include an emphasis on methods of reasoning and the way in which judgments are formed, on criticizing and organizing beliefs, and on the nature and role of fundamental concepts.

Students of almost any discipline can find something in philosophy which is relevant to their own specialties. In the sciences, it provides a framework within which the foundations and scope of a scientific theory can be studied, and it may even suggest directions for future development. Since philosophical ideas have had an important influence on human endeavors of all kinds, including artistic, political, and economic, students of the humanities should find their understanding deepened by acquaintance with philosophy.

## MISSION OF THE UNDERGRADUATE PROGRAM IN PHILOSOPHY

The mission of the undergraduate program in Philosophy is to train students to think clearly and critically about the deepest and broadest questions concerning being, knowledge, and value and their connections to the full range of human activities and interests. The Philosophy major presents students with paradigms and perspectives of past thinkers and introduces students to a variety of methods of reasoning and the ways in which judgments are formed. Courses in the major equip students with core skills involved in critical reading, analytical thinking, sound argumentation, and the clear and well-organized expression of ideas. Philosophy is an excellent major for those planning a career in law, medicine, or business. It provides analytical skills and a breadth of perspective helpful to those called upon to make decisions about their own conduct and the welfare of others. Philosophy majors who have carefully planned their undergraduate

program have an excellent record of admission to professional and graduate schools.

## LEARNING OUTCOMES

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. the ability to communicate philosophical ideas effectively orally and in writing.
2. close reading, argument evaluation, and analytical writing.
3. dialectical ability to identify strengths and weaknesses of an argument and devise appropriate and telling responses.
4. the ability to think critically and demonstrate clarity of conceptualization.
5. the ability to differentiate good from unpromising philosophical questions.
6. the ability to sustain an argument of substantial scope, showing control over logical, argumentative, and evidential relations among its parts.

## SPECIAL AND JOINT MAJORS

The Special Program in the History and Philosophy of Science enables students to combine interests in science, history, and philosophy. Students interested in this program should see the special adviser.

The joint major in Philosophy and Religious Studies combines courses from both departments into a coherent theoretical pattern.

## GRADUATE PROGRAM IN PHILOSOPHY

The Department of Philosophy offers an M.A. and a Ph.D. degree. The University's basic requirements for the M.A. and Ph.D. degrees are discussed in the "Graduate Degrees" section of this bulletin.

## LIBRARY AND ASSOCIATIONS

The Tanner Memorial Library of Philosophy contains an excellent working library and ideal conditions for study. Graduate students and undergraduate majors in philosophy have formed associations for discussion of philosophical issues and the reading of papers by students, faculty, and visitors.

## BACHELOR OF ARTS IN PHILOSOPHY

There are three ways of majoring in Philosophy:

- The General Program
- The Special Program in the History and Philosophy of Science
- The Special Option in Philosophical and Literary Thought.

A student completing any of these receives a B.A. degree in Philosophy. There is also a major program offered jointly with the Department of Religious Studies. To declare a major, a student should consult with the Director of Undergraduate Study and see the undergraduate student services administrator to be assigned an adviser and work out a coherent plan. The department recommends proficiency in at least one foreign language.

## GENERAL PROGRAM

1. Course requirements, minimum 55 units:
  - a. preparation for the major: an introductory course (under 100) and 80. (PHIL 80 should normally be taken no later than the first quarter after declaring the major.) Students taking both quarters of the Winter/Spring Philosophy Introduction to the Humanities (IHUM) track can count 5 units toward the introductory Philosophy requirement.
  - b. the core: 24 additional Philosophy units as follows:
    1. logic: one from 50, 150, 151, 152, 153, 154, 155, 157
    1. philosophy of science: any course from 60, 61, 160, 162-168
    2. moral and political philosophy: one from 170-174

3. metaphysics and epistemology: one from 1, 80, 180-189
4. history of philosophy: 100 and 102 are required of each major
  - c. one undergraduate philosophy seminar from the 194 series.
  - d. electives: courses numbered 10 or above, at least 13 units of which must be in courses numbered above 99.
2. Units for Tutorial, Directed Reading (PHIL 196, 197, 198), *The Dualist* (PHIL 198), Honors Seminar (PHIL 199), or affiliated courses may not be counted in the 55-unit requirement. No more than 10 units completed with grades of 'satisfactory' and/or 'credit' may be counted in the 55-unit requirement.
3. A maximum of 10 transfer units or two courses can be used for the departmental major. In general, transfer courses cannot be used to satisfy the five area requirements or the undergraduate seminar requirement. Students may not substitute transfer units for the PHIL 80 requirement.

### SPECIAL PROGRAM IN HISTORY AND PHILOSOPHY OF SCIENCE

Undergraduates may major in Philosophy with a field of study in History and Philosophy of Science. This field of study is declared on Axess. Each participating student is assigned an adviser who approves the course of study. A total of 61 units are required for the sub-major, to be taken according to requirements 1 through 5 below. Substitutions for the listed courses are allowed only by written consent of the undergraduate adviser for History and Philosophy of Science. Students are encouraged to consider doing honors work with an emphasis on the history and philosophy of science. Interested students should see the description of the honors thesis in Philosophy and consult their advisers for further information.

1. Three science courses (for example, biology, chemistry, physics) for 12 units.
2. The following Philosophy (PHIL) core courses must be completed with a letter grade by the end of the junior year:
  - a. one from 50, 150, 151, 154
  - b. 60 or 61
  - c. 80
3. Three history of science courses.
4. Three philosophy of science courses, of which one must be PHIL 164.
5. Three additional courses related to the major, in philosophy or history, to be agreed on by the adviser.
6. At least six courses in the major must be completed at Stanford with a letter grade. Units for Tutorial, Directed Reading, or *The Dualist* (196, 197, 198) may not be counted in the 61-unit requirement. No more than 10 units completed with grades of 'satisfactory' and/or 'credit' may be counted in the 61-unit requirement.
7. Transfer units must be approved in writing by the Director of Undergraduate Study at the time of declaring a major. Transfer courses are strictly limited when used to satisfy major requirements.

### SPECIAL OPTION IN PHILOSOPHICAL AND LITERARY THOUGHT

Undergraduates may major in Philosophy with a special option in philosophy and literature. This option is declared to the department; it is not declared on Axess, and it does not appear on the transcript or the diploma. Students in this option take courses alongside students from other major departments which also have a specialized option associated with the program for the study of philosophical and literary thought, with administrative staff in the DLCL. Each student in this option is assigned an adviser in Philosophy, and students' schedules and overall course of study must be approved in writing by the adviser, and the Directors of Undergraduate Studies of Philosophy and of the program.

A total of 65 units must be completed for this option, including the following requirements.

1. Core requirements for the major in Philosophy, including:
  - a. an introductory course
  - b. PHIL 80
  - c. the core distribution requirements listed in section 1b of the general program above.
2. Gateway course in philosophy and literature (PHIL 81). This course should be taken as early as possible in the student's career, normally in the sophomore year.
3. Three courses in a single national literature, chosen by the student in consultation with the adviser and the program director of undergraduate studies. This normally involves meeting the language proficiency requirements of the relevant literature department.
4. Electives within Philosophy beyond the core requirements totaling at least 5 units, and drawn from courses numbered 100 or higher.
5. Two upper division courses of special relevance to the study of philosophy and literature, as identified by the committee in charge of the program. A list of approved courses is available from the program director of undergraduate studies.
6. Capstone seminar in the PHIL 194 series.
7. Capstone seminar of relevance to the study of philosophy and literature, as approved by the program committee. In some cases, with approval of the Philosophy Director of Undergraduate Study and the program director of undergraduate studies, the same course may be used to meet requirements 6 and 7 simultaneously. In any case, the student's choice of a capstone seminar must be approved in writing by the Philosophy Director of Undergraduate Study and the program director of undergraduate studies.

Students are encouraged to consider doing honors work in a topic related to philosophy and literature through the Philosophy honors program.

The following rules also apply to the special option:

1. Units for Honors Tutorial, Directed Reading (PHIL 196, 197, 198), *The Dualist* (PHIL 198), Honors Seminar (PHIL 199) may not be counted toward the 65-unit requirement. No more than 10 units with a grade of 'satisfactory' or 'credit' may be counted toward the unit requirement.
2. A maximum of 15 transfer units may be counted toward the major, at most 10 of which may substitute for courses within Philosophy. Transfer credits may not substitute for PHIL 80 or 81, and are approved as substitutes for the five area requirements or PHIL 194 only in exceptional cases.
3. Courses offered in other departments may be counted toward requirements 3, 5 and 7, but such courses, including affiliated courses, do not generally count toward the other requirements. In particular, such courses may not satisfy requirement 4.
4. Units devoted to meeting the language requirement are not counted toward the 65-unit requirement.

### HONORS PROGRAM

Students who wish to undertake a more intensive and extensive program of study, including seminars and independent work, are invited to apply for the honors program during Winter Quarter of the junior year. Admission is selective on the basis of demonstrated ability in philosophy, including an average grade of at least 'A-' in a substantial number of philosophy courses and progress towards satisfying the requirements of the major.

With their application, candidates should submit an intended plan of study for the remainder of the junior and the senior years. It should include at least 5 units of Senior Tutorial (196) during Autumn and/or Winter Quarter(s) of the senior year. Students who are applying to Honors College may use the same application for philosophy honors. In the quarter preceding the tutorial, students should submit an essay proposal to the Philosophy undergraduate director and determine an adviser.

Students applying for honors should enroll in Junior Honors Seminar (199) during the Spring Quarter of the junior year.

The length of the honors essay may vary considerably depending on the problem and the approach; usually it falls somewhere between 7,500 and 12,500 words. This essay may use work in previous seminars and courses as a starting point, but it cannot be the same essay that has been used, or is being used, in some other class or seminar. It must be a substantially new and different piece of work reflecting work in the tutorials.

A completed draft of the essay is submitted to the adviser at the end of the Winter Quarter of the senior year. Any further revisions must be finished by the fifth full week of the Spring Quarter, when three copies of the essay are to be given to the undergraduate secretary. The honors essay is graded by the adviser together with a second reader, chosen by the adviser in consultation with the student. The student also provides an oral defense of the thesis at a meeting with the adviser and second reader. The essay must receive a grade of 'A-' or better for the student to receive honors.

Honors tutorials represent units in addition to the 55-unit requirement.

## MINOR IN PHILOSOPHY

A minor in Philosophy consists of at least 30 units of Philosophy courses satisfying the following conditions:

- Students taking both quarters of the Winter/Spring Philosophy Introduction to the Humanities (IHUM) track may count these courses as equivalent to a maximum of 5 units of Philosophy courses under 100.
- At least 10 units must be from courses numbered 100 or above.
- The 30 units must include one of:
  - a history of philosophy course numbered 100 or above
  - two quarters of IHUM (only 5 of the 10 units can count towards 30-unit requirement).
- One course from any two of the following three areas (PHIL):
  - philosophy of science and logic: 60, 61, 160, 162-168; 50, 150, 151, 152, 153, 154, 155, 157
  - moral and political philosophy: 2, 170-174
  - metaphysics and epistemology: 1, 80, 180-189.
- Units for tutorials, directed reading, and affiliated courses may not be counted.
- Transfer units must be approved in writing by the Director of Undergraduate Study at the time of declaring. The number of transfer units is generally limited to a maximum of 10.
- No more than 6 units completed with grades of 'satisfactory' or 'credit' count towards the 30-unit requirement.

Students must declare their intention to minor in Philosophy in a meeting with the Director of Undergraduate Study. This formal declaration must be made no later than the last day of the quarter two quarters before degree conferral. The Permission to Declare a Philosophy Minor (signed by the Director of Undergraduate Study) lists courses taken and to be taken to fulfill minor requirements. This permission is on file in the department office. Before graduation, a student's record is checked to see that requirements have been fulfilled, and the results are reported to the University Registrar.

## JOINT MAJOR IN PHILOSOPHY AND RELIGIOUS STUDIES

The joint undergraduate major in Philosophy and Religious Studies consists of 60 units of course work with approximately one third each in the philosophy core, the religious studies core, and either the general major or the special concentration. Affiliated courses cannot be used to satisfy this requirement.

No courses in either the philosophy or religious studies core may be taken satisfactory/no credit or credit/no credit.

In general, transfer units cannot be used to satisfy the core requirements. Transfer units and substitutions must be approved by the director of undergraduate studies in the appropriate department.

## CORE REQUIREMENTS

- Philosophy (PHIL) courses:
  - 80

- 16 units, including at least one Philosophy course from each of the following areas:
  - logic and philosophy of science: 50, 60, 61, 150, 151, 152, 153, 154, 155, 160, 162-168
  - ethics and value theory: 170-173
  - epistemology, metaphysics, and philosophy of language: 1, 80, 180-189
  - history of philosophy: 100-103
- Religious Studies (RELIGST) courses: 20 units, chosen in consultation with the student's adviser, including:
  - RELIGST 290. Theories of Religion (5 units; Winter Quarter; recommended junior year; fulfills WIM requirement)
  - at least one course in philosophy of religion, broadly construed: RELIGST 52, 54, 62, 101, 173, 174E, 183, 212, 220, 226, 238, 240, 242, 244, 245, 271A, 271B, 273, 274, 275, 278, 279, 280
  - diversity requirement: Students may not take all their religion courses in one religious tradition.

*General Major Requirements*—Five additional courses (approximately 20 units) divided between the two departments. No more than five of these units may come from courses numbered under 99 in either department. Each student must also take at least one undergraduate seminar in religious studies and one undergraduate seminar in philosophy.

*Special Concentration*—With the aid of an adviser, students pursue a specialized form of inquiry in which the combined departments have strength; for example, American philosophy and religious thought, philosophical and religious theories of human nature and action, philosophy of religion. Courses for this concentration must be approved in writing by the adviser.

*Directed Reading and Satisfactory/No Credit Units*—Units of directed reading for fulfilling requirements of the joint major are allowed only with special permission. No more than 10 units of work with a grade of 'satisfactory' count toward the joint major.

## HONORS PROGRAM

Students pursuing a joint major in Philosophy and Religious Studies may also apply for honors by following the procedure for honors in either of the departments.

## COTERMINAL BACHELOR'S AND MASTER'S DEGREES IN PHILOSOPHY

It is possible to earn an M.A. in Philosophy while earning a B.A. or B.S. This can usually be done by the end of the fifth undergraduate year, although a student whose degree is not in Philosophy may require an additional year. Standards for admission to, and completion of, this program are the same as for M.A. applicants who already have the bachelor's degree when matriculating. Applicants for the coterminal program are not, however, required to take the Graduate Record Exam.

University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees" section of this bulletin. For University coterminal degree program rules and University application forms, see <http://studentaffairs.stanford.edu/registrar/publications#Coterm>.

## MASTER OF ARTS IN PHILOSOPHY

University requirements for the M.A. are discussed in the "Graduate Degrees" section of this bulletin.

Three programs lead to the M.A. in Philosophy. One is a general program providing a grounding in all branches of the subject. The others provide special training in one branch.

*Admissions*—All prospective master's students, including those currently enrolled in other Stanford programs, must apply for admission to the program. No fellowships are available. Entering students must meet with the director of the master's program and have their adviser's approval, in writing, of program proposals. The



master's program should not be considered a stepping stone to the doctoral program; these two programs are separate and distinct.

**Unit Requirements**—Each program requires a minimum of 45 units in philosophy. Students in a special program may be allowed or required to replace up to 9 units of philosophy by 9 units in the field of specialization. Although the requirements for the M.A. are designed so that a student with the equivalent of a strong undergraduate philosophy major at Stanford might complete them in one year, most students need longer. Students should also keep in mind that although 45 units is the minimum required by the University, quite often more units are necessary to complete department requirements. Up to 6 units of directed reading in philosophy may be allowed. There is no thesis requirement, but an optional master's thesis or project, upon faculty approval, may count as the equivalent of up to 8 units. A special program may require knowledge of a foreign language. At least 45 units in courses numbered 100 or above must be completed with a grade of 'B-' or better at Stanford. Students are reminded of the University requirements for advanced degrees, and particularly of the fact that for the M.A., students must complete three full quarters as measured by tuition payment.

## GENERAL PROGRAM

The General Program requires a minimum of 45 units in Philosophy courses numbered above 99. These courses must be taken for a letter grade, and the student must receive at least a 'B-' in the course. Courses taken to satisfy the undergraduate core or affiliated courses may not be counted in the 45 units. The requirement has three parts:

- Undergraduate Core**—Students must have when they enter, or complete early in their program, the following undergraduate courses (students entering from other institutions should establish equivalent requirements with a master's adviser upon arrival or earlier):
  - Logic: 50 (formerly 57), 150 (formerly 159), or 151 (formerly 160A)
  - Philosophy of science: any course from 60, 61, 163-167
  - Moral and political philosophy: one from 170-173
  - Metaphysics and epistemology: one from 80, 180-189
  - History of philosophy: two history of philosophy courses numbered 100 or above
- Graduate Core**—Students must take at least one course numbered over 105 from three of the following five areas (courses used to satisfy the undergraduate core cannot also be counted toward satisfaction of the graduate core). Crosslisted and other courses taught outside the Department of Philosophy do not count towards satisfaction of the core.
  - Logic and semantics
  - Philosophy of science and history of science
  - Ethics, value theory, and moral and political philosophy
  - Metaphysics, epistemology, and philosophy of language
  - History of philosophy
- Each master's candidate must take at least two courses numbered above 200; these cannot be graduate sections of undergraduate courses.
- Specialization**—Students must take at least three courses numbered over 105 in one of the five areas.

## SPECIAL PROGRAM IN SYMBOLIC SYSTEMS

Students should have the equivalent of the Stanford undergraduate major in Symbolic Systems. Students who have a strong major in one of the basic SSP disciplines (philosophy, psychology, linguistics, computer science) may be admitted, but are required to do a substantial part of the undergraduate SSP core in each of the other basic SSP fields. This must include the following three philosophy courses or their equivalents: 80; 151

(formerly 160A); and one from 181, 183, 184, 186. This work does not count towards the 45-unit requirement.

## COURSE REQUIREMENTS

- Four courses in philosophy at the graduate level (numbered 200 or above), including courses from three of the following five areas:
  - Philosophy of language
  - Logic
  - Philosophy of mind
  - Metaphysics and epistemology
  - Philosophy of science
 At most two of the four courses may be graduate sections of undergraduate courses numbered 100 or higher.
- Three courses numbered 100 or higher from outside Philosophy, chosen in consultation with an adviser. These courses should be from two of the following four areas:
  - Psychology
  - Linguistics
  - Computer Science
  - Education
 Remaining courses are chosen in consultation with and approved by an adviser.

## SPECIAL PROGRAM IN THE PHILOSOPHY OF LANGUAGE

Admission is limited to students with substantial preparation in philosophy or linguistics. Those whose primary preparation has been in linguistics may be required to satisfy all or part of the undergraduate core requirements as described in the "General Program" subsection above. Those whose preparation is primarily in philosophy may be required to take additional courses in linguistics.

## COURSE REQUIREMENTS

- Philosophy of language: two approved courses in the philosophy of language numbered 180 or higher.
- Syntactic theory and generative grammar: 384 and LINGUIST 231.
- Logic: at least two approved courses numbered 151 (formerly 160A) or higher.
- An approved graduate-level course in mathematical linguistics or automata theory.

## DOCTOR OF PHILOSOPHY IN PHILOSOPHY

Prospective graduate students should see <http://gradadmissions.stanford.edu> for information and application materials. Applicants should take the Graduate Record Examination by October of the year the application is submitted.

The University's basic requirements for the Ph.D. degree including residence, dissertation, and examination are discussed in the "Graduate Degrees" section of this bulletin. The requirements detailed here are department requirements.

Courses used to satisfy any course requirement in Philosophy must be passed with a letter grade of 'B-' or better (no satisfactory/no credit), except in the case of a course/seminar used to satisfy the third-year course/seminar requirement and taken for only 2 units. Such a reduced-unit third-year course/seminar must be taken credit/no credit.

At the end of each year, the department reviews the progress of each student to determine whether the student is making satisfactory progress, and on that basis to make decisions about probationary status and termination from the program where appropriate.

Any student in one of the Ph.D. programs may apply for the M.A. when all University and department requirements have been met.

## PROFICIENCY REQUIREMENTS

1. *First-year Ph.D. Proseminar*—A one quarter, topically focused seminar offered in Autumn Quarter, and required of all first-year students.
2. *Distribution requirements during the first six quarters*—
  - a. six courses distributed across three areas as follows:
    1. two courses in value theory including ethics, aesthetics, political philosophy, social philosophy, philosophy of law. At least one of the courses satisfying this distribution requirement must be in ethics or political philosophy.
    2. Two courses in language, mind, and action. One course satisfying this requirement must be drawn from the language related courses, and one from mind and action related courses.
    3. two courses in metaphysics and epistemology (including metaphysics, epistemology, philosophy of science). At least one of the courses satisfying this requirement must be drawn from either metaphysics or epistemology.
      - Instructors indicate which courses may satisfy particular requirements. If a course potentially satisfies more than one requirement the student may use it for only one of those area requirements; no units may be double-counted. Students must develop broad competencies in all these areas. Those without strong backgrounds in these areas would normally satisfy these distribution requirements by taking more basic courses rather than highly specialized and focused courses. Students should consult with their adviser in making these course decisions, and be prepared to explain these decisions when reviewed for candidacy; see requirement 6 below.
  - b. Logic requirement: PHIL 150 or equivalent.
  - c. History/logic requirement. Three of the four courses listed below.
    1. Three approved history courses
    2. PHIL 151
      - To satisfy this history/logic requirement it is necessary to take at least one course in ancient philosophy and one course in the history of modern philosophy.
  - d. Students should normally take at least 64 graduate level units at Stanford during their first six quarters (in many cases students would take more units than that) and of those total units, at least 49 units of course work are to be in the Philosophy department. These courses must be numbered above 110, but not including Teaching Methods (PHIL 239) or affiliated courses. Units of Individual Directed Reading are normally not to be counted toward this 49-unit requirement unless there is consent from the student's adviser and the Director of Graduate Study.
3. *Writing requirement*—A qualifying paper of professional quality and approximately 8000 words. Students must complete a version of the paper, which is itself likely to be a revision of a paper written during the first year of course work, by the beginning of their fourth quarter. The paper is read by a committee of two faculty who make suggestions for additional revision. The final version must be submitted by the first day of the sixth quarter, normally Spring Quarter of the second year.
4. *Teaching Assistancy*—A minimum of five quarters of teaching assistancy are required for the Ph.D. Normally one of these quarters is as a teaching assistant for the Philosophy Department's Writing in the Major course, PHIL 80. It is expected that students not teach in their first year and that they teach no more than two quarters in their second year. Students are required to take PHIL 239 during Spring Quarter of their first year and during Autumn Quarter of their second year.
5. *Review at the End of the Second Year for Advancement to Candidacy*—By the fourth week of the sixth quarter students must submit a one-page explanation of their first- and second-year course plan and their writing requirement paper. The faculty's review of each student includes a review of the student's record, an assessment of the qualifying paper, and an assessment of the student's preparation for work in her/his intended area of specialization, as well as recommendations of additional preparation, if necessary.
6. *Candidacy*—To continue in the Ph.D. program, each student must be approved for candidacy during the sixth academic quarter, normally the Spring Quarter of the student's second year. Students may be approved for candidacy on a conditional basis if they have only one or two outstanding deficiencies, but are not officially advanced to candidacy until these deficiencies have been removed. Approval for candidacy indicates that, in the department's judgment, the student can complete the Ph.D. In reaching this judgment, the department considers the overall quality of the student's work during the first six quarters and the student's success in fulfilling course and writing requirements.
7. During the Summer Quarter of the second year, students are required to attend a dissertation development seminar given by the department.
8. During the third year of graduate study, and after advancement to candidacy, a Ph.D. student must complete at least three graduate-level courses and/or seminars, at least two of which must be in Philosophy. Courses required for candidacy are not counted toward satisfaction of this requirement. Courses and/or seminars outside Philosophy are determined in consultation with a student's adviser. Except in special circumstances, one of these courses and/or seminars may be taken for reduced units if that option is provided by the faculty teaching the course or seminar. Courses used to satisfy these requirements must be passed with a letter grade of 'B-' or better, except in the case of a course or seminar used to satisfy the third-year course and/or seminar requirement and taken for only 2 units. Such a reduced-unit third-year course or seminar must be taken credit/no credit.
9. *Dissertation Work and Defense*—The third and fourth, and normally fifth, years are devoted to dissertation work. Students should make every effort to conform to the following deadlines.
  - a. *Dissertation Proposal*—By Spring Quarter of the third year, students choose a dissertation topic, a reading committee, and a possible thesis relative to that topic. The topic and thesis should be sketched in a proposal of 3-5 pages, along with a detailed, annotated bibliography demonstrating familiarity with the relevant literature. Individual faculty on the committee may impose further requirements on the proposal. The proposal should be approved by the reading committee before the meeting on graduate student progress late in Spring Quarter.
  - b. *Departmental Oral*—During Autumn Quarter of the fourth year, students take an oral examination, called the departmental oral, based on at least 30 pages of written work, in addition to the proposal. The aim of the exam is to help the student arrive at an acceptable plan for the dissertation and to make sure that student, thesis topic, and adviser make a reasonable fit.
  - c. *Fourth-Year Colloquium*—No later than Spring Quarter of the fourth year, students present a research paper in a seminar open to the entire department. This paper should be on an aspect of the student's dissertation research.
  - d. *University Oral Exam*—Ph.D. students must submit a completed draft of the dissertation to the reading committee at least one month before the student expects to defend the thesis in the University oral exam. If the student is given consent to go forward, the University oral take place approximately two weeks later. A portion of the exam consists of a student presentation based on the dissertation and is open to the public. A closed question period follows. If the draft is ready by Autumn Quarter of

the fourth year, the student may request that the University oral count as the department oral.

## INTERDISCIPLINARY STUDY

The department supports interdisciplinary study. Courses in Stanford's other departments and programs may be counted towards the degree, and course requirements in Philosophy are designed to allow students considerable freedom in taking such courses. Dissertation committees may include members from other departments. Where special needs arise, the department is committed to making it possible for students to obtain a philosophical education and to meet their interdisciplinary goals. Students are advised to consult their advisers and the department's student services office for assistance.

## INTERDEPARTMENTAL PROGRAMS

### PH.D. IN PHILOSOPHY AND HUMANITIES

The department participated in the Graduate Program in Humanities leading to a Ph.D. degree in Philosophy and Humanities. At this time, the option is available only to students already enrolled in the Graduate Program in Humanities; no new students are being accepted. The University remains committed to a broad-based graduate education in the humanities; the courses, colloquium, and symposium continue to be offered, and the Division of Literatures, Cultures, and Languages provides advising for students already enrolled who may contact DLCL Student Affairs at 650-724-1333 or dlcl@stanford.edu for further information. Courses are listed under the subject code HUMNTIES and may be viewed on the *Stanford Bulletin's* ExploreCourses web site.

### GRADUATE PROGRAM IN COGNITIVE SCIENCE

Philosophy participates with the departments of Computer Science, Linguistics, and Psychology in an interdisciplinary program in Cognitive Science. It is intended to provide an interdisciplinary education, as well as a deeper concentration in philosophy, and is open to doctoral students. Students who complete the requirements within Philosophy and the Cognitive Science requirements receive a special designation in Cognitive Science along with the Ph.D. in Philosophy. To receive this field designation, students must complete 30 units of approved courses, 18 of which must be taken in two disciplines outside of philosophy. The list of approved courses can be obtained from the Cognitive Science program located in the Department of Psychology.

### SPECIAL TRACK IN PHILOSOPHY AND SYMBOLIC SYSTEMS

Students interested in interdisciplinary work relating philosophy to artificial intelligence, cognitive science, computer science, linguistics, or logic may pursue a degree in this program.

Prerequisites—Admitted students should have covered the equivalent of the core of the undergraduate Symbolic Systems Program requirements as described in the "Symbolic Systems" section of this bulletin, including courses in artificial intelligence (AI), cognitive science, linguistics, logic, and philosophy. The graduate program is designed with this background in mind. Students missing part of this background may need additional course work. Aside from the required course work below, the Ph.D. requirements are the same as for the regular program, with the exception that one course in value theory and one course in history may be omitted.

*Courses of Study*—The program consists of three years of courses and two years of dissertation work. Students are required to take the following courses in the first two years:

1. Philosophy courses:
  - a. at least three graduate seminars in the general area of symbolic systems other than logic, such as philosophy of mind and philosophy of language.
  - b. two quarters of graduate logic courses from among 350A, 351A, 352A, 353A

2. Five cognitive science and computer science courses:
  - a. at least two courses in cognitive psychology
  - b. two or three graduate courses in computer science, at least one in AI and one in theory
3. Three linguistics and computational linguistics courses:
  - a. graduate courses on natural language that focus on two of the following areas: phonetics and phonology, syntax, semantics, or pragmatics
  - b. one graduate course in computational linguistics, typically LINGUIST 288
4. At least two additional graduate seminars at a more advanced level, in the general area of the program, independent of department. These would typically be in the area of the student's proposed dissertation project.

The requirements for the third year and subsequent years are the same as for other third-year graduate students in philosophy: The dissertation committee must include at least one member of the Department of Philosophy and one member of the Program in Symbolic Systems outside the Department of Philosophy.

### JOINT PROGRAM IN ANCIENT PHILOSOPHY

This program is jointly administered by the Departments of Classics and Philosophy and is overseen by a joint committee composed of members of both departments. It provides students with the training, specialist skills, and knowledge needed for research and teaching in ancient philosophy while producing scholars who are fully trained as either philosophers with a strong specialization in ancient languages and philology, or classicists with a concentration in philosophy.

Students are admitted to the program by either department. Graduate students admitted by the Philosophy department receive their Ph.D. from the Philosophy department; those admitted by the Classics department receive their Ph.D. from the Classics department. For Philosophy graduate students, this program provides training in classical languages, literature, culture, and history. For Classics graduate students, this program provides training in the history of philosophy and in contemporary philosophy.

Each student in the program is advised by a committee consisting of one professor in each department.

*Requirements for Philosophy Graduate Students*—These are the same as the proficiency requirements for the Ph.D. in Philosophy with the following exception: if the student has already taken two courses in modern philosophy, there is no need to take a course in modern philosophy to satisfy proficiency requirement 2.c.

One year of Greek is a requirement for admission to the program. If students have had a year of Latin, they are required to take 3 courses in second- or third-year Greek or Latin, at least one of which must be in Latin. If they have not had a year of Latin, they are then required to complete a year of Latin, and take two courses in second- or third-year Greek or Latin.

Students are also required to take at least three courses in ancient philosophy at the 200 level or above, one of which must be in the Classics department and two of which must be in the Philosophy department.

### GRADUATE DEGREES IN HISTORY AND PHILOSOPHY OF SCIENCE AND TECHNOLOGY

See the description in the "History and Philosophy of Science and Technology" section of this bulletin.

### PH.D. MINOR IN PHILOSOPHY

To obtain a Ph.D. minor in Philosophy, students must follow these procedures:

1. Consult with the Director of Graduate Study to establish eligibility, and select a suitable adviser.
2. Give to the department academic assistant a signed copy of the program of study (designed with the adviser) which offers:
  - a. 30 units of courses in the Department of Philosophy with a letter grade of 'B-' or better in each course. No more than 3

- units of directed reading may be counted in the 30-unit requirement.
- b. At least one course or seminar numbered over 99 to be taken in each of these five areas:
    1. Logic
    2. Philosophy of science
    3. Ethics, value theory, and moral and political philosophy
    4. Metaphysics, epistemology, and philosophy of language
    5. History of philosophy
  - c. Two additional courses numbered over 199 to be taken in one of those (b) five areas.
3. A faculty member from the Department of Philosophy (usually the student's adviser) serves on the student's doctoral oral examination committee and may request that up to one third of this examination be devoted to the minor subject.
  4. Paperwork for the minor must be submitted to the department office before beginning the program.

### COGNATE COURSES

The following courses have substantial philosophical content. However, in the absence of special permission these courses cannot generally be used to satisfy requirements for the Philosophy major or graduate degrees in Philosophy.

- CLASSHIS 101. The Greeks
- CLASSGRK 113. Advanced Greek: Thucydides
- CLASSGEN 94. Ethics of Pleasure
- CLASSGEN 208B. Survey of Greek and Latin Literature: Classical Greek
- CLASSGEN 237. Augustine on the Body (Same as COMPLIT 337)
- ETHICSOC 179M. Libertarianism, Egalitarianism, and Public Policy
- GERGEN 246/346. Being at Home in the World: Kant's Critique of the Power of Judgment
- IPS 206A. Politics and Collective Action (same as POLISCI 331S, PUBLPOL 304A)
- MATH 161. Set Theory
- POLISCI 132. Ethics of Political Animals
- POLISCI 332R,S. Greek Political Economy I,II
- RELIGST 278/378. Heidegger: Confronting the Ultimate

## PHYSICS

*Emeriti: (Professors)* Steven Chu, Alexander L. Fetter, Stanley S. Hanna, William A. Little, Douglas D. Osheroff, David M. Ritson, H. Alan Schwettman, Robert V. Wagoner, John Dirk Walecka, Stanley G. Wojcicki\*, Mason R. Yearian; (*Professors, Research*) John A. Lipa\*, Todd I. Smith\*, John P. Turneaure; (*Professors, Courtesy*) Peter A. Sturrock (Applied Physics), Richard Taylor (SLAC National Accelerator Laboratory)

*Chair:* Steven M. Kahn

*Associate Chair:* Giorgio Gratta

*Professors:* Roger Blandford, Phil Bucksbaum, Patricia Burchat, Blas Cabrera, Savas G. Dimopoulos, Sebastian Doniach, Giorgio Gratta, Shomit Kachru, Steven Kahn, Renata E. Kallosh, Aharon Kapitulnik, Mark Kasevich, Steven A. Kivelson, Robert B. Laughlin, Andrei D. Linde, Kathryn Moler, Peter F. Michelson, Vahe Petrosian, Roger W. Romani, Zhi-Xun Shen, Stephen Shenker, Eva Silverstein, Leonard Susskind, Shoucheng Zhang

*Associate Professors:* Tom Abel, Steven Allen, Sarah Church, David Goldhaber-Gordon, Hari Manoharan

*Assistant Professors:* Stefan Funk, Peter Graham, Sean Hartnoll, Chao-Lin Kuo, Xiao-liang Qi, Srinivas Raghu, Leonardo Senatore, Risa Wechsler

*Professors (Research):* Leo Hollberg, Phillip H. Scherrer

*Courtesy Professors:* Rhiju Das, Benjamin Lev, Craig Levin, Stephen Quake, Richard N. Zare

*Lecturers:* Chaya Nanavati, Rick Pam

*Consulting Professors:* Ralph Devoe, Gerald Fisher, Barbara Jones, Alan Title

*Visiting Associate Professor:* Joel Franklin

\* Recalled to active duty.

*Department Offices:* 382 Via Pueblo Mall

*Mail Code:* 94305-4060

*Phone:* (650) 723-4344

*Web Site:* <http://stanford.edu/dept/physics>

Courses offered by the Department of Physics are listed under the subject code PHYSICS on the *Stanford Bulletin's* ExploreCourses web site.

### MISSION OF THE UNDERGRADUATE PROGRAM IN PHYSICS

The mission of the undergraduate program in Physics is to provide students with a strong foundation in both classical and modern physics. The goal of the program is to develop both quantitative problem solving skills and the ability to conceive experiments and analyze and interpret data. These abilities are acquired through both course work and opportunities to conduct independent research. The program prepares students for careers in fields that benefit from quantitative and analytical thinking, including physics, engineering, teaching, medicine, law, science writing, and science policy, in government or the private sector. In some cases, the path to this career will be through an advanced degree in physics or a professional program.

### LEARNING OUTCOMES

Students develop an understanding of the fundamental laws that govern the universe, and a strong foundation of mathematical, analytical, laboratory, and written communication skills. They will also be presented with opportunities for learning through research. Upon completion of the Physics degree, students should have acquired the following knowledge and skills:

1. a thorough quantitative and conceptual understanding of the core areas of physics, including mechanics, electricity and magnetism, thermodynamics, statistical physics, and quantum mechanics, at a level compatible with admission to graduate programs in physics at peer institutions.
2. the ability to analyze and interpret quantitative results, both in the core areas of physics and in complex problems that cross multiple core areas.
3. the ability to apply the principles of physics to solve new and unfamiliar problems. This ability is often described as "thinking like a physicist."
4. the ability to use contemporary experimental apparatus and analysis tools to acquire, analyze and interpret scientific data.
5. the ability to communicate scientific results effectively in written papers and presentations or posters.

### COURSE WORK

Course work is designed to provide students with a sound foundation in both classical and modern physics. Students who wish to specialize in astronomy, astrophysics, or space science should also consult the "Astronomy Program" section of this bulletin.

Three introductory series of courses include labs in which undergraduates carry out individual experiments. The Intermediate Physics Laboratories offer facilities for increasingly complex individual work, including the conception, design, and fabrication of laboratory equipment. Undergraduates are also encouraged to participate in research; most can do this through the senior thesis and/or the summer research program.

The study of physics is undertaken by three principal groups of undergraduates: those including physics as part of a general education; those preparing for careers in professional fields that require a knowledge of physics, such as medicine or engineering;

and those preparing for careers in physics or related fields, including teaching and research in colleges and universities, research in federally funded laboratories and industry, and jobs in technical areas. Physics courses numbered below 100 are intended to serve all three of these groups. The courses numbered above 100 mainly meet the needs of the third group, but also of some students majoring in other branches of science and in engineering.

## ENTRY-LEVEL SEQUENCES IN PHYSICS

The Department of Physics offers three year-long, entry-level physics sequences, the PHYSICS 20, 40, and 60 series. The first of these (the 20 series) is non-calculus-based, and is intended primarily for those who are majoring in biology. Students with AP Physics credit, particularly those who are considering research careers, may wish to consider taking the PHYSICS 20 or 40 series, rather than using AP placement. These introductory courses provide a depth and emphasis on problem solving that has significant value in biological research, given today's considerable physics-based technology.

For those intending to major in engineering or the physical sciences, or simply wanting a stronger background in physics, the department offers the PHYSICS 40 and 60 series. Either of these satisfies the entry-level physics requirements of any Stanford major. The 60 series is intended for those who have already taken a Physics course at the level of the 40 series, or at least have a strong background in mechanics, some background in electricity and magnetism, and a strong background in calculus. The PHYSICS 40 series begins with mechanics in Winter Quarter, electricity and magnetism in Spring Quarter, and light and heat in Autumn Quarter. While it is recommended that most students begin the sequence with mechanics (PHYSICS 41) in Winter Quarter, those who have had strong physics preparation in high school (such as a score of at least 4 on the Physics Advanced Placement C exam) may start the sequence with PHYSICS 45 in Autumn Quarter.

All courses for the Physics major must be taken for a letter grade, and a grade of 'C-' or better must be received for all units applied toward the major.

## GRADUATE PROGRAMS IN PHYSICS

Graduate students find opportunities for research in the fields of astrophysics, particle astrophysics, cosmology, experimental particle physics, particle theory, string theory, intermediate energy physics, low temperature physics, condensed matter physics, materials research, atomic physics, laser physics, quantum electronics, coherent optical radiation, novel imaging technologies, and biophysics. Faculty advisers are drawn from many departments, including Physics, Applied Physics, Materials Science and Engineering, Electrical Engineering, and Biology. Opportunities for research are also available with the faculty at SLAC in the areas of theoretical and experimental particle physics, particle astrophysics, cosmology, accelerator design, and photon science.

The number of graduate students admitted to the Department of Physics is strictly limited. Students should submit applications by Tuesday, December 13, 2011 for matriculation the following Autumn Quarter. Graduate students may normally enter the department only at the beginning of Autumn Quarter.

## FELLOWSHIPS AND ASSISTANTSHIPS

The Department of Physics makes an effort to support all its graduate students through fellowships, teaching assistantships, research assistantships, or a combination of sources. More detailed information is provided with the offer of admission.

## TEACHING CREDENTIALS

For information on teaching credentials, consult the "School of Education" section of this bulletin or visit <http://usestep.stanford.edu>. Also see the section on the Individually Designed Major program in Teaching Physical Science.

## MASTER OF SCIENCE

The department does not offer a coterminal degree program, or a separate program for the M.S. degree, but this degree may be awarded for a portion of the Ph.D. degree work.

University requirements for the master's degree, discussed in the "Graduate Degrees" section of this bulletin, include completion of 45 units of unduplicated course work after the bachelor's degree. Among the department requirements are a grade point average (GPA) of at least 3.0 (B) for courses 210 or 211, 212, 220, 221, 230, 231, or their equivalents. Up to 6 of these required units may be waived on petition if a thesis is submitted.

## LABORATORIES AND INSTITUTES

The Russell H. Varian Laboratory of Physics, the Physics and Astrophysics Building, the W. W. Hansen Experimental Physics Laboratory (HEPL), the E. L. Ginzton Laboratory, and the Geballe Laboratory for Advanced Materials (GLAM) together house a range of physics activities from general courses through advanced research. Ginzton Lab houses research on optical systems, including quantum electronics, metrology, optical communication and development of advanced lasers. GLAM houses research on novel and nanopatterned materials, from high-temperature superconductors and magnets to organic semiconductors, subwavelength photon waveguides, and quantum dots. GLAM also supports the materials community on campus with a range of characterization tools: it is the site for the Stanford Nanocharacterization Lab (SNL) and the NSF-sponsored Center for Probing the Nanoscale (CPN). The SLAC National Accelerator Laboratory is just a few miles from the Varian Laboratory. SLAC is a national laboratory funded by the Office of Basic Energy Sciences and High Energy Physics of the Department of Energy. Scientists at SLAC conduct research in photon science, accelerator physics, particle physics, astrophysics and cosmology. The laboratory hosts a two-mile-long linear accelerator that can accelerate electrons and positrons. Until recently, the PEP-II asymmetric-energy electron-positron storage ring was used to study CP violation in the B meson system. The Stanford Synchrotron Radiation Laboratory (SSRL) uses intense x-ray beams produced with another smaller storage ring on the SLAC site. The Linac Coherent Light Source (LCLS), completed in 2009, is the world's first x-ray free electron laser and has opened new avenues of research in ultra-fast photon science.

The Ginzton Laboratory, HEPL, GLAM, SLAC, and SSRL are listed in the "Academic Programs and Centers, Independent Research Laboratories, Centers, and Institutes" section of this bulletin. Students may also be interested in research and facilities at two other independent labs: the Center for Integrated Systems, focused on electronics and nanofabrication; and the Clark Center, an interdisciplinary biology, medicine, and bioengineering laboratory.

The Kavli Institute for Particle Astrophysics and Cosmology (KIPAC), formed jointly with the SLAC National Accelerator Laboratory, provides a focus for theoretical, computational, observational, and instrumental research programs. A wide range of research areas in particle astrophysics and cosmology are investigated by students, postdocs, research staff and faculty. The two major projects with which KIPAC is heavily involved are the Fermi Gamma-Ray Space Telescope (FGST) and the large Synoptic Survey Telescope. KIPAC members also participate fully in the Cryogenic Dark Matter Search (CDMS), the Solar Dynamics Observatory, the EXO-200 double beta decay experiment, the Dark Energy Survey (DES), the NuSTAR and Astro-H X-ray satellites, the Cerenkov Telescope Array (CTA) and several cosmic microwave background experiments (BICEP, KECK, QUIET and POLAR-1).

The Stanford Institute for Theoretical Physics is devoted to the investigation of the basic structure of matter (particle theory, string theory, M-theory, quantum cosmology, condensed matter physics).

## PHYSICS COURSE CATALOG NUMBERING SYSTEM

There are four series of beginning courses. One course from the teen series (15, 16, 17, 19) is recommended for the humanities or social science student who wishes to become familiar with the methodology and content of modern physics. The 20 series (21, 22, 23, 24, 25, 26) is recommended for general students and for students preparing for medicine or biology. The 40 series (41, 42, 43, 44, 45, 46) is for students of engineering, chemistry, earth sciences, mathematics, or physics. The advanced freshman series (61, 62, 63, 64, 65, 67) is for students who have had strong preparation in physics and calculus in high school. Students who have had appropriate background and wish to major in physics should take this introductory series.

The 20, 40, and 60 series consist of demonstration lectures on the fundamental principles of physics, problem work on application of these principles to actual cases, and lab experiments correlated with the lectures. Their objectives are not only to give information on particular subjects, but also to provide training in the use of the scientific method. The primary difference between the series of courses is that topics are discussed more thoroughly and treated with greater mathematical rigor in the 40 and 60 series.

Courses beyond 99 are numbered in accordance with a three-digit code. The first digit indicates the approximate level of the course:

100	undergraduate courses
200	first-year graduate courses
300	more advanced courses
400	research, special, or current topics

The second digit indicates the general subject matter:

00	laboratory
10,20,30	general courses
40	nuclear physics, nuclear energy, energy
50	elementary particle physics
60	astrophysics, cosmology, gravitation
70	condensed matter physics
80	optics and atomic physics
90	miscellaneous courses

## BACHELOR OF SCIENCE IN PHYSICS

To help in deciding which introductory sequence is most suitable, students considering a major in Physics may contact the undergraduate program coordinator (elva@stanford.edu) to arrange an advising appointment. Although it is possible to complete the Physics major in three years, students who contemplate starting the major during sophomore year should make an advising appointment to map out their schedule. Students who have had previous college-level courses (including EPGY) should make an advising appointment for placement and possible transfer credit. For advanced placement advice, see <http://studentaffairs.stanford.edu/registrar/students/ap>.

Undergraduates are offered help with physics problems in the Physics Tutoring Center in the Physics and Astrophysics Building, sub-basement, room S-17, which is staffed Monday through Friday. See schedule at <http://physicstutor.stanford.edu>.

- Prospective Physics majors are advised to take PHYSICS 59, Current Research Topics, in their freshman or sophomore year.
  - A calculus-based entry-level series is required, either PHYSICS 61, 62, 63, 64, 65, 67, or 41, 42, 43, 44, 45, 46 (or preferably 67 rather than 44). Students who take the PHYSICS 40 series take PHYSICS 70, which covers the foundations of modern physics.
  - Students taking the PHYSICS 60 series do not take PHYSICS 70; instead, they must take one advanced Physics elective (100-level or higher).
- In addition, the following advanced courses are required: PHYSICS 105, 107 (WIM), 108, 110, 120, 121, 130, 131, 170, and 171; MATH 51, 52, 53, 131P (MATH 173 can be taken in place of MATH131P); one additional Mathematics course

numbered 101 or higher, or PHYSICS 112 or STATS 116 or EE 261.

- MATH 51H, 52H, and 53H may substitute for MATH 51, 52, and 53.
- It is recommended that students intending to complete a Ph.D. in Physics also take PHYSICS 113, 134, and one or more of the following, depending upon their interests:
    - PHYSICS 100, 152A,B, 160, 161, 172, 204, 262, APPPHYS 192, or EE 268.
    - PHYSICS 113 is designed to be taken in parallel with 110.
  - The department advises the study of some computer science such as CS 106A,B or CS 106X.
  - Physics and Mathematics courses taken to satisfy the department's major requirements must be taken for a letter grade, and a grade of 'C-' or better must be received for all units applied toward the major.

## REQUIRED COURSES FOR MAJORS

For sample schedules illustrating how to complete the Physics major, see <http://physics.stanford.edu/academics/undergrad.html>.

### INTRODUCTORY SEQUENCE

Students must complete either the 40 or 60 series as follows:

40 Series:	Qtr. and Units
PHYSICS 41. Mechanics	W 4
PHYSICS 42. Mechanics Lab	W 1
PHYSICS 43. Electricity and Magnetism	S 4
PHYSICS 44. Electricity and Magnetism Lab	S 1
PHYSICS 45. Light and Heat	A 4
PHYSICS 46. Light and Heat Lab	A 1
PHYSICS 67. Introduction to Laboratory Physics (recommended for Physics majors in place of 44)	S 2
PHYSICS 70. Foundations of Modern Physics	A 4

60 Series: Subject and Catalog Number	Qtr. and Units
PHYSICS 61. Mechanics and Special Relativity	A 4
PHYSICS 62. Mechanics Lab	A 1
PHYSICS 63. Electricity, Magnetism and Waves	W 4
PHYSICS 64. Electromagnetism Lab	W 1
PHYSICS 65. Thermodynamics and Foundations of Modern Physics	S 4
PHYSICS 67. Introduction to Laboratory Physics and	S 2
MATH 51. Linear Algebra and Differential Calculus of Several Variables	AWS 15
MATH 52. Integral Calculus of Several Variables	
MATH 53. Ordinary Differential Equations with Linear Algebra	
PHYSICS 59. Current Research Topics (recommended)*	A 1

### INTERMEDIATE SEQUENCE

PHYSICS 105. Intermediate Laboratory I: Analog Electronics	A 3
PHYSICS 107. Intermediate Laboratory II: Experimental Techniques and Data Analysis (WIM)	W 4
PHYSICS 108. Advanced Physics Laboratory: Project	W or S 4
PHYSICS 110. Intermediate Mechanics	S 4
PHYSICS 112. Math Methods of Physics (recommended)**	W 4
PHYSICS 113. Computational Physics (recommended)*	S 4
PHYSICS 120,121. Intermediate Electricity and Magnetism	W,S 8
and	
MATH 131P. Partial Differential Equations I or	A,W 3
MATH 173. Theory of Partial Differential Equations	

### ADVANCED SEQUENCE

PHYSICS 130,131. Quantum Mechanics	A,W 8
PHYSICS 134. Advanced Topics in Quantum Mechanics*	S 4
PHYSICS 170,171. Statistical Mechanics and one advanced Mathematics elective (101 level or higher) or PHYSICS 112 or STATS 116 or EE 261.	A,W 8

One advanced Physics elective (100 level or higher):  
required only for students who are not required to take PHYSICS 70

- \* These courses are not required. PHYSICS 113 is recommended for students planning to work in technical fields. Both PHYSICS 113 and PHYSICS 134 are recommended for students who intend to complete a Ph.D. in Physics.
- \*\* Those wishing to pursue theoretical physics in graduate school may wish to take a collection of courses in the Department of Mathematics rather than or in addition to PHYSICS 112.

## CONCENTRATIONS IN PHYSICS

The primary purpose of concentrations in the Physics major is to provide consistent and more formal advising to students who want to concentrate in a particular area of physics during their undergraduate education, or prepare for future graduate studies in a particular area of physics. Physics majors are not required to choose a concentration and a concentration does not add any formal requirements to the Physics major. Upon graduation, students receive a certificate of completion of a concentration.

Students seeking further advice on a given concentration should contact the professor whose name appears next to the respective title of each section below. Within the chosen concentration below, complete at least four courses from the list or three courses plus a senior thesis. No more than one of the courses can be taken for CR/NC.

### A. APPLIED PHYSICS (HARI MANOHARAN)

*Solid State—*

- PHYSICS 172. Solid State Physics
- APPPHYS 270. Magnetism and Long Range Order in Solids
- MATSCI 195. Waves and Diffraction in Solids

*Biophysics—*

- APPPHYS 192. Introductory Biophysics

*Lasers—*

- EE 231. Introduction to Lasers
- EE 232. Laser Dynamics
- EE 268. Introduction to Modern Optics

*Lab Methods—*

- APPPHYS 207, 208. Laboratory Electronics, Analog and Digital
- APPPHYS 304. Lasers Laboratory

### B. ASTROPHYSICS (ROGER ROMANI, SARAH CHURCH)

*Requirements—*

- PHYSICS 100. Introduction to Observational and Laboratory Astronomy
- PHYSICS 160. Introduction to Stellar and Galactic Astrophysics
- PHYSICS 161. Introduction to Extragalactic Astrophysics and Cosmology

*Plus one elective from below or a senior thesis—*

- PHYSICS 211. Continuum Mechanics
- PHYSICS 260. Introduction to Astrophysics and Cosmology
- PHYSICS 262. Introduction to Gravitation
- PHYSICS 312. Basic Plasma Physics

### C. BIOPHYSICS (SEB DONIACH)

- APPPHYS 136. Biology by the Numbers
  - APPPHYS 192/292. Introductory Biophysics
  - BIOC 202. Biochemistry Bootcamp
  - BIOPHYS 228. Computational Structural Biology
  - BIO 141. Biostatistics
  - BIO 132/232. Advanced Imaging Lab In Biophysics
  - BIO 135/HUMBIO 186. Biological Clocks
  - BIO 217. Neuronal Biophysics
  - CS 273A. A Computational Tour of the Human Genome
- It is recommended that Physics majors interested in pursuing a career in biophysics consider a minor in Biology.

### D. GEOPHYSICS (SIMON KLEMPERER, GEOPHYSICS)

The following requirements apply to students matriculating 2010-11 or later:

*Requirements—*

- GEOPHYS 110. Earth on the Edge: Introduction to Geophysics
- GEOPHYS 120. Ice, Water, Fire
- GEOPHYS 150. Geodynamics: Our Dynamic Earth *Plus one elective from below or a senior thesis—*
- GEOPHYS 130. Introductory Seismology
- GEOPHYS 140. The Earth from Space: Introduction to Remote Sensing
- GEOPHYS 170. Global Tectonics
- GEOPHYS 184. Journey to the Center of the Earth
- GEOPHYS 190. Near-Surface Geophysics

Physics majors matriculating prior to 2010-11 who wish to complete a concentration in Geophysics should consult Prof. Klemperer.

### E. THEORETICAL PHYSICS (ANDREI LINDE)

- PHYSICS 152A,B. Introduction to Particle Physics
- PHYSICS 153. Introduction to String Theory, Quantum Gravity, and Black Holes
- PHYSICS 204. Seminar in Theoretical Physics
- PHYSICS 212. Statistical Mechanics
- PHYSICS 232. Quantum Mechanics
- PHYSICS 260. Introduction to Astrophysics and Cosmology
- PHYSICS 262. Introduction to Gravitation
- PHYSICS 330,331,332. Quantum Field Theory
- PHYSICS 351. Standard Model of Particle Physics
- PHYSICS 362. Advanced Extragalactic Astrophysics and Cosmology
- PHYSICS 364. Advanced Gravitation

Notes to students taking this concentration:

1. Students should discuss the choice of courses with members of the Institute for Theoretical Physics and/or their major adviser.
2. Students may attend 330 after taking 130, 131 and 134. Prior study of special topics in quantum mechanics (232) may be helpful.

## INDIVIDUALLY DESIGNED MAJOR PROGRAM IN TEACHING PHYSICAL SCIENCE

This major, a joint effort of the Department of Physics and the Stanford Teacher Education Program (STEP), is designed for students to prepare themselves as high school teachers of physics and general science. Students complete 47-49 units of Physics and related Mathematics courses, 40-43 units of course work in other sciences such as the life sciences, chemistry, and geosciences, and in general issues of science, and 9-15 units of concentration and depth courses. Total program units: 96-107. Students interested in this program should consult Professor Patricia Burchat (burchat@stanford.edu, 725-5771), and Professor Rachel Lotan, Director of the Stanford Teacher Education Program (STEP) in the School of Education (rlotan@stanford.edu).

### CORE PHYSICS COURSES

<i>Mechanics:</i>	<i>Units</i>
PHYSICS 41. Mechanics	
PHYSICS 42. Mechanics Lab	
<i>or</i>	
PHYSICS 61. Mechanics and Special Relativity	
PHYSICS 62. Mechanics Lab	5
<i>Heat:</i>	
PHYSICS 45. Light and Heat	
PHYSICS 46. Light and Heat Lab	
<i>or</i>	
PHYSICS 65. Thermodynamics and Foundations of Modern Physics	
PHYSICS 67. Introduction to Laboratory Physics	5-6

*Electricity and Magnetism:*  
 PHYSICS 43. Electricity and Magnetism  
 PHYSICS 67. Introduction to Laboratory Physics  
 or  
 PHYSICS 63. Electricity, Magnetism, and Waves  
 PHYSICS 64. Electricity and Magnetism Lab  
 and  
 PHYSICS 105. Analog Electronics (Lab) 8-9  
*Wave Motion:*  
 PHYSICS 107 Intermediate Physics Laboratory II: 4  
 Experimental Techniques and Data Analysis (WIM)  
*Modern Physics (for students who take 40 series):*  
 PHYSICS 70. Foundations of Modern Physics 4  
*Applications:*  
 PHYSICS 59. Current Research Topics 1  
*Mathematics (Physics departmental requirement):*  
 MATH 51. Linear Algebra and Differential Calculus of Several 4  
 Variables  
 MATH 52. Integral Calculus of Several Variables  
 MATH 53. Ordinary Differential Equations with Linear Algebra 4  
 and  
 A course in Statistics (choose one):  
 STATS 110. Statistical Methods in Engineering and the 4  
 Physical Sciences  
 STATS 116. Theory of Probability  
 STATS 141. Biostatistics  
 STATS 166. Computational Biology  
 STATS 191. Introduction to Applied Statistics  
 Total 20  
 47-49

**ADDITIONAL SCIENCE BREADTH COURSES**

*Life Sciences—*  
 BIO 41. Genetics, Biochemistry, and Molecular Biology  
 BIO 42. Cell Biology and Animal Physiology  
 BIO 43. Plant Biology, Evolution and Ecology  
 or  
 HUMBIO 2A. Genetics, Evolution, and Ecology 15  
 HUMBIO 2B. Culture, Evolution, and Society  
 HUMBIO 3A. Cell and Developmental Biology  
 HUMBIO 3B. Behavior, Health, and Development  
 HUMBIO 4A. The Human Organism  
 HUMBIO 4B. Environmental and Health Policy Analysis  
  
*Chemistry—*  
 CHEM 31A and B, or 31X. Chemical Principles  
 CHEM 33. Structure and Reactivity 8  
  
*Geosciences—*  
 EARTHSYS 10. Introduction to Earth Systems  
 PHYSICS 15. The Nature of the Universe  
 or PHYSICS 16. Cosmic Horizon  
 or PHYSICS 17. Black Holes 8  
  
*General Issues of Science—*  
 STS 101. Science, Technology, and Contemporary Society  
 EDUC 180. Directed Reading in Education  
 ENGR 103. Public Speaking 9-12  
  
*Concentration and Depth Courses—*  
 3 courses (100 level or above) in a single area of 9-15  
 concentration  
 Total units for general science 49-58  
 Total units for the Physical Science program 96-107

This individually designed major program in Physical Science includes all the elements of a Program of Subject Matter Preparation for Secondary Teachers of Physics and General Science that has been approved by the California Commission on Teacher Credentialing (CCTC). Students who complete the program are exempt from taking the C-BEST examination in Physics and General Science for admission to the Stanford Teacher Education Program (STEP) or any other accredited secondary teacher education program in California. Full details of the CCTC-approved program may be found at <http://ed.stanford.edu/suse/programs-degrees/program-coterminal-step.html>.

*Note:* the Stanford individually designed major program in Physical Science requires course work beyond the CCTC-approved program, specifically 9-15 units of depth courses in a field of concentration: Physics, Astrophysics, Biology, Chemistry, Earth Sciences, Human Biology, or Computational Mathematics. See the adviser in the Physics department or the School of Education for more details.

**SENIOR THESIS**

The department offers Physics majors the opportunity to complete a senior thesis. These are the guidelines:

1. Students must submit a Senior Thesis Application form once they identify a physics project, either theoretical or experimental, in consultation with individual faculty members. Proposal forms are available from the Undergraduate Coordinator and must be submitted by the week prior to the November Thanksgiving break of the academic year in which the student plans to graduate.
2. Credit for the project is assigned by the adviser within the framework of PHYSICS 205. A minimum of 3 units of PHYSICS 205 must be completed for a letter grade during the senior year. Work completed in the Senior Thesis Program may not be used as a substitute for regular required courses for the Physics major.
3. A written report and a presentation of the work at its completion are required for the Senior Thesis. By mid-May, the Senior Thesis candidate is required to present the project at the department's Senior Thesis Presentation Program. This event is publicized and open to the general public. The expectation is that the student's adviser, second reader, and all other Senior Thesis candidates attend.

**HONORS PROGRAM**

Physics majors are granted a Bachelor of Science in Physics with Honors if they satisfy these three requirements beyond the general Physics major requirements:

1. The student files for entry into the honors program by completing an Honors Program Application (available from the Undergraduate Coordinator) by the same deadline as the Senior Thesis Application, and eligibility is confirmed by the department.
2. The student completes a Senior Thesis by meeting the deadlines and requirements described above.
3. The student completes course work with an overall GPA of 3.30 or higher, and a GPA of 3.50 or higher in courses required for the Physics major.

**MINOR IN PHYSICS OR ASTRONOMY**

A minor is offered in either Physics or Astronomy. Students who take the PHYSICS 20, 40, or 60 series at Stanford in support of their major may count those units towards the minor. Those who have fulfilled Physics requirements at the 20 or 40 level by enrollment at another accredited university, or through advanced placement credits, may count credits towards 21/22 and 23/24, or 41/42 and 43/44, respectively. 25/26, or 45/46 for a technical minor, must be taken at Stanford even if similar material has been covered elsewhere. With the 21/22/23/24 or 41/43/44 exception noted above, all courses for the minor must be taken at Stanford University for a letter grade, and a grade of 'C-' or better must be received for all units applied toward the minor. The minor declaration deadline is three quarters before graduation, typically the beginning of Autumn Quarter if the student is graduating at the end of Spring Quarter.

**MINOR IN PHYSICS**

An undergraduate minor in Physics requires a minimum of 25 units with the following course work:

PHYSICS 41/42, 43/44, 45/46 and PHYSICS 70	<i>Units</i> 19
or	
PHYSICS 61/62, 63/64, 65/67	16



At least three PHYSICS courses numbered 100 or above	9-12
Total	25-31

\* PHYSICS 67 may be substituted for PHYSICS 44.

## MINOR IN ASTRONOMY

Students wishing to pursue advanced work in astrophysical sciences should major in physics and concentrate in astrophysics. Students who take the 20, 40, or 60 series at Stanford in support of their major may count those units towards the minor. However, students outside of physics with a general interest in astronomy may organize their studies by completing one of the following minor programs.

An undergraduate minor in astronomy requires the following courses:

*Non-Technical*—For students whose majors do not require the PHYSICS 40 or 60 series:

PHYSICS 21, 23, 25/26	Units
	10
PHYSICS 50 or 100 (Observatory Lab)	3-4
Choose two courses from the following:	
PHYSICS 15, 16, 17	6

Total 19-20 (9-10 in addition to the 20 series)

*Technical*—For students whose majors require the PHYSICS 40 or 60 series:

PHYSICS 41, 43, 45/46	Units
or	13-14
PHYSICS 61, 63, 65 and 67	
PHYSICS 70	4
PHYSICS 100 (Observatory Lab)	4
Choose two courses from the following:	
PHYSICS 160,* 161,* EE 106*	6
Total	27-28 (14 or 15 in addition to the 40 or 60 series)

\* With approval of the minor adviser and the chair of the Astronomy Course Program, 3 units of PHYSICS 169, Independent Study in Astrophysics, may be substituted for one course of astronomy (e.g., 160, 161, EE 106). This independent study can either be constituted as a directed reading program or participation in a research project. Students are also encouraged to take the electricity and magnetism/optics lab of the appropriate PHYSICS series (24, 44, and 64) for 1 additional unit.

## DOCTOR OF PHILOSOPHY IN PHYSICS

The University's basic requirements for the Ph.D. are discussed in the "Graduate Degrees" section of this bulletin.

The minimum department requirements for the Ph.D. degree in Physics consist of completing all courses listed below, plus 290 and 294 and at least one quarter from each of two subject areas outside the student's primary area of research (among biophysics, condensed matter, quantum optics and atomic physics, astrophysics and gravitation, and nuclear and particle physics) chosen from courses with numbers above 232, except 290 and 294. The requirements in the following list may be fulfilled by passing the course at Stanford or passing an equivalent course elsewhere: 210 or 211, 212, 220, 221, 230, 231. A grade point average (GPA) of at least 3.0 (B) is required for courses taken toward the degree.

All Ph.D. candidates must have math proficiency equivalent to the following Stanford MATH courses: 106, 113, 114, 116, 131, 132.

Prior to making an application for candidacy, each student is required to pass a comprehensive qualifying examination on undergraduate physics. This closed book exam is given in the month of January following the student's arrival at Stanford. This is a written examination held over two days, covering particle mechanics, electricity and magnetism, quantum mechanics, statistical mechanics, thermodynamics, special relativity, and general physics. A thesis proposal must be submitted during the third year. In order to assess the direction and progress toward a thesis, an oral report and evaluation are required during the fourth year. After completion of the dissertation, each student must take the University oral examination (defense of dissertation).

Three quarters of teaching (including a demonstrated ability to teach) are a requirement for obtaining the Ph.D. in Physics.

Students interested in applied physics and biophysics research should also take note of the Ph.D. granted independently by the Department of Applied Physics and by the Biophysics Program. Students interested in astronomy, astrophysics, or space science should also consult the "Astronomy Course Program" section of this bulletin.

## PH.D. MINOR IN PHYSICS

Doctoral students seeking a minor in Physics must take at least six courses numbered 210 to 232 among the 20 required units. All prospective minors must obtain approval of their Physics course program from the Physics Graduate Study Committee at least one year before the award of the Ph.D.

## POLITICAL SCIENCE

*Emeriti: (Professors)* David B. Abernethy, Lucius J. Barker, Richard A. Brody, David Danielski, Charles Drekmeier, Richard R. Fagen, John A. Ferejohn, John W. Lewis, John Manley, James March, Hubert R. Marshall, Daniel Okimoto, Robert A. Packenham, Philippe Schmitter, Hans N. Weiler

*Chair:* Josiah Ober

*Professors:* David W. Brady, Joshua Cohen, Gary W. Cox, James D. Fearon, Morris P. Fiorina, Judith L. Goldstein, Stephen H. Haber, David J. Holloway, Shanto Iyengar, Simon D. Jackman, Terry L. Karl, Stephen D. Krasner, Jon A. Krosnick, David D. Laitin, Michael A. McFaul (on leave), Terry M. Moe, Josiah Ober, Jean C. Oi, Jack N. Rakove, Condoleezza Rice, Douglas Rivers, Scott D. Sagan, Kenneth A. Schultz, Gary M. Segura, Paul M. Sniderman, Michael R. Tomz (on leave), Barry R. Weingast

*Associate Professors:* Beatriz Magaloni, Rob Reich (on leave), Jonathan A. Rodden, Jeremy Weinstein

*Assistant Professors:* Lisa Blaydes, Adam Bonica, Lauren Davenport, Justin Grimmer, Karen L. Jusko, Phillip Y. Lipsky, Alison McQueen, Clayton Nall, Jonathan Wand

*Lecturers:* Thomas J. Dougherty, Tammy Frisby, Margaret E. Peters, Andrew R. Rutten, Patricia Young

*Courtesy Professors:* David P. Baron, Jonathan B. Bendor, Coit D. Blacker, Gerhard Casper, Martha Crenshaw, Mariano Florentino-Cuellar, Larry Diamond, Jean-Pierre Dupuy, James Fishkin, Lawrence Friedman, Francis Fukuyama, Keith Krehbiel, Debra M. Satz, Stephen J. Stedman

*Courtesy Associate Professors:* Neil Malhotra, Ken Shotts

*Courtesy Assistant Professor:* Saumitra Jha

*Department Offices:* Encina Hall West, room 100

*Mail Code:* 94305-6044

*Phone:* (650) 723-1806

*Web Site:* <http://polisci.stanford.edu>

Courses offered by the Department of Political Science are listed under the subject code POLISCI on the *Stanford Bulletin's* ExploreCourses web site.

## MISSION OF THE UNDERGRADUATE PROGRAM IN POLITICAL SCIENCE

The mission of the undergraduate program in Political Science is to provide students with a solid grasp of the American political system and other political systems within the context of global forces, international conflicts, social movements, ideological systems and diversity. Courses in the major are designed to help students gain competency in the primary subfields of political science including American and comparative politics, international relations, and the theory/philosophy of politics; to introduce students to a variety of research methodologies and analytical frameworks; and to develop students' written and oral communication skills. Students in the program have excellent

preparation for further study in graduate or professional schools as well as careers in government, business, and not-for-profit organizations.

## LEARNING OUTCOMES

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. an understanding of core knowledge within the discipline of political science.
2. the ability to communicate ideas clearly and persuasively in writing.
3. the ability to analyze a problem and draw correct inferences using qualitative and/or quantitative analysis.
4. the ability to evaluate theory and critique research within the discipline of Political Science.

## GRADUATE PROGRAMS IN POLITICAL SCIENCE

*Admission*—Prospective graduate students should go to <http://gradadmissions.stanford.edu> for application materials. Applicants are required to submit a recent sample of their writing (not to exceed 35 pages) and to take the General Test of the Graduate Record Examination (GRE). Applicants whose native language is not English must take the Test of English as a Foreign Language (TOEFL). The TOEFL requirements are waived for applicants who have recently completed two or more years of study at a university where all instruction is provided in English. For details concerning these tests, see the *Guide to Graduate Admission*, available at <http://gradadmissions.stanford.edu>. The application deadline is December 6, 2011. Admission is offered for the Autumn Quarter only. The department expects all students to pursue a full-time program except for time devoted to teaching or research assistantships.

## BACHELOR OF ARTS IN POLITICAL SCIENCE

To receive a B.A. in Political Science, a student must:

1. Submit a Political Science major proposal to the undergraduate administrator and declare on Axess. Forms are available in Encina Hall West, room 100, or at <http://polisci.stanford.edu/bachelors>. For additional information, come to the office or phone (650) 723-1608. Students must complete their major declaration no later than the end of Autumn Quarter of their junior year.
2. Complete 70 units including:
  - a. 45 Political Science course units in the primary and secondary concentration combined. Each major should declare a primary concentration in one subfield and take at least 30 units in this concentration, including the introductory course for that subfield. The secondary concentration must be completed with at least 15 units, including the introductory course for that subfield. Subfields include:
    - International Relations (1, 110-119, 210-219, 310-319)
    - American Politics (2, 120-129, 220-229, 320-329)
    - Political Theory (3, 130-139, 230-239, 330-339)
    - Comparative Politics (4, 140-149, 240-249, 340-349)
    - Methodology (150-159, 350-359)
  - b. A 5-unit methods requirement satisfied by STATS 60, ECON 102A, POLISCI 150A, 150B, 150C, 151A, or 151B.
  - c. 20 additional Political Science units including no more than 5 units of directed reading. 10 units of ECON 1A and/or ECON 1B may substitute for two 5-unit POLISCI courses.

- d. No more than two 5-unit Stanford Introductory Seminar courses can be applied toward the 70-unit major requirement.
3. Introductory Courses: each student must take two from the following Political Science courses, one of which must be in the primary concentration, the other in the secondary concentration. These courses should be completed by the end of sophomore year.
    - POLISCI 1. Introduction to International Relations
    - POLISCI 2. Introduction to American National Government and Politics
    - POLISCI 3. Introduction to Political Philosophy
      - or POLISCI 3P. Justice
    - POLISCI 4. Introduction to Comparing Political Systems
    - POLISCI 151A. Doing Political Science
      - or POLISCI 151B. Data Analysis for Political Science
  4. Demonstrate the capacity for sustained research and writing in the discipline. This requirement is satisfied by taking a Political Science course designated as a Writing in the Major (WIM) course and may be in any subfield of the major.
  5. Take at least one 5-unit, 200 or 300-level undergraduate seminar in Political Science.
  6. Students may petition a maximum of ten units towards the major. Transfer students are allowed to petition up to twenty units towards the major. A maximum of 15 units may be applied towards the concentrations and 5 towards other Political Science course units. All Stanford-in-Washington courses and transfer credit from outside of Stanford require petitions which must be reviewed and approved by the Director of Undergraduate Studies. Petitions must be submitted within one quarter of course completion, or within one quarter of declaring the major. Cognate courses do not require a petition.
  7. Directed reading and Oxford tutorial units also require a petition and may only be applied towards related course work units. These units may not be used in the concentrations, and no more than 10 combined units of directed reading and Oxford tutorial units may count toward the required 70 Political Science units.
  8. All courses for the major must be completed with a letter grade of 'C' or better.

## COGNATE COURSES

- AFRICAST 111/211. Education for All? The Global and Local in Public Policy Making in Africa
- AFRICAST 112/212. AIDS, Literacy, and Land: International Aid and the Problems of Development in Africa
- ECON 1A,B. Introductory Economics A, B
- ETHICSOC 185M. Contemporary Moral Problems (same as PHIL 72)
- IPS 219. Intelligence and National Security
- IPS 221. International Organization and Institution
- IPS 246. China on the World Stage
- MS&E 193,193W, 293. Technology and National Security
- PUBLPOL 102. Organizations and Public Policy (same as PUBLPOL 202)
- STATS 60. Introduction to Statistical Methods (same as PSYCH 10 and STATS 160)
- OSPBEIJ 66. Essentials of China's Criminal Justice System
- OSPBER 15. Shifting Alliances? The European Union and the U.S.
- OSPBER 115X. The German Economy: Past and Present
- OSPBER 126X. A People's Union? Money, Markets, and Identity in the EU
- OSPCPTWN 31. Theory and Politics of Foreign Aid
- OSPFLOR 51. Italian Foreign Policy and the Global Players
- OSPFLOR 53. Law and the Use of Force: A Historical Appraisal

- OSPFOR 78. An Extraordinary Experiment: Politics and Policies of the New European Union
- OSPKYOTO 215X. The Political Economy of Japan
- OSPMOSC 72. Space, Politics, and Modernity in Russia
- OSPMOSC 74. Post-Soviet Eurasia and SCO: Society, Politics, Integration
- OSPOXFRD 18. Making Public Policy: An Introduction to Political Philosophy, Politics, and Economics
- OSPOXFRD 24. British and American Constitutional Systems in Comparative Perspective
- OSPOXFRD 35. Modern UK and European Government and Politics
- OSPOXFRD 41. Europe and US Foreign Policy
- OSPPARIS 32. Understanding French Politics
- OSPPARIS 57. Human Rights in Comparative Perspective
- OSPPARIS 122X. Challenges of Integration in the European Union
- OSPSANTG 116X. Modernization and its Discontents: Chilean Politics at the Turn of the Century
- OSPSANTG 129X. Latin America in the International System
- OSPSANTG 221X. Political Transition and Democratic Consolidation: Chile in Comparative Perspective

## RESEARCH HONORS TRACK PROGRAM

2011-12 is the first year of a research-based track within the undergraduate major. The track will lead to a B.A.H. (Bachelor of Arts with Honors) in Political Science and replaces the existing honors program described below. The five-year pilot program is designed to provide its students with the analytical tools they need to write honors theses and collaborate with Stanford faculty and Ph.D. students. Professor Stephen Haber is the 2011-12 program director.

To receive a B.A.H. in Political Science students must apply and be accepted to the research honors track. Students must apply to the program in the Spring Quarter of the sophomore year or Autumn Quarter of the junior year. A complete application includes a transcript; a letter of recommendation from a member of the Stanford Political Science faculty or from a teaching assistant in a Political Science course; and an essay outlining the student's interest in the research honors track.

To fulfill the research honors track major requirements, a student must:

1. Complete 70 units
  - a. All courses taken for the research honors track must receive a letter grade of 'C' or better. Junior research honors track courses (see 2d) must receive a 'B' or better to count toward the major. Students unable to meet these requirements may be removed from the track.
  - b. 10 units of introductory course work in Political Science. Students must complete at least two of the following courses, preferably by the end of Spring Quarter of sophomore year: POLISCI 1, POLISCI 2, POLISCI 3 or POLISCI 3P, or POLISCI 4. It is recommended that research honors track students enroll in one of the discussion sections designed for students interested in research.
  - c. 10 units of a math/statistics sequence. This can be completed by taking one of the following sequences
    - STATS 60 and 191
    - STATS 116 and 200
    - POLISCI 150A and 150B
    - ECON 102A and 102B.
 Students are encouraged to complete a calculus sequence, either by taking MATH 51, MATH 40 and 41, or MATH 19, 20, and 21.
  - d. Three courses designed for the research honors track, to be taken during junior year:
    - POLISCI 291. Political Institutions

- POLISCI 292. Political Behavior
- POLISCI 293. Research Design

Students must earn a minimum grade of 'B' in these three classes. To accommodate students studying at overseas campuses during their junior year, these courses are offered during the winter and spring quarters. (With two exceptions, most overseas programs are offered during Autumn Quarter.)

- e. Two 300-level or 400-level graduate elective courses during senior year.
  - f. Three 100-level or 200-level Stanford POLISCI courses that must be approved by the student's adviser.
  - g. A Political Science Writing in the Major (WIM) course.
  - h. 10 units of honors thesis work.
2. Complete at least one intensive summer research experience. After sophomore year, students have special access to the Department of Political Science Summer Research College (SRC). After junior year, students may choose to spend the summer advancing their own research project under faculty direction, with funding from the VPUE. Independent summer research may include traveling to archives or libraries, conducting surveys or interviews, or working with Stanford research teams off-campus.
  3. Students may petition a maximum of 10 units to count for the major. Transfer students are allowed to petition a maximum of 20 units. All petitions and transfer courses require approval from the research honors track director.

## HONORS PROGRAM (2011-12 ONLY)

Students interested in earning a B.A.H. in Political Science must apply to the research honors track program described above. The department's previously existing honors program is suspended for five years, and the requirements listed here apply only to seniors accepted into the program as juniors in 2010-11.

Students pursuing honors must complete the following by the end of Spring Quarter of their junior year:

1. Methods requirement (STATS 60, ECON 102A, POLISCI 150A,B,C, 151A, or 151B)
2. WIM requirement
3. Research paper from an advanced undergraduate seminar or directed reading

Students who are accepted into the program should plan to make the thesis the focus of their senior year. They should enroll in 10-15 units of POLISCI 299A,B,C, which covers research and writing directed by the student's adviser.

To complete the honors program, students must:

1. Complete all requirements for the major.
2. Enroll in POLISCI 299Q during Spring Quarter of the student's junior year. This course is designed to help students understand the research process and map out a concrete time line for their thesis work. Enroll in at least 10 units of POLISCI 299A, B, or C, Senior Project. Students must take at least two quarters of Senior Project units.
3. Complete a thesis of honors quality, for a grade of 'B+' or better.

Students cannot apply units from the POLISCI 299Q, Junior Research Seminar, toward the 70-unit requirement for the major. However, students can apply up to 10 units from POLISCI 299A,B,C, Senior Project, toward the 70-unit requirement.

## MINOR IN POLITICAL SCIENCE

Students must complete their declaration of the minor on Axess no later than the end of the junior year. They must submit the minor declaration form to the undergraduate administrator in Encina Hall West 100. This form can be found in Encina Hall West 100 or at <http://politicalscience.stanford.edu/minor.html>.

To receive a minor in Political Science, a student must complete a minimum of 30 unduplicated units. All units must be in Political Science courses or cognate courses. All courses for the minor must be taken for a letter grade. Students must receive a minimum letter grade of 'C' in all courses for the minor.

*Concentration*—The student selects a primary subfield in which three courses are taken. One of these courses is the introductory course, the other two are at a more advanced level (numbered above 100). The concentration corresponds to one of the subfields the department already has in place, namely, American politics, comparative politics, international relations, and political theory.

*Distribution*—Three courses must be in the primary concentration, as specified above, for 15 units. An additional 10 units of intermediate and advanced courses (100 level or above) must be in two additional subfields. The final 5 units may be in any related subfield. ECON 1A or 1B may also be used to satisfy the last five units.

*Petitioned courses*—Students may petition for a maximum of 5 units to count towards the minor. This includes directed readings and Stanford in Washington courses. Directed readings and Stanford in Washington courses may only count towards the last five related units for the minor. Transfer students can petition a maximum of 10 units towards the minor, while non-transfer students can petition a maximum of five units towards the major. All petitioned courses must be individually reviewed and approved by the Director of Undergraduate Studies. Students can download the petition form or pick one up from Encina Hall West, room 100. Students must submit petitions to the undergraduate administrator in Encina Hall West, room 100.

## MASTER OF ARTS IN POLITICAL SCIENCE

The Political Science department does not offer a terminal M.A. degree. An M.A. degree may only be pursued in combination with a doctoral degree from another department within the University or with an advanced degree from one of the University's professional schools. Students interested in pursuing the M.A. should discuss the application requirements with the graduate administrator in Political Science.

Students from within the department and from other degree programs who have applied to the M.A. program may elect to take the M.A. degree in Political Science when they have met the following requirements:

1. Completion of at least three quarters of residency as a graduate student with 45 units of credit of which at least 25 units must be taken in Political Science graduate seminars of 300 level and above. Not more than 25 units of the 45-unit requirement may be taken in a single field.
2. At least two graduate seminars in each of two fields and at least one graduate seminar in a third field.
3. The remaining 20 units must come from courses numbered above 100. Of those 20 units, not more than 10 units of work from related departments may be accepted in lieu of a portion of the work in Political Science. Not more than 10 units may be taken as directed reading.
4. Courses must be numbered above 100.
5. A grade point average (GPA) of 2.7 (B-) or better must be attained for directed readings and all course work. No thesis is required.

The department does not offer a coterminal bachelor's and master's degree.

Political Science doctoral candidates may pursue master's degrees from other departments. Recent examples include but are not restricted to master's degrees in Statistics and Economics. Students interested in this option should consult the relevant sections of this Bulletin for both University and department requirements for master's degrees.

## DOCTOR OF PHILOSOPHY IN POLITICAL SCIENCE

The University's basic requirements for the Ph.D. degree are discussed in the "Graduate Degrees" section of this bulletin.

Programs of study leading to the Ph.D. degree are designed by the student, in consultation with advisers and the Director of Graduate Studies, to serve his or her particular interests as well as to achieve the general department requirements. A student is

recommended to the University Committee on Graduate Studies to receive the Ph.D. degree in Political Science when the following program of study has been completed:

1. The candidate for the Ph.D. degree must take three of the following concentrations in political science: American politics, comparative politics, international relations, methodology, and political theory. Students concentrate on two of these areas by fulfilling, depending on the concentration, combinations of the following: written qualifying examinations, research papers, research design, or course work. The requirement for the third concentration may be satisfied by taking either a written examination in that area or by taking a minimum of 10 units with a grade point average (GPA) of 3.0 (B) or better in the third concentration from among the formal graduate-level courses in the five divisions of the department. The third concentration cannot be satisfied by courses taken as a requirement for a first or second concentration. A third concentration in theory requires two courses in addition to the five units necessary to fulfill the program requirement. A third concentration in methodology requires two courses in addition to the 10 units necessary to fulfill the program requirement. Completion of special concentrations may require more than 10 units of course work.
2. The Ph.D. candidate is required to demonstrate competence in a language and/or skill that is likely to be relevant to the dissertation research. The level of competence needed for successful completion of the research is determined by the student's adviser. All candidates must complete at least 10 units of statistical methodology or its equivalent. Previous instruction can be counted towards this requirement only if approved by the Director of Graduate Studies.
3. Every Ph.D. candidate must complete at least five units of graduate-level instruction in political theory.
4. By the start of the fourth quarter in residence, each graduate student submits a statement of purpose to the student's adviser. This statement indicates the student's proposed major concentrations of study, the courses taken and those planned to be taken to cover those fields, the student's plan for meeting language and/or skill requirements, plans for scheduling of comprehensive examinations and/or research papers, and, where possible, dissertation ideas or plans. This statement is discussed with, and must be approved by, the student's adviser. In the Autumn Quarter following completion of their first year, students are reviewed at a regular meeting of the department faculty. The main purposes of this procedure are, in order of importance: to advise and assist the student to realize his or her educational goals; to provide an incentive for clarifying goals and for identifying ways to achieve them; and to facilitate assessment of progress toward the degree.
5. Students must take the comprehensive exams in two major fields by the end of their second year in the program. Students are expected to have passed these examinations and to have faculty approval of their research paper by the end of their second year.
6. Upon completion of one research paper and two comprehensive exams in his or her two major concentrations, the student files an Application for Candidacy for the Doctoral Degree which details program plans and records. The University and the department expect that students be advanced to candidacy by the completion of their sixth quarter as a full-time student. Each second-year student is reviewed and considered for admission to candidacy in a meeting of the faculty that is typically held during the tenth week of Spring Quarter. Since completion of two comprehensive exams and a research paper are prerequisites for admission to candidacy, students should plan their first- and second-year studies so that these requirements are satisfied by the time of the faculty review meeting. In particular, students should submit their research paper to the relevant faculty readers no later than the middle of Winter Quarter, since revisions of the paper are often required prior to obtaining faculty approval.

7. During the third year, a formal dissertation proposal must be submitted to and approved by the student's dissertation adviser and the Director of Graduate Studies. Dissertation proposals must be approved by the end of the third year.
8. A candidate for the Ph.D. in Political Science is required to serve as a teaching assistant (TA) in the department for a minimum of three quarters.
9. Doctoral candidates who apply for the M.A. degree are awarded that degree on completion of the requirements outlined in the description of the M.A. program.
10. The candidate must pass the University oral examination on the area of the dissertation at a time, after the passing of the written comprehensive examinations, suggested by the candidate's dissertation committee.
11. The candidate must complete a dissertation satisfactory to the dissertation reading committee.

## PH.D. MINOR IN POLITICAL SCIENCE

Candidates in other departments which accept a minor in Political Science select two concentrations in political science in consultation with the Director of Graduate Studies and submit to her or him a program of study for approval. Written approval for the program must be obtained from the Director of Graduate Studies before application for doctoral candidacy. Students are required to complete at least 20 units in Political Science courses. Courses must be 300 level and above. Grades must be a GPA of 3.0 (B) or better. Candidates may be examined in their concentrations in the general oral examination by a member of the Department of Political Science, chosen in consultation with the Director of Graduate Studies.

## OVERSEAS STUDIES COURSES IN POLITICAL SCIENCE

For course descriptions and additional offerings, see the listings in the *Stanford Bulletin's* ExploreCourses web site (<http://explorecourses.stanford.edu>) or the Bing Overseas Studies web site (<http://bosp.stanford.edu>). Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

### AUTUMN QUARTER

#### BEIJING

OSPBELJ 66. Essentials of China's Criminal Justice System. 5 units, Wang, GER:DB:SocSci, EC:GlobalCom

#### BERLIN

OSPBER 15. Shifting Alliances? The European Union and the US. 4-5 units, Brückner, GER: DB:SocSci, EC:GlobCom

OSPBER 115X. German Economy: Past and Present. 4-5 units, Klein, GER:DB:SocSci, EC:GlobalCom

OSPBER 126X. A People's Union? Money, Markets, and Identity in the EU. 4-5 units, Brückner, GER: DB:SocSci, EC: GlobCom

#### FLORENCE

OSPFLOR 51. Italian Foreign Policy and the Global Players. 5 units, Pistelli

OSPFLOR 53. Law and the Use of Force: An Historical Appraisal. 3 units, Sofaer

#### KYOTO

OSPKYOTO 215X. Political Economy of Japan. 4-5 units, Hayashi, DB:SocSci.

#### MOSCOW

OSPMOSC 72. Space, Politics and Modernity in Russia. 5 units, Medvedev, GER:DB:SocSci, EC:GlobalCom

OSPMOSC 74. Post-Soviet Eurasia and SCO: Society, Politics, and Integration

#### OXFORD

OSPOXFRD 35. Modern UK and European Government and Politics. 4-5 units, Cappocia, GER:DB:SocSci

#### PARIS

OSPPARIS 32. Understanding French Politics. 4-5 units, Chamorel, GER:DB: SocSci

#### SANTIAGO

OSPSANTG 221X. Political Transition and Democratic Consolidation: Chile in Comparative Perspective. 5 units, Micco, GER:DB:SocSci

### WINTER QUARTER

#### FLORENCE

OSPFLOR 78. An Extraordinary Experiment: Politics and Policies of the "New" European Union.

#### OXFORD

OSPOXFRD 18. Making Public Policy: an Introduction to Political Philosophy, Politics and Economics. 4-5 units, McMahon, GER:DB:SocSci

#### PARIS

OSPPARIS 57. Human Rights in Comparative Perspective. 4-5 units, Boussaguet, GER:DB:SocSci, EC:GlobalCom

#### SANTIAGO

OSPSANTG 129X. Latin America in the International System. 4-5 units, GER: DB:SocSci

### SPRING QUARTER

#### BERLIN

OSPBER 15. Shifting Alliances? The European Union and the US. 4-5 units, Brückner, GER: DB:SocSci, EC: GlobCom

#### CAPETOWN

OSPCPTWN 31. Theory and Politics of Foreign Aid. 3 units, Klingebiel

#### KYOTO

OSPKYOTO 215X. Political Economy of Japan. 4-5 units, Hayashi, GER:DB:SocSci

#### OXFORD

OSPOXFRD 24. British and American Constitutional Systems in Comparative Perspective. 4-5 units, McMahon, GER:DB:SocSci

OSPOXFRD 41. Europe and US Foreign Policy. 5 units, Schultz. GER: DB:SocSci

#### PARIS

OSPPARIS 122X. Challenges of Integration in the European Union. 4-5 units, Strudel, GER:DB:SocSci

#### SANTIAGO

OSPSANTG 116X. Modernization and its Discontents: Chilean Politics at the Turn of the Century. 5 units, Correa, GER:DB:SocSci

# PSYCHOLOGY

*Emeriti (Professors)* Albert Bandura, Gordon H. Bower, Lyn K. Carlsmith, John H. Flavell, Albert H. Hastorf, Leonard M. Horowitz, Eleanor E. Maccoby, David Rosenhan, Roger N. Shepard, Claude Steele, Barbara Tversky, Philip G. Zimbardo

*Chair:* James L. McClelland

*Professors:* Nalini Ambady, Laura L. Carstensen, Herbert H. Clark, Geoffrey Cohen, Carol Dweck, Ian H. Gotlib, James J. Gross, John D. Krumboltz, Mark R. Lepper, Ellen M. Markman, Hazel R. Markus, James L. McClelland, Dale Miller, Lee D. Ross, Ewart A. C. Thomas, Anthony Wagner, Brian Wandell, Jeffrey J. Wine

*Professor (Research):* Anthony Norcia

*Associate Professors:* Jennifer L. Eberhardt, Anne Fernald, Kalanit Grill-Spector, Brian Knutson, Benoit Monin, Jeanne L. Tsai

*Associate Professor (Teaching):* Catherine Heaney

*Assistant Professors:* Lera Boroditsky, Michael Frank, Noah Goodman, Samuel M. McClure, Gregory M. Walton, Jamil Zaki

*Lecturers:* Amie Haas, Beverley Hartman, Jennifer Winters

*Courtesy Professors:* William C. Dement, Gary H. Glover, Jon Krosnick, Tanya Luhmann, William T. Newsome, Anne C. Petersen

*Department Offices:* Jordan Hall, Building 420

*Mail Code:* 94305-2130

*Department Phone:* (650) 725-2400

*Web Site:* <http://psychology.stanford.edu>

Courses offered by the Department of Psychology are listed under the subject code PSYCH on the *Stanford Bulletin's* ExploreCourses web site.

The department, housed in Jordan Hall, maintains shop facilities and many computer-equipped laboratories. Bing Nursery School, located on campus at 850 Escondido Road, provides a laboratory for child observation, training in nursery school teaching, and research. It was constructed with funding from the National Science Foundation and a special grant from Mrs. Anna Bing Arnold and Dr. Peter Bing.

The department provides

- courses designed for the general student
- a major program leading to the degree of Bachelor of Arts, including options for honors and a specialization in one of four content area tracks
- an undergraduate minor program
- a coterminal master's degree program leading to the degree of Master of Arts
- programs of graduate study and research leading to the degree of Doctor of Philosophy
- a Ph.D. minor

Applications are not accepted for the master's degree except as noted below.

## MISSION OF THE UNDERGRADUATE PROGRAM IN PSYCHOLOGY

The mission of the undergraduate program in Psychology is to introduce students to the corpus of data on, and explanations of, human nature and behavior. Through the study of abnormal behavior, aging, child development, cognitive processes, decision making, emotion, group behavior, infancy, language, learning and memory, personality, social perception, visual perception, and other related topics, students are introduced to the properties of sensory, cognitive, and affective systems, and of their interrelationships to the reciprocal effects of one person on another and to the effects on behavior of the physical, social, and cultural environment. The major provides students with preparation for professional careers in computer science, business, counseling, education and law or medicine as well as for graduate work in Psychology.

## LEARNING OUTCOMES

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. an understanding of core knowledge within the discipline of psychology.
2. the ability to communicate ideas clearly and persuasively in writing.
3. the ability to analyze a problem and draw correct inferences using qualitative and/or quantitative analysis.
4. the ability to evaluate theory and critique research within the discipline of psychology.

## BACHELOR OF ARTS IN PSYCHOLOGY

*Major Requirements*—Students declaring a major in Psychology must complete a minimum of 70 units of course work in Psychology, 60 of which must be taken in the Psychology department. The remaining 10 units can be taken outside of the Psychology department but must be pre-approved by the student services office or faculty adviser. These courses should represent a coherent thematic focus. One way to achieve this focus is through a field of study. Courses taken to satisfy the 70-unit requirement must be taken for a grade of 'C-' or better (except for courses offered only on a satisfactory/no credit basis). Majors must take PSYCH 1, Introduction to Psychology, and PSYCH 10, Introduction to Statistical Methods. Advanced placement (AP) credit may no longer be used toward the Psychology major requirements. Beyond these two required courses, students must complete at least five of the following eleven core Psychology courses, with a minimum of two from each area A and B:

*Area A Courses—*

- BIO 20. Introduction to Brain and Behavior
- PSYCH 30. Introduction to Perception
- PSYCH 45. Introduction to Learning and Memory
- PSYCH 50. Introduction to Cognitive Neuroscience
- PSYCH 55. Introduction to Cognition and the Brain

*Area B Courses—*

- PSYCH 60. Introduction to Developmental Psychology
- PSYCH 70. Introduction to Social Psychology
- PSYCH 75. Introduction to Cultural Psychology
- PSYCH 80. Introduction to Introduction to Personality and Affective Science
- PSYCH 90. Introduction to Clinical Psychology
- PSYCH 95. Introduction to Abnormal Psychology

Students who declared a major in Psychology prior to the 2005-06 academic year may choose to adhere to the 55-unit major requirement, taking PSYCH 1 and 10, five core courses, and elective courses, totaling 55 units.

Students must take one Writing in the Major (WIM) course in Psychology, and should check the *Stanford Bulletin* yearly as these courses may change. The department also strongly recommends that all majors take at least one advanced seminar.

Students may count up to 10 units of research, independent study, and practica (including but not limited to PSYCH 194, 195, 281) toward the Psychology major. Students who are teaching assistants for a Psychology course or are enrolled in the senior honors program are allowed up to 15 units in independent study and research. Any units beyond the limit of 10 or 15 may be counted toward the 180 units required for graduation.

Students who are double majoring or completing a minor degree in another department may not overlap (double-count) courses, unless the overlapping courses constitute introductory skill requirements, such as PSYCH 10, Introduction to Statistical Methods. In this instance, while the course requirement would be satisfied, the units for the course can only be applied to one

program of study, not both. Consult the student services office for further clarification.

Summer Quarter Psychology courses are not equivalent to courses given during the regular academic year and, while applicable toward the 70 units needed for the major, may not be used to fulfill core course requirements. Additionally, a course taken during the Summer Quarter cannot be used to replace the grade of a non-Summer Quarter course, even if the title and units of the two courses are the same.

*Beyond the Minimal Requirements*—The following recommendations may be helpful to students who wish to plan a program which goes beyond the minimal requirements listed above:

1. Within the general major, the student may take advanced undergraduate or graduate courses, including seminars. The student may also take advantage of widespread opportunities for directed research, working closely with individual faculty and graduate students.
2. The student may apply to the senior honors program, described below.
3. The student may elect to pursue one of four fields of study: Cognitive Sciences; Health and Development; Mind, Culture, and Society; or Neuroscience, described below.

The training obtained from the pursuit of any of these options is valuable not only for students considering graduate work in Psychology, but also for those thinking of professional careers outside of Psychology in fields such as computer science, business, counseling, education, law, or medicine.

## CREDIT FROM OUTSIDE THE DEPARTMENT

Psychology majors must complete at least 60 units of course work toward their major at Stanford within the Psychology department. Psychology minors may count no more than a total of 10 units credit from outside the department toward the minor. Both majors and minors, under extenuating circumstances, may use one course from outside the department to fulfill core course requirements. Additional courses may be used to fulfill the 70-unit major requirement, but may not be counted as core courses. Please see the student services office for further clarification.

Petition for transfer of credit is rarely granted. In cases where petitioning is necessary, there are two types of credit from outside the department: external transfer credit for courses taken at institutions other than Stanford and credit for courses in other Stanford departments. A student must have already declared Psychology as a major or minor in order to submit a petition for transfer credit. Stanford credit for courses completed at other institutions must have been granted by the External Credit Evaluation section of the Registrar's Office; those units may be applied toward the 180 units required for graduation. To have credit from outside the department evaluated to fulfill requirements toward the Psychology major or minor, students must complete an Undergraduate Petition form, available from the student services office, and submit it with a course syllabus. Students requesting external transfer credit must also submit a copy of the signed transcript from the External Credit Evaluation section of the Registrar's Office showing the number of Stanford units granted for the course. The Psychology department then evaluates external credit courses and courses from other Stanford departments to determine if they can be applied toward Psychology major or minor requirements.

## FIELDS OF STUDY

Students in the major program, including those in the senior honors program, may elect to specialize in one of four fields of study: Cognitive Sciences; Health and Development; Mind, Culture, and Society; or Neuroscience. Fields of study consist of a coherent set of courses leading to advanced undergraduate or even graduate-level courses in an area. In the ideal case, the student who specializes would acquire an understanding of a range of psychological processes, as well as an appreciation of the significance of these processes in the chosen area of application. In

this way, specialization could facilitate the student's preparation for a professional career in, for example, medicine, business, or counseling, as well as for graduate work in Psychology.

Specialization in a field of study is optional, although students who do not wish to complete all the requirements for a track may still want to use the track as a guideline for an integrated program in Psychology. Students who choose to complete a field of study must meet the requirements for the major plus the additional requirements designated for the field of study. Typically the courses required for a field of study include one or two required courses, four to six recommended courses in Psychology, one or two advanced seminars, and three or four courses in related disciplines. Psychology courses completed for the field of study count toward satisfying the major requirements. Courses from other departments listed for the field of study may count toward the 10 outside units for the major requirement, but must be pre-approved by the student services office or faculty adviser.

## HONORS PROGRAM

The senior honors program is designed for exceptionally able Psychology majors who wish to pursue a year of intensive supervised independent research. Admission to the program is made at the end of the student's junior year on the basis of:

- excellent academic performance
- previous research experience
- two letters of recommendation by faculty and/or graduate students

Applications are available late Spring Quarter and are to be submitted to the student services office with a current transcript and recommendations prior to the student's senior year.

Students interested in the program should involve themselves in research as early as possible and should acquire a broad general background in Psychology, including statistics, and a deep background in their chosen area. The honors program is particularly appropriate for students planning to go to graduate school in Psychology or in other social sciences, as well as in computer science, business, counseling education, law, and medicine.

During Autumn Quarter of their senior year, honors program students participate in a weekly seminar and meet with their advisers to develop their experimental program and begin data collection. Winter and Spring Quarters are devoted to completing the research, analyzing the data, and writing the thesis, which is submitted mid-May. Students give oral presentations of their projects at the annual Honors Convention. This convention is attended by undergraduates, graduate students, and faculty.

## MINOR IN PSYCHOLOGY

*Declaration*—Students who wish to declare a minor field of concentration in Psychology must do so no later than the deadline for their application to graduate.

*Requirements*—Completion of a minimum of 35 units in Psychology is required for the minor, including PSYCH 1, Introduction to Psychology, and PSYCH 10, Introduction to Statistical Methods, or a comparable statistics course. Advanced placement (AP) credit may no longer be used towards the Psychology minor.

The minor must include three of eleven core courses, with a minimum of one from each of two areas (A: BIO 20; PSYCH 30, 45, 50, 55; and B: 60, 70, 75, 80, 90, 95) and elective Psychology courses of at least three units each, totaling 35 units. Students who declared a Psychology minor prior to the 2002-03 academic year may choose any three of the eleven core courses.

Students who declared a Psychology minor prior to the 2005-06 academic year may choose to complete seven total courses: PSYCH 1 and 10, three core courses, and two elective courses.

Independent study, research, and practica cannot be counted toward the minor. Summer Quarter Psychology courses are not applicable toward the 35 units needed for the minor.

All courses used to fulfill the requirements of the minor must be passed with a grade of 'C-' or better, except for courses offered only on a satisfactory/no credit basis. No more than 10 units of transfer credit may be counted toward the Psychology minor.

## MASTER OF ARTS IN PSYCHOLOGY

The Department of Psychology offers a Master of Arts degree only to students concurrently enrolled in its Ph.D. program or to students currently pursuing Stanford B.A. or M.A. degrees. In exceptional cases, students concurrently enrolled in another doctoral or professional program at Stanford may also apply for the M.A. degree. Such applicants should consult with the student services office.

All applicants must satisfy University residency requirements for the degree and are responsible for consulting with their primary departments or the Financial Aid Office about the effects of the proposed program on their current funding. General University requirements for the master's degree are described in the "Graduate Degrees" section of this bulletin.

**Coterminal Program**—Stanford undergraduates who would like advanced training in Psychology may apply for a coterminal M.A. degree in Psychology. To do so, students should consult with the student services office. Along with a coterminal program application, applicants must submit:

1. a statement of purpose
2. a preliminary program plan specifying the courses in which they intend to enroll to fulfill degree requirements
3. at least two letters of recommendation from Stanford faculty members familiar with their academic work
4. a current Stanford undergraduate transcript
5. a written nomination by a member of the Psychology faculty willing to serve as the student's master's degree adviser

This program is limited in size and admission is selective. Applicants must have earned a minimum of 120 units towards graduation as shown on the undergraduate transcript. The department's deadline for the submission of an application to the coterminal program is traditionally in January.

University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees" section of this bulletin. For University coterminal degree program rules and University application forms, see <http://studentaffairs.stanford.edu/registrar/publications#Coterm>.

## REQUIREMENTS

Students must complete at least 45 units of Psychology courses for the degree. (For coterminal degree students, course work for the master's degree may not duplicate courses taken for the undergraduate degree.) Of these 45 units, at least 27 must be in Psychology courses numbered 200 or above. Units from research, teaching, practica, independent study, and lab courses, such as PSYCH 258, 269, 275, 281, 282, and 297, may not be counted toward these 27 units. Two of the graduate courses of at least 3 units each (one from Area A and one from Area B below) are required. In addition, at least one upper division statistics course is required. The course must be approved by the student's adviser. It is recommended that all coterminal students enroll in PSYCH 196, Contemporary Psychology: Overview of Theory, Research, Applications.

Courses to be counted toward the master's degree must be passed with a grade of 'B-' or better, unless the course is offered only on a satisfactory/no credit basis. Units from research, teaching, practica, independent study, and lab courses, such as PSYCH 258, 269, 275, 281, 282, and 297, may be counted toward the remaining required 18 units. Psychology courses numbered in the 100-level and courses from other Stanford departments may be used to satisfy the remaining 18 units. Courses specifically for undergraduates, such as undergraduate honors courses, and courses offered in the Summer Quarter may not be counted toward the master's program unit requirements.

Demonstration of competence in the design and execution of psychological research is also required for receipt of the master's degree. This demonstration entails completion of a master's thesis containing original research. If the student is currently writing a senior honors thesis, this honors thesis may be accepted as proof of research competence provided the honors thesis is judged to be master's level research by the student's adviser and the department's graduate program committee. If the student has completed an honors thesis in Psychology in the prior year, the student would be expected to continue independent research during the coterminal year and to submit this research in a written report which, together with the completed honors thesis, would constitute the master's thesis. All students are required to make an oral presentation of their research during the Spring Quarter, and to present their thesis or written report in June.

Applicants to the coterminal program must have an adviser in the department who agrees to supervise the student's research. Students in the program may be terminated if they do not have an adviser, or if they are not making satisfactory progress in research or course work.

### Area A Courses—

- PSYCH 202. Cognitive Neuroscience
- PSYCH 205. Foundations of Cognition
- PSYCH 210. Foundations of Memory
- PSYCH 221. Applied Vision and Image Systems
- PSYCH 228. Ion Transport
- PSYCH 251. Affective Neuroscience
- PSYCH 261. Emotion
- PSYCH 261A. Learning and Cognition in Activity

### Area B Courses—

- PSYCH 211. Developmental Psychology
- PSYCH 212. Social Psychology
- PSYCH 213. Affective Science Seminar
- PSYCH 215. Mind, Culture, and Society
- PSYCH 217. Topics and Methods in Cultural Psychology
- PSYCH 259. Emotions: History, Theories, Research
- PSYCH 271. Applications of Social Psychology

## DOCTOR OF PHILOSOPHY IN PSYCHOLOGY

There are no specific course requirements for admission to the doctoral program. However, an applicant should have research experience as an undergraduate, as well as the equivalent of an undergraduate major in Psychology. The major focus of the doctoral program is on research training, and admission is highly selective.

Applicants for admission must submit their scores on the general Graduate Record Examination as part of the application. GRE subject scores are recommended.

General University requirements for the Ph.D. are described in the "Graduate Degrees" section of this bulletin.

In addition to fulfilling Stanford University requirements for the degree, the following departmental requirements are stipulated.

**First-Year Course Requirements**—During the first year of graduate study, the student must take PSYCH 207, Proseminar for First-Year Ph.D. Graduate Students, at least one approved graduate statistics course, and at least two core courses from the following list:

- PSYCH 202. Neuroscience
- PSYCH 205. Foundations of Cognition
- PSYCH 211. Developmental Psychology
- PSYCH 212. Social Psychology
  - or PSYCH 215. Mind, Culture, and Society
- PSYCH 213. Affective Science

Students in each area may be required to take up to two additional non-core graduate courses in their area of specialization.

The student is expected to spend at least half of the time in research from the beginning of the first year of graduate study to the completion of the Ph.D., taking no more than 10 units of course



work each quarter. At the end of the first year of graduate study, the student must file with the department a written report of the first-year research activities.

*Second Year Course Requirements*—By the end of the second year of graduate study, the student should complete the core courses listed above and take a second approved graduate course in statistics.

*Third-Year and Beyond*—Students are expected to form a research committee, which must include the dissertation reading committee, before the initiation of the dissertation research. The research committee includes the dissertation adviser and consists of at least three faculty members, at least two of whom should have primary appointments in the Psychology department. For University guidelines for the composition of the dissertation reading committee, see the "Graduate Degrees" section of this bulletin.

The research committee should meet no later than the last day of classes of Spring Quarter of the third year, and determines the timeline for further development of the dissertation research project. Subsequent meetings are triggered by the completion of one of two documents: a dissertation proposal (DP) or a conceptual analysis of the dissertation area (CADA). The timing and sequencing of the DP and CADA are developed by the student in consultation with the committee. As a general guide, one of the two preliminary elements (CADA or DP) should be completed by the end of the third Summer Quarter and the second should be completed by the end of the fourth Spring Quarter. Students are free to alter the membership of the committee at any time during the process, subject to consultation with the adviser.

The DP should be a description of the proposed research. The CADA provides a framework for the research topic of the dissertation, addresses the central issues within the specialty area, and reviews the pertinent literature.

*Advanced Course or Minor Requirements*—The candidate must complete 12 units of advanced graduate course work or a Ph.D. minor in another department. If a student waives the minor requirement in favor of the 12 advanced units, the student must fulfill the advanced course requirement by taking (a) non-core graduate courses required by a particular area, or (b) graduate-level courses in other departments comparable in quality to Psychology's graduate courses. If there is any question about comparability, the student should consult the adviser, student services, and, in some cases, the graduate program committee chair before taking the course.

*Orals*—The candidate must pass the University oral examination, which also serves as a dissertation defense. A committee is formed to review the oral examination, including the dissertation reading committee, an additional faculty member, and one oral examination committee chair from outside the Psychology department. The oral examination consists of a 40-45-minute presentation to the department of the completed dissertation research. Parents and friends are welcome to attend. Following the presentation, the student and the committee convene for a discussion of the dissertation and the presentation.

*Dissertation Requirements*—The candidate must complete a dissertation satisfactory to the dissertation reading committee prior to the oral examination. Minor revisions to formatting may be made after the oral examination.

Ph.D. candidacy expires five years after admission to candidacy at the end of the second year of study. Reapplication requires department reexamination.

## STUDENT EVALUATIONS

*First-Year Evaluation*—It is the department's policy to evaluate the progress of each graduate student at the end of the first year of graduate study. As part of the procedure, each student is required to file with the department a report of the first-year research activities.

Students should discuss this report and the evaluation procedures with their adviser as early as possible in their first year. If the student fulfills the academic promise displayed upon

entrance, he or she is invited to continue working towards the doctorate.

The first-year evaluation is primarily based on three factors:

1. quality of research carried out in the first year
2. performance in courses (especially required courses)
3. recommendations of the adviser (including a commitment on the part of that adviser to continue in that role).

*Second-Year and Beyond Evaluation*—A similar evaluation is conducted at the end of each year of graduate training involving the same criteria as the first year; however, the student is not required to submit a paper. Students who are not making satisfactory progress may be dropped from the program.

## THE DOCTORAL TRAINING PROGRAM

As indicated by the requirements described above, a student concentrates in any one of several areas within Psychology. Regardless of area, however, the training program places emphasis on the development of research competence, and students are encouraged to develop those skills and attitudes that are appropriate to a career of continuing research productivity.

Two kinds of experience are necessary for this purpose. One is the learning of substantial amounts of technical information. A number of courses and seminars are provided to assist in this learning, and a student is expected to work out a program, with his or her adviser, to attain this knowledge in the most stimulating and economical fashion.

A second aspect of training is one that cannot be gained from the courses or seminars. This is firsthand knowledge of, and practical experience with, the methods of psychological investigation and study. These methods include ways of behaving with the subjects being studied. Students are provided with whatever opportunities they need to reach those levels of competence representative of doctoral standing. Continuing research programs, sponsored by members of the faculty, offer direct opportunities for experience in fields represented by the faculty's many research interests.

Each student achieves competence in unique ways and at different rates. Each student and adviser share in planning a program leading to the objectives discussed. The student is expected to spend half of his or her time on research and takes no more than 10 units of course work per quarter. For further information please contact the student services office and the department graduate guide.

## TEACHING REQUIREMENT

The department views experience in supervised teaching as an integral part of its graduate program. Regardless of the source of financial support, all students serve as teaching assistants for at least five Psychology courses during their graduate study. Of the courses, two must be PSYCH 1, Introduction to Psychology, or PSYCH 10, 252 or 253, Statistical Methods. Students are discouraged from participating in teaching during the first year of graduate study. Students typically progress from closely supervised teaching to more independent work. Some students may be invited to offer a supervised, but essentially independent, seminar during their final year of graduate study.

## PSYCHOLOGY COLLOQUIUM

The Psychology Colloquium meets on most Wednesday afternoons at 3:45 p.m. Speakers from Stanford and other institutions present topics of current interest. Graduate students are expected to attend. Additional announcements may be found at <http://www.stanford.edu/dept/psychology/colloquium>.

## PH.D. MINOR IN PSYCHOLOGY

Candidates for the Ph.D. degree in other departments may elect a minor in Psychology. To obtain a minor, the student must complete 20 units of course work at the graduate level in the Department of Psychology, excluding PSYCH 275 (graduate-level research). Crosslisted graduate courses can be used to satisfy this

requirement. All courses counting toward the Ph.D. minor must be passed with a grade of 'B-' or better, unless the course is offered only on a credit/no credit basis.

## PUBLIC POLICY

*Director:* Bruce M. Owen (Stanford Institute for Economic Policy Research)

*Deputy Director:* Gregory L. Rosston (Stanford Institute for Economic Policy Research)

*Associate Director and Senior Lecturer:* Geoffrey Rothwell (Economics, Public Policy)

*Director of Undergraduate Capstone and Senior Lecturer:* Mary Sprague (Public Policy)

*Director of Graduate Practicum and Professor of the Practice of Public Policy:* Joe Nation (Public Policy)

*Executive Committee:* Laurence Baker (Medicine), Jonathan Bendor (Graduate School of Business), David Brady (Political Science, SIEPR), Samuel Chiu (Management Science and Engineering), Joshua Cohen (Political Science, Philosophy, Law), Morris Fiorina (Political Science, Hoover Institution), David Kennedy (History, emeritus), David Grusky (Sociology), Eric Hanushek (Hoover Institution, SIEPR), Deborah Hensler (Law), Jonathan Levin (Economics), Roger Noll (Economics, emeritus, SIEPR), Bruce Owen (SIEPR), Madhav Rajan (Graduate School of Business), Sean Reardon (Education), Lee Ross (Psychology), Gregory Rosston (SIEPR), Debra Satz (Philosophy), John Shoven (SIEPR, Economics), Kathryn Stoner-Weiss (Freeman Spogli Institute for International Studies)

*Affiliated Faculty:* William Abrams (Human Biology), Michael Armacost (Freeman Spogli Institute for International Studies), Jonathan Bendor (Graduate School of Business), Eric Bettinger (Education), Jayanta Bhattacharya (Medicine), Coit Blacker (Freeman Spogli Institute for International Studies), Lisa Blaydes (Political Science), Michael J. Boskin (Economics, Hoover Institution), Paul Brest (Law, emeritus), Jeremy Bulow (Graduate School of Business), Eamonn Callan (Education), Martin Carnoy (Education), John Cogan (Hoover Institution), Geoffrey Cohen (Psychology), Joshua Cohen (Political Science, Philosophy, Law), Gary Cox (Political Science), Christophe Crombez (Freeman Spogli Institute for International Studies), Larry Diamond (Freeman Spogli Institute for International Studies, Hoover Institution), Walter Falcon (Freeman Spogli Institute for International Studies, emeritus), Lawrence Friedman (Law), Lawrence Goulder (Economics, Freeman Spogli Institute for International Studies), Stephen Haber (Political Science, Hoover Institution), Justin Grimmer (Political Science), Deborah Hensler (Law), Pamela Hinds (Management Science and Engineering), Daniel Ho (Law), Nicholas Hope (Stanford Center for International Development), Caroline Hoxby (Economics, Hoover Institution, SIEPR), Joy Ishii (Graduate School of Business), Jakub Kastl (Economics), Daniel Kessler (Law, Hoover Institution, Graduate School of Business), Pete Klenow (Economics), Stephen Krasner (Political Science, Freeman Spogli Institute for International Studies, Hoover Institution), Jon A. Krosnick (Communication), Claire Lim (Graduate School of Business), Thomas MaCurdy (Economics, Hoover Institution), Robert McGinn (Management Science and Engineering; Science, Technology and Society), Milbrey McLaughlin (Education), Terry Moe (Political Science, Hoover Institution), Petra Moser (Economics), Joan Petersilia (Law), James Phills (Graduate School of Business), A. Mitchell Polinsky (Law), Walter Powell (Education), Robert Reich (Political Science), Douglas Rivers (Political Science, Hoover Institution), Lee Ross (Psychology), Ken Shotts (Graduate School of Business), Samuel So (Medicine), Stephan Stedman (Freeman Spogli Institute for International Studies), Jeff Strnad (Law), Barton Thompson (Law, Woods Institute, Freeman Spogli Institute for

International Studies), Michael Tomz (Political Science, SIEPR), Greg Walton (Psychology), Jonathan Wand (Political Science), Barry Weingast (Political Science, Hoover Institution), Robert M. White (Materials Science and Engineering), Frank Wolak (Economics, Freeman Spogli Institute for International Studies), Christine Min Wotipka (Education).

*Lecturers:* Laura Arrillaga (Graduate School of Business), Frank Benest (Public Policy), Jeffrey Clemens (SIEPR), David Crane (Public Policy), Tammy Frisby (Hoover Institution, Political Science), Dennis Gale (Urban Studies), Jonathan D. Greenberg (Law), Russell Hancock (Public Policy), Koichiro Ito (SIEPR), Adrienne Jamieson (Bing Stanford in Washington), Anjini Kochar (SIEPR), Eva Meyersson Milgrom (SIEPR, Sociology), Alyssa O'Brien (Program in Writing and Rhetoric), Mark Tendall (Economics), Patrick Windham (Public Policy)

*Program Office:* First Floor, SIEPR Gunn Building, 366 Galvez Street

*Mail Code:* 94305-6050

*Program Phone:* (650) 725-0109

*Web Site:* <http://publicpolicy.stanford.edu>

*Email:* [publicpolicy@stanford.edu](mailto:publicpolicy@stanford.edu)

Courses offered by the Public Policy Program are listed under the subject code PUBLPOL on the *Stanford Bulletin's* ExploreCourses web site.

### MISSION OF THE UNDERGRADUATE PROGRAM IN PUBLIC POLICY

The mission of the undergraduate program in Public Policy is to expose students to the concepts and tools used in evaluating public policy options and outcomes, and to prepare students for entry-level positions in organizations concerned with such analysis. The focus is chiefly on domestic policy issues, applicable anywhere in the world. Courses in the major provide students with background in economics and quantitative methods, political science, law, philosophy, ethics, organizational behavior, and social psychology. Economics and quantitative analyses are central to but not sufficient for modern public policy analysis; political science, law, philosophy, organizational behavior, and psychology are among other necessary disciplinary perspectives. Political philosophy and ethics form the foundations of public policy. Political science offers insights to the decision making process and information needs of a democracy. Organizational behavior focuses on the decisions made outside the market environment in hierarchies, bureaucracies, and teams. Nearly all public policy is formulated as law, and economic analysis of legal rules and institutions is key to effective implementation of policy decisions. Seniors have a research capstone requirement consisting either of an honors thesis or participation in a team practicum, conducting applied policy research for an outside client, typically a local or regional agency. Students majoring in Public Policy are prepared for careers in elective or appointed public office, business, law, and governmental agencies, or for further study in graduate or professional schools.

The Public Policy Program offers a Bachelor of Arts, an honors program, and a minor for undergraduates, as well as a coterminal M.A. in Public Policy.

### LEARNING OUTCOMES

The program expects its undergraduate majors to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the Program in Public Policy. Students are expected to demonstrate:

1. knowledge and understanding of Public Policy analytical tools.
2. ability to communicate ideas clearly and persuasively in written and oral forms.
3. ability to evaluate applied theoretical and empirical work in the discipline.

4. ability to apply skills and knowledge acquired in the curriculum to analyze policy issues and make policy recommendations.
5. demonstrate mastery in senior capstone experience.

## GRADUATE PROGRAMS IN PUBLIC POLICY

University requirements for the master's degree are described in the "Graduate Degrees" section of this Bulletin.

Courses in the graduate program in Public Policy offer advanced skills necessary to assess the performance of alternative approaches to policy making and implementation, evaluating program effectiveness, understanding the political constraints faced by policy makers, and appreciating the conflicts in fundamental human values that often animate policy debate. After completing the graduate core curriculum, students apply these skills by focusing their studies in a two quarter, 10-unit practicum for the M.P.P., or a 5-unit master's thesis for the M.A. Students in the M.P.P. program also complete at least one concentration tailored to the student's primary degree program or the student's interests and skills.

The Graduate Program in Public Policy offers two master's degrees:

- Master of Public Policy (M.P.P.), a two-year program leading to a professional degree
- Master of Arts (M.A.), a one-year program not intended as a professional degree

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

- Juris Doctor with a Master of Public Policy (J.D./M.P.P.)
- Juris Doctor with an M.A. of Public Policy (J.D./M.A.)
- Doctor of Philosophy in Economics, Education, Management Science and Engineering, Psychology, or Sociology with a Master of Public Policy (Ph.D./M.P.P.)
- Master of Business Administration with a Master of Public Policy (M.B.A./M.P.P.)
- Master of Arts in International Policy Studies with a Master of Public Policy (M.A./M.P.P.)
- Master of Science in Management Science and Engineering with a Master of Public Policy (M.S./M.P.P.)

Requirements for the joint degrees differ from completing the two degrees separately. See the "Master's Degrees in Public Policy" section for more details.

## BACHELOR OF ARTS IN PUBLIC POLICY

The core courses in the Public Policy Program develop the skills necessary to assess the performance of alternative approaches to policy implementation, evaluate the effectiveness of policies, understand the political objectives and constraints faced by policy makers, and appreciate the conflicts in fundamental human values that often animate the policy debate. After completing the core, students apply these skills by focusing their studies in one of several areas of concentration. The areas of concentration address specific fields of public policy, types of institutions, or a deeper development of the tools of policy analysis. Students design their own concentrations with the help of their faculty advisors and the approval of the program director. Students must submit a list of their proposed concentration course work and a brief written defense of its coherence in advance of taking concentration courses. Areas of concentration are not declared on Axess. They do not appear on the transcript or diploma.

Recent areas of concentration include, but are not limited to:

- Advanced Methods of Policy Analysis
- Design of Public Institutions
- Development and Growth Policies

- Education
- Environment, Resources, and Population
- Health Care
- International Policies
- Law and the Legal System
- Science and Technology Policy
- Social Policy: Discrimination, Crime, Poverty

Completion of the Bachelor of Arts degree in Public Policy requires a minimum of 87 units of course work.

1. *Preparatory courses (44 units)*—POLISCI 2 or equivalent; ECON 1A, 1B, 50, 51, 102A, 102B; MATH 51; MS&E 180 or PSYCH 70 or PSYCH 138. The U.S. Government and politics requirement can be fulfilled by taking POLISCI 2, by passing a diagnostic exam offered by the Public Policy program, or by receiving a score of at least 4 on the Advanced Placement exam in U.S. government and politics (which appears on the student's Stanford transcript). ECON 50, 51 and MATH 51 must be taken for a letter grade. A maximum of 10 units of the other preparatory courses may be taken as credit/no credit.
2. *Core courses*—A 25-unit sequence of 5-unit PUBLPOL courses (101, 102, 103B, C, or D, 104, and 106), which students should plan to complete by the end of the junior year. All core courses must be completed for a letter grade.
3. *Concentration*—Majors must complete at least 15 units of course work in an area of concentration. This post-core course work must be approved by a faculty advisor and the director. Concentration courses must be completed for a letter grade.
4. *Capstone research requirement*—Seniors are required to demonstrate competency in applied policy research. This requirement is fulfilled either by an honors thesis or by participation in a research project (Practicum) in which small student teams analyze real world policy problems faced by Bay Area agencies and produce a report for use by the client. A seminar for honors students is offered Autumn Quarter (PUBLPOL 200A, 3 units). The Practicum is offered both Winter and Spring quarters (PUBLPOL 200B and C, 5 units). The capstone research requirement must be completed for a letter grade.
5. Students must complete the Public Policy core, concentration and the senior capstone requirement with an overall grade point average (GPA) of 2.3 (C+) or higher.
6. It is recommended that the major be declared by the end of sophomore year but no later than the end of Autumn Quarter of the junior year. Major declaration forms are available in the Public Policy Program office and on the web site.

The Public Policy Program encourages students to attend the Bing Stanford in Washington Program and to participate in appropriate Stanford internship programs, especially those available through the Haas Center for Public Service and Stanford in Government.

## HONORS PROGRAM

The Public Policy Program offers students the opportunity to pursue honors work during the senior year. To graduate with honors in Public Policy, a student must:

1. Apply for admission to the honors program no later than the end of Spring Quarter of the junior year.
2. Complete the requirements for the B.A. in Public Policy and achieve an overall grade point average (GPA) of 3.5 in the following courses: the Public Policy core; concentration; Senior Capstone; PUBLPOL 199, Senior Research; and a course in applied econometrics (ECON 102C, ECON 103, ECON 104, STATS 202, PUBLPOL 303B, or PUBLPOL 303C). Students are encouraged to complete the applied econometrics course by the end of Spring Quarter of the junior year and take PUBLPOL 200A during Autumn Quarter of that year. Courses not taken at Stanford are not included in calculating the GPA.
3. During the senior year, enroll in at least 8 but no more than 15 units of PUBLPOL 199, Senior Research, with the thesis

advisor. Students need to contact the program office to have their thesis advisor listed as a 199 instructor. An 'N' grade will be given by the advisor in quarters prior to Spring, when the thesis is completed and presented. All PUBLPOL 199 units must receive a final grade of at least a 'B+'. The honors thesis must demonstrate mastery of relevant analytical tools and address a policy issue.

4. The honors thesis must be submitted to both the thesis advisor and the Public Policy Program office. In order to be considered for University and department awards, the final thesis must be submitted to the program office no later than the third Wednesday in May in both printed and electronic forms. All other theses must be submitted by the last Friday in May in both printed and electronic forms.

Students who intend to pursue honors work should plan their academic schedules so that most of the core courses are completed before the beginning of the senior year, and all of the core and concentration courses are completed by the end of Winter Quarter of senior year. This scheduling gives students both the time and the necessary course background to complete their honors thesis during Spring Quarter. In addition, prospective honors students are encouraged to enroll in PUBLPOL 197, Junior Honors Seminar, during Winter or Spring Quarter. This course focuses on developing a research plan and the research skills necessary to complete an honors thesis.

To apply for honors, a student must submit a completed application to the Public Policy Program office with a brief description of the thesis. Applications are found online or in the program office. The student must obtain the sponsorship of a faculty member who approves the thesis description and agrees to serve as a thesis advisor. Students intending to write a thesis involving more than one discipline may wish to have two advisors, at least one of whom is affiliated with the Public Policy Program.

Graduation with honors requires that the thesis be approved by both the advisor and the program director. The role of the director is to assure that the thesis deals with an issue of public policy and satisfies the standards of excellence of the program. However, the grade for the honors thesis (PUBLPOL 199 units) is determined solely by the advisor.

Members of the affiliated faculty in Public Policy are available to provide assistance in selecting a thesis topic and advisor.

## COTERMINAL M.A. IN PUBLIC POLICY

The coterminal M.A. in Public Policy is a structured program designed to impart the basic analytical tools of public policy analysis, or to permit public policy majors to specialize in an applied field of policy analysis. The coterminal M.A. is also a gateway to the M.P.P. degree program. Coterminal students in any program may apply for admission to the M.P.P. program after one quarter. Most students complete their M.A. in a fifth year at Stanford; occasionally students may be able to complete their B.A. and coterminal M.A. in the fourth year.

## APPLICATION AND ADMISSION

There are three application deadlines for the 2012-13 academic year: November 16, 2011; February 22, 2012; and April 25, 2012. Seniors wishing to apply to the coterminal program must apply by the November or February deadlines.

To apply for admission to the Public Policy coterminal M.A. program, students should submit the following materials directly to the Public Policy office:

1. the coterminal application
2. 1-2 page statement of purpose
3. one-page resume
4. a preliminary program proposal
5. a current unofficial undergraduate transcript
6. two confidential letters of recommendation from Stanford faculty members familiar with the student's academic work.

Applicants will be contacted for an interview. All applicants should have completed, or be currently enrolled in, required

preparatory course work (MATH 51, POLISCI 2, ECON 1A, 1B, 50, 51, 52, 102A and 102B) prior to application.

University regulations govern both the coterminal M.A. degree application process and the requirements for the degree. Undergraduates with strong academic records may apply for admission upon completion of 120 units, but no later than the quarter prior to the expected completion of the undergraduate degree. The University requires that units for a given course may not be counted to meet the requirements of more than one degree; that is, no units may be double-counted. No courses taken more than two quarters prior to admission to the coterminal master's program may be used to meet the 45-unit University minimum requirement for the master's degree.

The University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees" section of this Bulletin. For University coterminal degree program rules and University application forms, also see <http://studentaffairs.stanford.edu/registrar/publications#Coterm>.

## REQUIREMENTS

To graduate with a coterminal M.A. in Public Policy, students must:

1. Take all courses applied to the coterminal master's degree for a letter grade (with the exception of PUBLPOL 311, which is only offered C/NC). For courses with variable units, coterminal students in their graduate career should enroll in the course for 4 units. No units are counted for courses in which a student earns a grade less than 'B-'. Courses offered only for C/NC or other non-letter grade system may be applied upon approval of a petition to the program director.
2. Achieve a cumulative grade point average (GPA) of 3.0 (B) or better for all courses taken towards the M.A.
3. Comply with all relevant University and program deadlines and policies.
4. Students seeking the coterminal M.A. in Public Policy follow one of two tracks (A or B) through the program, as described below.
5. Students who apply successfully to the M.P.P. program must transfer all applicable M.A. units to the M.P.P. program.

## TRACK A

For students who have completed, or will complete, the Public Policy core course curriculum. Track A consists of at least 45 units of course work:

1. 27 or more units in an area of concentration. There are six concentrations:
  - Health Policy
  - Education Policy
  - International Policy
  - Regulatory Policy
  - Environmental Policy
  - Science and Technology Policy

Each concentration includes a set of required core courses and a variety of electives. Students must present a coherent written study plan to support concentration course choices, designed in consultation with a faculty adviser and approved by the program director.

2. 4 or 5 units of applied econometrics (ECON 102C, ECON 103, ECON 104, STATS 202, or PUBLPOL 303C).
3. PUBLPOL 302A. Introduction to American Law.
4. All Public Policy graduate students are required to attend three quarters of PUBLPOL 311, Public Policy Colloquium, and enroll for 1 unit during any quarter of their choosing. Attendance and participation are mandatory.
5. Completion of a 10-unit practicum or a faculty-supervised internship or thesis.
6. All 45 units must be taken in upper division (100-level) courses, and at least 25 of those units must be at the graduate level (200-level and above).
7. Track A students must also complete ECON 52, which does not count toward the 45 units.

8. Track A students who are accepted into the M.P.P. program take advanced courses in those subjects where the standard M.P.P. curriculum would duplicate undergraduate major requirements.

### TRACK B

For students who will not complete the Public Policy core curriculum. Track B consists of at least 45 units of core subjects in the analysis of public policy.

- The following preparatory courses are required, but do not count toward the 45-units:
  - ECON 1A, 1B, 50, 51, 52, 102A, 102B
  - MATH 51
  - POLISCI 2 or equivalent
- The following core courses are required and do count toward the required 45 units:
  - PUBLPOL 201. Politics and Public Policy *or* PUBLPOL 304A. Politics and Collective Action
  - PUBLPOL 301A. Microeconomics
  - PUBLPOL 202. Organizations and Public Policy *or* MS&E 180. Organizations: Theory and Management
  - PUBLPOL 307. Justice
  - PUBLPOL 301B. Cost-Benefit Analysis and Evaluation *or* PUBLPOL 204. Economic Policy Analysis
  - PUBLPOL 302A. Introduction to American Law
  - ECON 102C, ECON 103, ECON 104, STATS 202, PUBLPOL 303B, or PUBLPOL 303C .
  - PUBLPOL 206. Economics of Legal Rules and Institutions *or* PUBLPOL 302B. Economic Analysis of Law
  - PUBLPOL 305A. Judgment and Decision Making *or* PUBLPOL 305B. Social Psychology and Social Change
- All Public Policy graduate students are required to attend three quarters of PUBLPOL 311, Public Policy Colloquium, and enroll for 1 unit during any quarter of their choosing. Attendance and participation are mandatory.
- Students should petition to count additional advanced policy skills courses needed to meet the 45-unit degree requirement. All 45 units must be taken in upper division (100+ level) courses and at least 25 of those units must be taken at the graduate level (200-level and above).

Coterminal M.A. students must meet with their faculty adviser upon acceptance to the program. For Track A students, advisers must confirm that the courses proposed are likely to be taught during the applicable period, or that appropriate substitute courses are available. Public Policy student services will verify scheduling of courses.

### FINANCIAL AID

The Public Policy Program does not provide financial assistance to coterminal students. For information on student loans and other sources of support, please consult the Stanford Financial Aid Office. Students who enter public service employment with local, state, or federal agencies, schools, or certain non-for-profit organizations may obtain forgiveness for educational loans, based on years of public service employment.

### MASTER'S DEGREES IN PUBLIC POLICY

The program offers two master's programs in Public Policy. The Master of Public Policy (M.P.P.) is a two-year professional degree and the Master of Arts in Public Policy (M.A.) is a one-year non-professional degree.

Currently-enrolled students in other Stanford graduate programs or applicants to those programs may apply for either of the Public Policy master's programs. Stanford undergraduates may apply for the coterminal M.A. in Public Policy and then, after one quarter, apply to the M.P.P. program, using the Graduate Program Authorization Petition. The same is true for coterminal master's students in any program. Students accepted to the M.P.P. program withdraw from the M.A. degree program and complete the requirements for the 90-unit M.P.P. degree. This does not reduce

the total number of units required for the bachelor's or master's degrees. Earning the B.A. and M.P.P. typically takes at least five years. Students considering this option should be familiar with the University's coterminal degree policies and procedures and should consult the director of the Public Policy program early in their planning.

All Public Policy master's programs, with the exception of the J.D./M.A., require at least one year of study at Stanford beyond the requirements for the other joint or dual degree.

- Public Policy Joint Degrees. Students enrolled in or applying to certain degree programs in the Schools of Business, Education, Engineering, Humanities and Sciences, and Law are eligible to apply for Public Policy joint degrees.
  - Juris Doctor and Master of Public Policy (J.D./M.P.P.)
  - Juris Doctor and Master of Arts of Public Policy (J.D./M.A.)
  - Doctor of Philosophy in Education and Master of Public Policy (Ph.D./M.P.P.)
  - Doctor of Philosophy in Economics and Master of Public Policy (Ph.D./M.P.P.)
  - Doctor of Philosophy in Management Science & Engineering and Master of Public Policy (Ph.D./M.P.P.)
  - Doctor of Philosophy in Psychology and Master of Public Policy (Ph.D./M.P.P.)
  - Doctor of Philosophy in Sociology and Master of Public Policy (Ph.D./M.P.P.)
  - Master of Business Administration and Master of Public Policy (M.B.A./M.P.P.)
  - Master of Arts in International Policy Studies and Master of Public Policy (M.A./M.P.P.)
  - Master of Science in Management Science & Engineering and Master of Public Policy (M.S./M.P.P.)

For further information, see the "Joint Degree Programs" section of this bulletin and the University Registrar's site.
- Master of Public Policy (M.P.P.) and Master of Arts in Public Policy (M.A.) Dual Degrees  
Any other Stanford graduate student (i.e., not covered in '1' above) is eligible to apply for a dual degree, either the M.P.P. or the M.A. in Public Policy, in addition to the degree program in which they are currently enrolled.

### PREREQUISITES

Graduate students in Public Policy are expected to be literate in mathematics and microeconomics at a level equivalent to MATH 51 and ECON 50 before beginning the curriculum. A no-credit refresher course in mathematics and economics is offered in the two weeks preceding the start of Autumn Quarter.

### APPLICATION AND ADMISSIONS

Applications for graduate study in Public Policy are accepted only from students currently enrolled in any Stanford graduate degree program or from external applicants seeking a joint degree. Coterminal M.A. or M.S. students in any program are eligible to apply to the M.P.P. program once they complete one quarter of coterminal study, using the Graduate Program Authorization Petition for this purpose.

External applicants for joint degrees must apply to the department or school offering the other graduate degree (i.e., Ph.D., M.A., M.S., M.B.A., or J.D.), indicating an interest in the joint degree program; applicants admitted to the other degree program are then evaluated for admission to the M.P.P. or M.A. program.

Students currently enrolled in any Stanford graduate program may, with the consent of that program, apply either for the applicable joint degree program or for the dual M.P.P. or M.A. degree. To apply for admission for the Master of Public Policy (M.P.P.) or Master's of Arts in Public Policy (M.A.) degree program, graduate students should submit the following materials directly to the Public Policy office by April 13, 2012:

- application form

- confidential letter of recommendation from a Stanford faculty member familiar with applicant's academic work
- undergraduate and graduate transcripts
- GRE, GMAT, LSAT or MCAT test scores
- 1-2 page statement of purpose, including career goals
- resume
- preliminary program proposal
- transcripts and course descriptions demonstrating completion of required prerequisite course work in multivariate calculus and intermediate microeconomics

Applicants will be interviewed. If admitted, students will submit a Graduate Authorization Petition through Axess.

## REQUIREMENTS

1. *Core Curriculum*—All core courses must be taken for a letter grade and must be completed with an overall grade point average (GPA) of 3.0 or better.
  - PUBLPOL 301A. Microeconomics
  - PUBLPOL 301B. Cost-Benefit Analysis and Evaluation
  - PUBLPOL 302A. Introduction to American Law
  - PUBLPOL 302B. Economic Analysis of Law
  - PUBLPOL 303A. Political Methodology I
  - PUBLPOL 303B. Political Methodology II
  - PUBLPOL 304A. Politics and Collective Action
  - PUBLPOL 305A. Judgment and Decision Making
  - PUBLPOL 305B. Social Psychology and Social Change
  - PUBLPOL 306. Writing and Rhetoric for Policy Audiences (M.P.P. students only)
  - PUBLPOL 307. Justice
  - PUBLPOL 317. Comparing Institutional Forms
2. *Colloquium*—All Public Policy graduate students are required to attend three quarters of PUBLPOL 311, Public Policy Colloquium, and enroll for 1 unit during any quarter of their choosing. Attendance and participation are mandatory.
3. *Practicum (M.P.P. and Track A Coterminal M.A. students only)*—Completion of the two quarter practicum course, PUBLPOL 309 (10 units, Autumn and Winter Quarters), and presentation of a report in which interdisciplinary student teams analyze real world policy issues for an outside client.
4. *Concentration (M.P.P. students only)*—Advanced course work in a specialized field, chosen from the approved list of concentration courses with the prior approval of the student's faculty adviser and the program director.
5. *Master's Thesis (M.A. students only)*—All M.A. students must submit a 5-unit master's thesis, written under the guidance of an adviser who is a member of the Public Policy affiliated faculty on a topic approved in advance by the program director. Students give the program office the name of their thesis adviser during Autumn Quarter and enroll in PUBLPOL 310 during a quarter of their choosing. The 5 units may be spread over multiple quarters, and an 'N' (continuing course) grade is given during any quarters prior to Spring. The thesis must be submitted to the Public Policy Program office in both electronic and printed form no later than the last Friday in May. The final grade for PUBLPOL 310 is the M.A. thesis grade, which is determined solely by the thesis adviser.

## M.P.P. AND M.A. DEGREE REQUIREMENTS

1. All graduate degree candidates must submit a Master's Degree Program Proposal to the Public Policy office by the end of Autumn Quarter and must amend this proposal formally if plans for meeting the degree requirements change.
2. Public Policy students are never required to repeat a course which duplicates material they have already mastered. Students may, by petition, substitute a different course for a core requirement whose material would be duplicative. This flexibility does not reduce the unit requirements for any degree.
3. M.P.P. degree students are not permitted to enroll in PUBLPOL 309, Practicum, without having completed the

following Core Courses: PUBLPOL 301A, 301B, 302B, 303A, 303B, 306.

## PUBLIC POLICY JOINT DEGREE REQUIREMENTS

1. A joint degree is regarded by the University as distinct from either of its component degrees, and requirements for the joint degree generally differ from the sum of the requirements for the individual degrees.
2. Up to a maximum of 45 units, or one year, of the University residency requirement can be credited toward both graduate degree programs (i.e., the joint degree requirements may contain up to 45 units less than the sum of the individual degree unit requirements). For example, a J.D./M.P.P. has a four-year residency requirement, one year less than the sum of the requirements for the separate degrees. This recognizes that there is a subject matter overlap between the fields comprising the joint degree.
3. The Public Policy Program strives to encourage an intellectual, professional, and social community among its students. For this reason, joint degree students are expected to devote one year of full-time study at Stanford (usually the second) entirely to the Public Policy Program, rather than spacing Public Policy courses throughout their graduate careers. Unavoidable scheduling conflicts involving joint degree students may be mitigated by substitution of equivalent courses approved in advance by petition.
4. Joint degree students are expected to have and to consult regularly with an academic adviser. The adviser is generally a member of the faculty of both degree programs. The program director is available to make adviser recommendations.
5. In order to take advantage of the reduced residency requirement, joint M.P.P. students must define their area of concentration from among courses offered in their non-Public Policy program. Students wishing to concentrate in another field should apply for a dual, rather than a joint, MPP degree.

## MINORS IN PUBLIC POLICY

The Public Policy Program offers a minor that is intended to provide bachelor's students with interdisciplinary training in applied social sciences. Students who pursue the minor are required to take the courses listed below for a total of 35 units in Public Policy and its supporting disciplinary departments. Because University rules prohibit double-counting courses, the requirements for a minor differ according to the student's major requirements. Courses for the minor must be completed for a letter grade, with the exception of PUBLPOL 311.

For students whose major department or program requires no courses in economics and political science, the requirements for a Public Policy minor are:

<i>Subject and Catalog Number</i>	<i>Units</i>
ECON 1A,B, 50, 51	20
POLISCI 2*	5
PUBLPOL 101	5
PUBLPOL 104	5

For students who are Economics majors or who satisfy a major requirement by taking ECON 50, but have taken no courses in political science, the requirements for a Public Policy minor are:

MS&E 180	4
POLISCI 2*	5
PUBLPOL 101	5
PUBLPOL 102	5
PUBLPOL 103B, C or D	5
PUBLPOL 104	5
PUBLPOL 106	5
PUBLPOL 311	1

\* The U.S. government and politics requirement can be fulfilled by taking POLISCI 2, passing a diagnostic exam offered by the Public Policy program, or by receiving a score of at least 4 on the Advanced Placement exam in U.S. government and politics (which appears on the Stanford transcript).

For students who are Political Science majors or who satisfy a major requirement by taking POLISCI 2 but no courses in Economics, the requirements for a Public Policy minor are:

ECON 1A,B, 50, 51, 102A	25
PUBLPOL 104	5
PUBLPOL 106	5

For Sociology majors, the requirements for a Public Policy minor are:

ECON 1A,B, 50, 51, 102A	25
PUBLPOL 103B, C or D	5
PUBLPOL 104	5

For students who major in another interdepartmental program such as International Relations and who satisfy major requirements by taking ECON 50, POLISCI 2, and an introductory course in statistics such as ECON 102A or STATS 60, the requirements for a Public Policy minor are:

ECON 51, 102B	10
PUBLPOL 101	5
PUBLPOL 102	5
PUBLPOL 103B, C or D	5
PUBLPOL 104	5
PUBLPOL 106	5

## OVERSEAS STUDIES COURSES IN PUBLIC POLICY

For course descriptions and additional offerings, see the listings in the *Stanford Bulletin's* ExploreCourses web site (<http://explorecourses.stanford.edu>) or the Bing Overseas Studies web site (<http://bosp.stanford.edu>). Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

### AUTUMN QUARTER

#### BEIJING

OSPBEIJ 024. China's Economic Development. 5 units, Rozelle, GER:DB:SocSci

#### PARIS

OSPPARIS 124X. Building the European Economy: Economic Policies and the Challenges Ahead. 5 units, Jacques Le Cacheux, GER:DB:SocSci

OSPPARIS 153X. Health Systems and Health Insurance: France and the U.S. -- a Comparison. 4-5 units, Fessler, GER:DB:SocSci, EC:GlobCom

### WINTER QUARTER

#### MADRID

OSPMADRID 32. Health Care Systems Design: Spain, Europe, and the United States. 4 units, Baker, GER:DB:HUM

#### OXFORD

OSPOXFRD 18. Making Public Policy: An Introduction to Political Philosophy, Politics and Economics. 4-5 units, Robert McMahon, GER:DB:SocSci

### SPRING QUARTER

#### CAPETOWN

OSPCPTWN 40. Education in the Post-Apartheid City. 4 units, Bardroodien, Aslam Fataar

#### FLORENCE

OSPFLOR 24. Economics in the European Setting. 3 units, Eric Bettinger

OSPFLOR 78. An Extraordinary Experiment: Politics and Policies of the "New" European Union. 5 units, Morlino, GER:DB:SocSci

#### PARIS

OSPPARIS 33. The Economics of Climate Change: Policies in Theory and in Practice in the EU and the US. 5 units, Christian de Perthuis, Benoit Leguet, GER:DB:SocSci, EC:GlobalCom

#### SANTIAGO

OSPSANTG 119X. The Chilean Economy: History, International Relations, and Development Strategies. 5 units, Staff, GER:DB:SocSci

## RELIGIOUS STUDIES

*Emeriti: (Professors)* Arnold Eisen, Bernard Faure, René Girard, Edwin M. Good, Robert C. Gregg, Van Harvey, David S. Nivison

*Chair:* Hester G. Gelber

*Professors:* Carl W. Bielefeldt, Shahzad Bashir (on leave), Hester G. Gelber, Paul Harrison, Thomas Sheehan, Steven Weitzman, Lee Yearley

*Associate Professors:* Charlotte Fonrobert, Brent Sockness

*Assistant Professor:* Behnam Sadeghi (on leave)

*Senior Lecturers:* Linda Hess, Barbara Pitkin

*Lecturers:* Kirsti Copeland, Ozgen Felek, Irene Lin, Azim Nanji, Yuhua S.-D. Vevaina

*Visiting Professors:* Devin DeWeese, Zvi Lederman

*Visiting Associate Professor:* Jinhua Chen

*Affiliated Faculty:* Vincent Barletta (Iberian and Latin American Cultures), Jean-Pierre Dupuy (French and Italian)

*Department Offices:* Building 70

*Mail Code:* 94305-2165

*Phone:* (650) 723-3322

*Web Site:* <http://stanford.edu/dept/relstud>

Courses offered by the Department of Religious Studies are listed under the subject code RELIGST on the *Stanford Bulletin's* ExploreCourses web site.

## MISSION OF THE DEPARTMENT

The field of Religious Studies brings a variety of disciplinary perspectives to bear on the phenomena of religion for the purpose of understanding and interpreting the history, literature, thought, social structures, and practices of the religious traditions of the world. Comprised of a dozen regular faculty with particular strengths in the study of Buddhism, Christianity, Islam, and Judaism, it enrolls about thirty graduate students (mostly doctoral) and roughly as many undergraduate majors, minors, and joint majors.

Religious Studies works closely with several related programs at Stanford: the Department of Philosophy, with which it offers a joint undergraduate major; the Ho Center for Buddhist Studies; the Taube Center for Jewish Studies; the Abbasi Program in Islamic Studies; the McCoy Center for Ethics in Society; and the Center for Medieval and Early Modern Studies.

While some undergraduates continue their study of religion in a graduate or professional program, most pursue meaningful and successful careers in business, government, the nonprofit sector, and medicine. In this respect, Religious Studies is an ideal interdisciplinary major in the liberal arts. Graduates of the department's doctoral program generally pursue academic careers and are routinely placed in the best universities and colleges in the country.

## LEARNING OUTCOMES

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. understanding of the subject matter of and methods used in the study of religion.

2. skill in reading and interpreting religious texts critically.
3. ability to conduct and present research within the discipline.

## UNDERGRADUATE PROGRAMS IN RELIGIOUS STUDIES

The department offers a Bachelor of Arts major, minor, and honors program in Religious Studies, and a joint major with the Philosophy Department in Religious Studies and Philosophy. Undergraduate courses in Religious Studies are designed to engage students existentially and to assist them in thinking about intellectual, ethical, and sociopolitical issues in the world's religions. The department's faculty seek to provide tools for understanding the complex encounters among religious ideas, practices, and communities, and the past and present cultures that have shaped and been shaped by religion. Courses therefore expose students to: leading concepts in the field of religious studies such as god(s), sacrifice, ritual, scripture, prophecy, and priesthood; approaches developed over the past century, including the anthropological, historical, psychological, philosophical, and phenomenological, that open religion to closer inspection and analysis; and major questions, themes, developments, features, and figures in the world's religious traditions. The department encourages and supports the acquisition of languages needed for engagement with sacred texts and interpretive traditions as well as study abroad at Stanford's overseas centers where religions can be observed and experienced in the culture of their origin.

## GRADUATE PROGRAMS IN RELIGIOUS STUDIES

The graduate mission of the department is to provide students with an interdisciplinary setting of study within which to focus on their respective areas of specialization. The department offers an M.A. and a Ph.D. degree in Religious Studies.

## BACHELOR OF ARTS IN RELIGIOUS STUDIES

### SUGGESTED PREPARATION FOR THE MAJOR

There is no prescribed route or prerequisite to the major; students typically find themselves majoring after taking courses in the department and becoming acquainted with department faculty. Students contemplating the major or joint major are invited to consult with the Director of Undergraduate Studies. The undergraduate student services associate in Building 70 can also field questions regarding the declaration procedure within the department.

### DEGREE REQUIREMENTS

The curriculum for majors is designed to move students sequentially from foundational courses, through deeper investigations, culminating in integrative research courses. Thus, the introductory sequence is designed to lead to courses which build on this foundation with topics including: particular traditions such as Judaism or Buddhism; comparative studies such as nonviolence in Hinduism and Buddhism, or Muslim and Christian interpretations of scripture; specific topics such as mysticism, gender and religion, or theodicy; and distinctive approaches such as the philosophy of religion or ritual studies. Majors complete their careers with integrative courses that afford opportunity for research and consolidation of the knowledge and skills gained earlier.

A Bachelor of Arts in Religious Studies requires 60 units of course work. At least 44 units are to be taken in courses numbered above 100. Ten units out of the 60 may be taken for the grade of C/NC.

### REQUIRED COURSES

1. At least 8 of the 60 units must be courses at the introductory level. Students may satisfy this requirement by taking either:

- a. IHUM 68A,B. Ultimate Meanings (Winter/Spring sequence), or
  - b. one course in each of the following categories: introduction to religious traditions (courses numbered 11-50) and introductory topics in the study of religion (courses numbered 51-99). In consultation with the Undergraduate Director, one Stanford Introductory Seminar in Religious Studies may be applied to this introductory requirement.
2. At least 29 units are to be taken in intermediate lecture and seminar courses numbered 100-289. Of these, at least two seminars are required from courses numbered above 200. With approval of the Undergraduate Director, language courses related to the student's program of study (such as Arabic, Biblical Hebrew, New Testament Greek, Chinese, or Japanese), but not counted towards the University language requirement, may be counted among these 29 units.
  3. 15 units in integrative courses:
    - a. Majors' Seminar: RELIGST 290. Theories of Religion (5 units; Winter Quarter of junior year; fulfills WIM requirement; letter grade only)
    - b. Senior Essay or Honors Thesis Research: RELIGST 297 (3-5 units; minimum 5 units; up to 10 units over two quarters; graded 'N' until completion of essay or thesis)
    - c. Senior Majors' Colloquium: RELIGST 298 (5 units; Spring Quarter; grading option S/NC)
    - d. completion of either a senior essay or honors thesis. See below concerning the difference between these options.
  4. Each student, in consultation with his/her adviser, works out a focus of study centering either on a particular religious tradition or on a theme or problem that cuts across traditions such as ritual, ethics, scripture, or gender.
  5. Students focusing on one religious tradition must take at least 8 units in one or more religious traditions outside their concentration.

### SENIOR ESSAY

A 25-30 page essay on a topic chosen by the student and approved by the adviser upon receipt of a student's proposal by the end of the third quarter prior to expected graduation. The character and content of the essay, which is meant to allow the student to call into play knowledge and skills learned in the course of the major, may take several forms. For example, a student may return to a subject studied earlier but now pursued in more depth or from a new perspective, research a recent or new topic of interest in the field, or offer a carefully framed critical assessment of what has been learned in the major based on review of influential sources, theories, and methods of studying religion. The senior essay is read and graded by the student's adviser and one other member of the Religious Studies faculty.

### HONORS THESIS

A 40-80 page research paper on a topic chosen by the student and approved by the adviser upon receipt of a proposal in the fourth quarter prior to expected graduation. The paper, supported by mastery of primary and secondary scholarship, advances a well-reasoned, supportable thesis. Writers of honors theses must have a grade point average (GPA) of 3.5 in Religious Studies courses, and at least 3.2 overall, and are expected to have already demonstrated success in writing research papers. The honors thesis is read and graded by the student's adviser and one other member of the Religious Studies faculty. Theses earning a grade of 'B+' or above receive honors.

### COGNATE COURSES

The following courses in other departments/programs have been approved by the Chair as fulfilling requirement 2 above.  
 CLASSGEN 18. Greek Mythology  
 POLISCI 149S. Islam and the West



## MAJOR IN RELIGIOUS STUDIES AND PHILOSOPHY

The departments of Religious Studies and Philosophy jointly nominate for the B.A. in Religious Studies and Philosophy those students who have completed a major in the two disciplines. See a description of this joint major in the "Philosophy" section of this bulletin, or in the guidelines available from the undergraduate director of either department.

## MINOR IN RELIGIOUS STUDIES

A Religious Studies minor is a complement to many majors throughout the University. Students contemplating the minor are invited to consult with the Director of Undergraduate Studies. The undergraduate student services associate in Bldg. 70 can also field questions regarding the declaration procedure within the department.

*Requirements*—A minor in Religious Studies requires a minimum of 30 graded units. Students are encouraged to focus their program of study either in a religious tradition or in a theme that cuts across traditions. In consultation with their advisers, students may design the minor in Religious Studies to complement their major. The minor must be declared no later than the last day of the quarter, two quarters before degree conferral.

*Required Courses for the Minor*—

- Two introductory courses. To satisfy this requirement, students take either:
  - IHUM 68A,B. Ultimate Meanings (Winter/Spring sequence), or
  - one course in each of the following categories: introduction to religious traditions (courses numbered 11-50) and introductory topics in the study of religion (courses numbered 51-99). In consultation with the Undergraduate Director, one Stanford Introductory Seminar in Religious Studies may be applied to this introductory requirement.
- At least 22 units in courses at the intermediate and advanced level (above 100), including at least one 200-level seminar.
- Diversity requirement: Students may not take all courses in one religious tradition.
- One course in directed reading (RELIGST 199) may count towards the minor.
- With approval of the Undergraduate Director, one language course related to the student's program of study (such as Arabic, Biblical Hebrew, New Testament Greek, Chinese, or Japanese), but not counted towards the University language requirement, may be counted toward the minor.
- Courses from other departments may not count towards the minor. (*Exception*: language courses covered by point 5.)

## MASTER OF ARTS IN RELIGIOUS STUDIES

University requirements for the M.A. are described in the "Graduate Degrees" section of this bulletin. The department offers a one-year terminal M.A. program. Students can also earn their M.A. degree as part of their coterminal degree program. The M.A. program serves two groups of students: a) those who wish to prepare for a doctoral program in religious studies and b) those who wish to further deepen their knowledge in an area in which they have acquired some expertise during their undergraduate work.

### DEGREE REQUIREMENTS

The following requirements are in addition to the University's basic requirements.

The student completes at least 45 units of graduate work at Stanford beyond the B.A. degree, including either RELIGST 290, Majors Seminar, or, with consent of instructor, RELIGST 304A or B, Theories and Methods. Residence may be completed by three quarters of full-time work or the equivalent.

The student's plan of courses is subject to approval by the Graduate Director. No field of specialization is expected, but students may focus work in particular areas. Advanced and graduate courses in other departments may be taken (see below). No thesis is required; a thesis, if elected, may count for as many as 9 units.

Each student demonstrates reading knowledge of at least one foreign language.

## DOCTOR OF PHILOSOPHY IN RELIGIOUS STUDIES

University requirements for the Ph.D. are described in the "Graduate Degrees" section of this bulletin. The Ph.D. in Religious Studies signifies special knowledge of an interdisciplinary field of study and potential mastery of an area of specialization within it. The faculty of the department have established certain fields of study in which the department's strengths and those of other Stanford departments cohere. They are: Buddhist studies, Islamic studies, Jewish studies, and modern religious thought, ethics, and philosophy. Students who wish to specialize in other fields must obtain early approval by the faculty. Each of these areas of specialization follows a shared structure of study.

### DEGREE REQUIREMENTS

The following requirements are in addition to the University's basic requirements.

- Residence*—Each student completes three years (nine quarters) of full-time study, or the equivalent, in graduate work beyond the B.A. degree, and a minimum of 135 units of graduate course work (excluding the dissertation).
- Required Courses*—The 135 units of graduate course work must include the following:  
RELIGST 304A. Theories and Methods  
RELIGST 304B. Theories and Methods  
RELIGST 391. Pedagogy  
RELIGST 399. Recent Works in Religious Studies  
The remainder of the course work is individually designed, in consultation with the adviser.
- Languages*—Each student demonstrates a reading knowledge of two foreign languages, including French or German. One of those language requirements should be fulfilled by the time of advancing to candidacy at the end of the second year. Competence in the second language must be demonstrated at the time of the qualifying examination. Each student also demonstrates reading knowledge of other ancient or modern languages necessary for the field of study, area of specialization, and dissertation topic.
- Candidacy*—At the end of each academic year, the department's faculty recommend second-year students for candidacy on the basis of all relevant information, and especially on the student's candidacy dossier that includes the approved declaration of an area of specialization, certification for one foreign language, and two substantial papers written for courses during the previous two years. Students are required to take RELIGST 391 and RELIGST 399 prior to candidacy.
- Paper-in-Field*—During the third year, under the supervision of their advisers, students prepare a paper suitable for submission to an academic journal in their field. The paper is read and approved by at least two faculty members in the department. Students are encouraged to register for RELIGST 392 while working on the paper.
- Teaching Internship*—At least one teaching internship under the supervision of faculty members is undertaken at a time negotiated with the Graduate Director. Students receive academic credit for the required internship, which is a part of academic training and not of employment.
- Qualifying Examination*—To qualify for writing a dissertation, the student must pass a comprehensive examination in the chosen field and the area of specialization, typically during the

first quarter of their fourth year. The student must complete the second language requirement before taking the qualifying examination. The qualifying examination is normally conducted by a committee of at least three Academic Council members of the department, one of whom is the adviser. One faculty member may be from outside the department with permission of the Director of Graduate Studies.

8. *Dissertation*—The dissertation contributes to the humanistic study of religion and is written under the direction of the candidate's dissertation adviser and at least two other members of the Academic Council. The University Oral examination is a defense of a completed draft of the dissertation.
  - a. *Dissertation Proposal*—Candidates submit their dissertation proposal in consultation with their advisers. It is read by a committee of at least three faculty, of whom one is the adviser (as chair) and the two others are members of the Academic Council. One non-departmental faculty member may be included.
  - b. *Dissertation Committee*—The dissertation committee is formed after acceptance of the dissertation proposal. It is normally composed of the dissertation adviser and at least two Academic Council members of the Religious Studies department. One non-departmental faculty member may serve as a reader when approved by the Director of Graduate Studies.
9. *University Oral Examination*—This examination, required by the University of Ph.D. students, is a defense of a completed draft of the dissertation. The composition of the examination committee is set by University regulation: five or more faculty, normally all of whom are members of the Academic Council, one of whom must be outside the department to serve as chair of the committee. Normally, the examining committee includes all qualified members of the dissertation committee.

## PH.D. IN RELIGIOUS STUDIES AND HUMANITIES

The department participated in the Graduate Program in Humanities leading to a Ph.D. degree in Religious Studies and Humanities. At this time, the option is available only to students already enrolled in the Graduate Program in Humanities; no new students are being accepted. The University remains committed to a broad-based graduate education in the humanities; the courses, colloquium, and symposium continue to be offered, and the Division of Literatures, Cultures, and Languages provides advising for students already enrolled who may contact DLCL Student Affairs at 650-724-1333 or dlcl@stanford.edu for further information. Courses are listed under the subject code HUMNTIES and may be viewed on the *Stanford Bulletin's* ExploreCourses web site.

## PH.D. MINOR IN RELIGIOUS STUDIES

Candidates for the Ph.D. in other departments may select a Ph.D. minor in Religious Studies.

*Requirements*—The minor requires at least 24 units in Religious Studies at the 200 level or above. Four of the 24 units should be in RELIGST 304 A,B, Theories and Methods.

*Required Courses for the Minor*—  
RELIGST 304A or B. Theories and Methods

*Optional Courses for the Minor*—  
The student should choose any of the courses offered in the department at the 200 level or above, for the equivalent of at least 24 units. Other courses can be chosen in consultation with the Graduate Director.

## OVERSEAS STUDIES COURSES IN RELIGIOUS STUDIES

For course descriptions and additional offerings, see the listings in the *Stanford Bulletin's* ExploreCourses web site

(<http://explorecourses.stanford.edu>) or the Bing Overseas Studies web site (<http://bosp.stanford.edu>). Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

## AUTUMN QUARTER

### MADRID

- OSPMADR 74. Islam in Spain and Europe. 5 units, Almudena Ariza.

## WINTER QUARTER

### MADRID

- OSPMADR 75. Sefarad: The Jewish Community in Spain. 5 units, Almudena Ariza.

## RUSSIAN, EAST EUROPEAN AND EURASIAN STUDIES

*Director:* Robert Crews (History)

*Professors:* Lazar Fleishman (Slavic Languages and Literatures), Gregory D. Freidin (Slavic Languages and Literatures), David J. Holloway (History, Political Science), Nancy S. Kollmann (History, on leave), Michael A. McFaul (Political Science, on leave), Norman Naimark (History), Aron Rodrigue (History), Gabriella Safran (Slavic Languages and Literatures), Nancy B. Tuma (Sociology), Steven J. Zipperstein (History)

*Associate Professors:* Shahzad Bashir (Religious Studies, on leave), Robert Crews (History), Monika Greenleaf (Slavic Languages and Literatures), Amir Weiner (History)

*Assistant Professors:* Vera Gribanova (Linguistics), Branislav Jakovljevic (Drama), Pavle Levi (Film Studies), Bissera Pentcheva (Art History, on leave), Edith Sheffer (History), Nariman Skakov (Slavic Languages and Literatures)

*Senior Lecturers:* Rima Greenhill (Slavic Languages and Literatures), Katherine Jolluck (History)

*Lecturers:* Jelena Batrinic (History), Julie Draskoczy (Slavic Languages and Literatures), Eugenia Khassina (Slavic Languages and Literatures), Jack Kollmann (Center for Russian, East European and Eurasian Studies), Gail Lapidus (Center for Russian, East European and Eurasian Studies), Alma Kunanbaeva (Anthropology), Asya Perelstvaig (Linguistics), Kathryn Stoner-Weiss (Political Science, and Senior Fellow at FSI), Patricia Young (Political Science)

*Courtesy Professor:* Coit Blacker (Political Science)

*Visiting Professors:* Devin Deweese (Religious Studies), Arek Marciniak (Archeology)

*Visiting Associate Professor:* Ewa Domanska (Anthropology)

*Affiliates:* Michael B. Bernstam (Hoover Institution), Lera Boroditsky (Psychology), Margaret Brandeau (School of Engineering), Chaim Braun (Freeman Spogli Institute for International Studies), Martin Carnoy (School of Education), Robert Conquest (Hoover Institution), John B. Dunlop (Hoover Institution), Timothy Garton Ash (Hoover Institution), Paul Gregory (Hoover Institution), Siegfried S. Hecker (School of Engineering), Kenneth Jowitt (Hoover Institution), Terry L. Karl (Political Science), David Laitin (Political Science), Scott Littlefield (Hoover Institution), Douglas Owens (School of Medicine), Bertrand Patenaude (Hoover Institution), William J. Perry (School of Engineering), Dmitri Petrov (Biology), Pavel Podvig (Freeman Spogli Institute for International Studies), Condoleezza Rice (Political Science), Jeffrey Richardson (Freeman Spogli Institute for International Studies), Karen Rondstvedt (Stanford Libraries), Geoffrey Rothwell (Economics), Nancy Ruttenburg (English), Anatol Shmelev (Hoover Institution), Maciej Siekierski (Hoover Institution), Mitchell Stevens (School of Education and Sociology), Ilya

Strebulaev (Graduate School of Business), Allen S. Weiner (School of Law)

Center Offices: Encina West, Room 203

Mail Code: 94305-6045

Phone: (650) 723-3562

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

Courses offered by the Center for Russian, East European and Eurasian Studies are listed under the subject code REES on the *Stanford Bulletin's* ExploreCourses web site.

The Center for Russian, East European and Eurasian Studies (CREEES) coordinates the University's teaching, research, and extracurricular activities related to Russia, Eastern Europe, Central Asia, and the Caucasus and administers a one-year interdisciplinary M.A. graduate degree program. Information on the center's degree programs and other activities is available at <http://CREEES.stanford.edu>. CREEES and its degree programs are directed by the CREEES Steering Committee, composed of faculty members associated with the Center. The program draws on the strengths of nationally recognized area faculty and research affiliates and significant library and archival collections at Stanford. The Center is a U.S. Department of Education Title VI National Resource Center for Russia, East Europe, and Eurasia.

## UNDERGRADUATE PROGRAMS IN RUSSIAN, EAST EUROPEAN AND EURASIAN STUDIES

Students interested in a minor should consult the Director of Undergraduate Studies in the Department of Slavic Languages and Literatures which offers the following relevant minors:

- Russian, East European and Eurasian Studies
- Russian Language
- Russian Language, Literature and Culture
- Russian Culture

*Slavic Theme House*—Slavianskii Dom (SlavDom), at 650 Mayfield Avenue, is an undergraduate residence which houses 50 students and offers a wide variety of opportunities to expand knowledge, understanding and appreciation of Russia and the nations of East Europe, the Caucasus and Central Asia.

*Overseas Studies Programs*—Undergraduates interested in the study of languages, history, culture and social organization of the countries of Russia, Eurasia and East Europe may apply to study at the Stanford centers in Moscow and Berlin. Information about these programs is available at the Bing Overseas Studies Program at <http://bosp.stanford.edu>.

## GRADUATE PROGRAMS IN RUSSIAN, EAST EUROPEAN AND EURASIAN STUDIES

The center offers an M.A. in Russian, East European and Eurasian Studies. The center also offers a coterminal M.A. in Russian, East European and Eurasian Studies.

*Financial Aid*—Subject to funding, CREEES may have a limited number of Foreign Language and Area Studies (FLAS) fellowships for U.S. citizens or permanent residents. Additional financial aid may also be available from CREEES. Applicants to the M.A. program have priority in the annual FLAS competition; in recent years CREEES has also awarded FLAS fellowships to students enrolled in the School of Education and the School of Law. Consult the CREEES associate director for further information about the application and award process. Applications for FLAS fellowships can be obtained at <http://CREEES.stanford.edu/grants/>.

*Doctoral Programs*—Since the University does not offer a Ph.D. in Russian, East European and Eurasian Studies, students wishing to pursue a REEES-related doctoral program must apply to one of the departments offering a Ph.D. with an emphasis on Russia, Eurasia, or Eastern Europe, such as the departments of

History, Anthropology, Political Science, or Slavic Languages and Literatures.

## MINOR IN RUSSIAN, EAST EUROPEAN, AND EURASIAN STUDIES

### UNDERGRADUATE MINOR IN RUSSIAN, EAST EUROPEAN, AND EURASIAN STUDIES

The Center for Russian, East European and Eurasian Studies no longer offers an undergraduate minor.

Students interested in a minor should consult the "Minors in Slavic Languages and Literatures" section of this bulletin which describes the following relevant minors:

- Russian, East European, and Eurasian Studies
- Russian Language
- Russian Language, Literature, and Culture
- Russian Culture

## MASTER OF ARTS IN RUSSIAN, EAST EUROPEAN AND EURASIAN STUDIES

CREEES offers a one-year interdisciplinary master's degree program in Russian, East European and Eurasian Studies for students with a strong prior language and area studies background. The program structure allows students the flexibility to pursue their particular academic interests, while providing intellectual cohesion through a required core curriculum that addresses historical and contemporary processes of change in the Russian Federation, Eastern Europe, the Caucasus, and Central Asia. This core curriculum consists of three core courses and REES 200, Core Seminar Series. The program may be taken separately or coterminally with a B.A. degree program. The interdisciplinary M.A. program typically serves three types of students:

1. Those who intend to pursue careers and/or advanced degrees in such fields as business, education, government, journalism, medicine, or law, and who wish to establish competence in Russian, East European and Eurasian studies.
2. Those who intend to apply to a Ph.D. program involving Russian, East European and Eurasian studies and who need to enhance their academic skills and credentials.
3. Those who are as yet undecided on a career but who wish to continue an interest in Russian, East European and Eurasian studies.

## ADVISING

The advising structure is two-tiered: each M.A. candidate works with the CREEES associate director who advises on the program of course work and monitors the student's progress toward completing the degree. Candidates are also assigned a faculty adviser from the Academic Council faculty, who provides intellectual and academic guidance.

## ADMISSION

Applicants apply electronically; see <http://gradadmissions.stanford.edu> for a link to the electronic application and general information regarding graduate admission. In addition, prospective applicants may consult with the CREEES associate director regarding the application process.

To qualify for admission to the program, the following apply:

1. Applicants must have earned a B.A. or B.S. degree, or the equivalent.
2. At least three years of college-level language study in Russian, a East European or Central Asian language, is preferred. Candidates with fewer years of area language study will be considered.
3. Applicants whose native language is not English and do not possess a U.S. bachelor's degree are expected to take the Test of English as a Foreign Language (TOEFL) and have the results sent to Graduate Admissions, Office of the University Registrar.

4. All applicants must take the General Test of the Graduate Record Examination (GRE) and have the results sent to Graduate Admissions, Office of the University Registrar.
5. Applicants must submit a writing sample of 20 pages or less in English on a topic in Russian, East European, or Eurasian studies.

The deadline for submission of applications for admission and for financial aid is January 11, 2011. Admission is normally granted for Autumn Quarter, but requests for exceptions are considered.

The successful applicant generally demonstrates the following strengths: requisite foreign language study, significant course work in Russian, East European and Eurasian studies in multiple disciplines, outstanding grades in previous academic work, strong analytical writing skills, high GRE scores (particularly verbal and analytical writing), study or work experience in the region, strong letters of recommendation from faculty members in the Russian, East European, and Eurasian Studies field (one letter may be from a language instructor), and a persuasive statement of purpose explaining how the program would advance the applicant's academic and career goals.

### DEGREE REQUIREMENTS

Candidates for the M.A. degree must meet University requirements for an M.A. degree as described in the "Graduate Degrees" section of this bulletin.

The M.A. program in REEES can ordinarily be completed in one academic year by a well-prepared student; longer periods of study are permitted.

Requirements to complete the interdisciplinary M.A. degree are principally ones of distribution, with the exception of three required core courses and a core seminar, as described below. Each student, with the advice of the CREEES associate director, selects courses according to the student's interests, needs, and goals.

All students in the M.A. REEES program must complete a minimum of 48 academic credit units within the following guidelines.

1. *Core courses:* students must complete three core courses, including REES 301 Gateway Course in Russian, East European and Eurasian Studies (autumn), REES 340 The Comparative Political Economy of Post-Communist Transitions (autumn), and REES 320 State and Nation-Building in Central Asia (winter).
2. *Core seminar:* REES 200, Current Issues in Russian, East European and Eurasian Studies, is required of all students in the M.A. program in the winter and spring quarters. The goal of this course is to survey current methodological and substantive issues in Russian, East European and Eurasian studies, acquaint students with Stanford resources and faculty, and present professional development and career options.
3. *Interdisciplinary course work:* all courses (other than language courses) must be taken on the graduate level (200-level or higher). Courses in Russian, East European and Eurasian studies must be completed and distributed among at least three disciplines. All course work applied to the 48-unit minimum must deal primarily with Russian, Eurasian, or East European studies.
4. *Language study:* students in the program are encouraged to study Russian or a language of Eastern Europe, Central Asia or the Caucasus. Credit towards the 48-unit minimum (maximum 3 units per quarter, 9 units total) is allowed for advanced language work.
5. All course work qualifying for the 48-unit minimum (except REES 200) must have a letter grade of 'B' or higher. ('B-' does not count for degree credit, nor does 'S' or 'CR'.)
6. All courses counting towards the 48-unit minimum must be approved by the CREEES associate director, who ensures that planned course work satisfies requirements towards the degree. The CREEES director and steering committee determine the requirements. Consult the CREEES website or the associate

director for the complete and updated list of courses which may be taken toward the degree.

#### *Required Core Courses for 2011-12—*

- REES 301. Gateway Course in Russian, East European, and Eurasian Studies  
 REES 320. State and Nation Building in Central Asia  
 REES 340. Comparative Political Economy of Post-Communist Transitions

#### *Pre-approved courses—*

- ANTHRO 147A. Folklore, Mythology, and Islam in Central Asia  
 ANTHRO 148A/248A. Nomads of Eurasia: Culture in Transition  
 ARTHIST 106. Byzantine Art and Architecture, 300-1453 C.E.  
 ARTHIST 208. Hagia Sophia  
 COMPLIT 219. Dostoevsky and His Time  
 HISTORY 125. 20th-Century Eastern Europe  
 HISTORY 137/337. The Holocaust  
 HISTORY 138A. Germany and the World Wars  
 HISTORY 185B. Jews in the Modern World  
 HISTORY 224A/424A. Soviet Civilization  
 HISTORY 224B/324B. Modern Afghanistan  
 HISTORY 227/327. East European Women and War in the 20th Century  
 HISTORY 236A/336A. Nations and Nationalism in East-Central Europe  
 HISTORY 236D/336D. Cold War Europe  
 HISTORY 238K/328K. Resistance and Collaboration in Hitler's Europe During World War II  
 POLISCI 140C. The Comparative Political Economy of Post-Communist Transitions  
 POLISCI 241L. Democracy and the Market in Eastern Europe  
 RELIGST 125. Authority of the Past in Islamic Thought  
 SLAVGEN 145/245. Age of Experiment: From Pushkin to Gogol  
 SLAVGEN 146/246. The Age of the Great Russian Novel: History and Other Theories of Time  
 SLAVGEN 147/247. The Age of War and Revolution: A Survey of Russian Literature and Culture, 1900-1950s  
 SLAVGEN 148/248. Dissent and Disenchantment: A Survey of Literature and Culture, 1953 to Present  
 SLAVGEN 169/269. Slavic Folklore and Folklore Theory  
 SLAVLIT 179/279. Literature from Old Rus' and Medieval Russian  
 SLAVLIT 188/288. Russian Poetry  
 SLAVLIT 203. Academic Russian  
 SLAVLIT 211. Introduction to Old Church Slavonic  
 SLAVLIT 224. The Russian Postmodern Novel  
 SLAVLIT 232. Formalism/Semiotics/Bakhtin: Key Texts  
 SLAVLIT 272. Osip Mandelstam and the Modernist Paradigm

#### *Additional courses which may be counted for the M.A. degree (with approval) —*

- ANTRHO 338A. Biohumanities: Continental Philosophy and the Human and Social Sciences  
 ARTHIST 411. Animacy, Performance, Presence in Medieval Art  
 COMPLIT 122. Literature as Performance  
 DRAMA 167/267. Avant Garde Theater  
 DRAMA 300A. Critical Styles I  
 FILMSTUD 102. Theories of the Moving Image  
 FILMSTUD 116/316. International Documentary  
 FILMSTUD 137/337. European New Wave Cinemas  
 HISTORY 284/384. The Ottoman Turks in Comparative Perspective: The Inner Life of a Eurasian Empire  
 HISTORY 299X. Design and Methodology for International Field Research  
 INTNLREL 122A. The Political Economy of the European Union  
 IPS 211. The Transition from War to Peace: Peacebuilding Strategies  
 IPS 219. Intelligence and National Security  
 IPS 221. International Organizations and Institutions  
 IPS 241. International Security in a Changing World (Same as POLISCI 114S)

IPS 280. Transitional Justice, International Criminal Tribunals, and the International Criminal Court  
 LINGUIST 167. Languages of the World  
 MS&E 193/293. Technology and National Security  
 POLISCI 141. The Global Politics of Human Rights  
 POLISCI 210R. International Conflict: Management and Resolution (Same as IPS 250)  
 POLISCI 214R/314R. Challenges and Dilemmas in American Foreign Policy  
 POLISCI 242P. The Comparative Politics of Corruption  
 POLISCI 314D. Democracy, Development, and the Rule of Law (Same as IPS 230)  
 POLISCI 314S. Decision Making in U.S. Foreign Policy (Same as IPS 314S)  
 POLISCI 337S. Seminar on Liberation Technologies  
 RELIGST 222B. Sufism Seminar  
 RELIGST 224B/324B. Unveiling the Sacred: Explorations in Islamic Religious Imagination  
 RELIGST 236/336. European Reformatations  
 SOC 109/209. The Sociology of Terrorism  
 SOC 341W. Workshop: Inequality

Other courses may be counted towards the M.A. by special arrangement with the instructor and the CREEES associate director.

A description of the M.A. program is also available on the web at <http://CREEES.stanford.edu/academic/graduate-masters.html> and by request from the Center for Russian, East European and Eurasian Studies.

## COTERMINAL MASTER'S PROGRAM IN RUSSIAN, EAST EUROPEAN, AND EURASIAN STUDIES

University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees" section of this bulletin. For University coterminal degree program rules and University application forms, see <http://studentaffairs.stanford.edu/registrar/publications#Coterm>.

To qualify for a coterminal M.A. degree in Russian, East European, and Eurasian Studies, besides completing University requirements for the B.A. degree, a student must:

1. Submit a coterminal application for admission to the program no later than the quarter prior to the expected completion of the undergraduate degree, normally Winter Quarter prior to Spring Quarter graduation. Students with advanced placement and transfer credit must apply at least four quarters before the expected master's degree conferral date. The deadline for all coterminal applications to the M.A. program in Russian, East European, and Eurasian Studies is January 11, 2011.
2. Include in the application a program which outlines, by quarter, the schedule of courses the student plans to complete toward the M.A. degree. The student should seek the advice of the CREEES associate director in drafting this schedule. The application also should include:
  - a. a current Stanford transcript
  - b. a one-page statement of purpose
  - c. three letters of recommendation from Stanford professors
  - d. a writing sample of 20 pages or less on a Russian, East European, or Eurasian Studies topic
3. Applicants must have a grade point average (GPA) of at least 3.0 (B). Coterminal applicants must take the general test of the Graduate Record Examination and have the results sent to Graduate Admissions, Office of the University Registrar.
4. Complete 15 full-time quarters or the equivalent, or three quarters in full-time residence after completing 180 units; and complete, in addition to the 180 units required for the bachelor's degree, a minimum of 48 units for the master's degree.

The same courses may not be counted to meet both undergraduate and graduate requirements, and no courses taken

before the junior year may be used to meet the course requirements for the master's degree.

For M.A. degree requirements, see the "Master of Arts in Russian, East European, and Eurasian Studies" section of this bulletin.

## SCIENCE, TECHNOLOGY, AND SOCIETY

*Emeriti:* James Adams (Management Science and Engineering, Mechanical Engineering), Alex Inkeles (Sociology), Walter Vincenti (Aeronautics and Astronautics)

*Director:* Fred Turner (Communication)

*Associate Director:* Allison Carruth

*Program Committee:* Stephen Barley (Management Science and Engineering), Mark Granovetter (Sociology), Hank Greely (Law), Ursula K. Heise (English), Sarah Lochlann Jain (Anthropology), Robert McGinn (Management Science and Engineering), Brad Osgood (Electrical Engineering), Eric Roberts (Computer Science), Scott Sagan (Political Science), Fred Turner (Communication), John Willinsky (Education)

*Affiliated Faculty and Staff:* Jeremy Bailenson (Communication), Stephen Barley (Management Science and Engineering), Barton Bernstein (History), Scott Bukatman (Art and Art History), Thomas Byers (Management Science and Engineering), Jean-Pierre Dupuy (French), Paula Findlen (History), Hank Greely (Law), Ursula K. Heise (English), Martin Hellman (Electrical Engineering, Emeritus), Sarah Lochlann Jain (Anthropology), Pamela Lee (Art and Art History), Henry Lowood (Stanford University Libraries), Robert McGinn (Management Science and Engineering), Thomas Mullaney (History), Clifford Nass (Communication), Brad Osgood (Electrical Engineering), Walter Powell (Education), Robert Proctor (History), Jessica Riskin (History), Eric Roberts (Computer Science), Scott Sagan (Political Science), Londa Schiebinger (History), Michael Shanks (Classics, Anthropology), Fred Turner (Communication), John Willinsky (Education), Patrick Windham (Public Policy), Gavin Wright (Economics)

*Mail Code:* 94305-2120

*Phone:* (650) 723-2565

*Web Site:* <http://sts.stanford.edu>

Courses offered by the Program in Science, Technology, and Society are listed under the subject code STS on the *Stanford Bulletin's* ExploreCourses web site.

Technology and science are activities of central importance in contemporary life, intimately bound up with society's evolving character, problems, and potentials. If scientific and technological pursuits are to further enhance human well-being, they and their effects on society and the individual must be better understood by non-technical professionals and ordinary citizens as well as by engineers and scientists. Issues of professional ethics and social responsibility confront technical practitioners. At the same time, lawyers, public officials, civil servants, and business people are increasingly called upon to make decisions requiring a basic understanding of science and technology and their ethical, social, and environmental consequences. Ordinary citizens, moreover, are being asked with increasing frequency to pass judgment on controversial matters of public policy related to science and technology in society. These circumstances require education befitting the complex sociotechnical character of the contemporary era.

Science, Technology, and Society (STS) is a program devoted to understanding the natures, consequences, origins, and shaping of technological and scientific activities in modern and contemporary societies. Students in STS courses study science and technology in society from a variety of perspectives in the humanities and social sciences. To provide a basic understanding of technology and science, STS majors are also required to achieve either theoretical

literacy (B.A.) or a solid grasp of practical fundamentals (B.S.) in some area of engineering or science.

STS courses may be used, individually or in groups, for purposes such as:

1. To satisfy University General Education Requirements (GER)
2. To satisfy the Technology in Society Requirement of the School of Engineering
3. To comprise parts of student-designed concentrations required for majors in fields such as Human Biology and Public Policy
4. To satisfy the requirements of the STS honors program complementing any major
5. To satisfy requirements for majors in STS
6. To satisfy requirements for a minor in STS

STS courses are particularly valuable for undergraduates planning further study in graduate professional schools (for example, in business, education, engineering, law, journalism, or medicine) and for students wishing to relate the specialized knowledge of their major fields to broad technology and science-related aspects of modern society and culture.

## UNDERGRADUATE MISSION STATEMENT

The mission of the Science, Technology and Society (STS) Program is to provide Stanford undergraduates with intellectually stimulating education that will prepare them for life in the contemporary era, one in which science and technology are pervasive and potent forces for transformative social change. To that end, STS courses explore the evolving natures and interrelationship of science and technology, influences of science and technology on different kinds of societies, how societies manage and otherwise shape their scientific and technological endeavors and products, and ethical, social, cultural, and policy issues raised by scientific and technological innovations in contemporary societies. STS faculty believe that probing study of this vital subject matter provides an innovative form of liberal arts and pre-professional education, one that helps STS students fulfill their future civic and professional roles in an informed, responsible manner.

STS is an interdisciplinary and multidisciplinary program. STS students learn to critically analyze the interplay of science and technology with human values and world views, political and economic forces, and cultural and environmental systems. To a set of core STS courses promoting such learning, Program majors add structured sets of pertinent disciplinary courses in the humanities, social sciences, natural sciences, and engineering. Every STS major completes a capstone project in her or his final year, as an honors thesis or in the senior colloquium. The capstone project is an integrative research endeavor incorporating prior STS coursework. The Program prepares its majors for successful careers in business, law, medicine, education, engineering, public policy, and public service, for masters-level work in selected humanistic, social scientific, and engineering disciplines, and for doctoral work in STS and related academic areas.

## LEARNING OUTCOMES

The program expects undergraduate majors to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the Program in Science, Technology, and Society. Students are expected to demonstrate:

1. knowledge of core concepts, approaches, and issues of the STS field.
2. ability to use STS intellectual resources to analyze and illuminate issues of science and technology in society.
3. ability to critically evaluate and effectively utilize scholarship and empirical evidence in the field of STS.
4. ability to clearly and persuasively communicate about STS issues to a general audience, orally and in writing.

## UNDERGRADUATE PROGRAMS IN SCIENCE, TECHNOLOGY, AND SOCIETY

Degree programs in STS are curricula devoted to understanding the nature and significance of technology and science in modern society. Majors analyze phenomena of science and technology in society from ethical, aesthetic, historical, economic, and sociological perspectives. In addition, students pursuing the B.A. degree study a technical field in sufficient depth to obtain a grasp of basic concepts and methods, and complete a structured concentration on a theme, issue, problem, or area of personal interest related to science and technology in society. Those seeking the B.S. degree complete at least 50 structured units in technology, science, and/or mathematics. The particular technical courses chosen reflect the student's special interest in issue areas of science and technology in society.

## BACHELOR OF ARTS IN SCIENCE, TECHNOLOGY, AND SOCIETY

### REQUIREMENTS

1. *STS Core* — requires completion of eight courses satisfying the following requirements:
  - a. *Interdisciplinary Foundational Course*: STS 101 or 101Q
  - b. *Disciplinary Analyses*: six courses, with one in each area, and at least three of which must be upper-level (targeted primarily at juniors and seniors)
    1. Philosophical/Ethical/Aesthetic Perspectives: STS 110, 112, 114, 210; ARTHIST 158A; COMM 131, 137W; CS 181; ENGLISH 176; ME 120, 214/314; PHIL 60, 163H
    1. Historical Perspectives: ARTHIST 158A; CEE 64; CLASSGEN 123, 133; EARTHSYS 145; ECON 116, 226; HISTORY 31/131, 40/140, 41A/141A, 130A, 140A, 208A, 242G, 243G; ME 120; PHIL 163H; POLISCI 116
    2. Social Science Perspectives: STS 190; AA 116N; ANTHRO 82, 180; COMM 1B, 108, 120, 166, 168, 169, 172, 182; COMPMED 87Q; EARTHSYS 57Q, 111, 173, 184; ECON 113, 224, 225; EDUC 358X; ENGR 110; HUMBIO 175; MS&E 181, 185, 189, 193; POLISCI 114S, 122; PUBLPOL 194; SOC 114, 160, 161
  - c. *Interdisciplinary Senior Seminar*: STS 200, Senior Colloquium, or STS 299, Advanced Individual Work, for students writing an STS honors thesis.
2. *Technical Literacy* (five courses)—
  - a. CS 101, 105 or 106A or equivalent; and
  - b. A four-course sequence (minimum of 12 units) in a field of engineering or science (sample sequences available in the STS office)
3. *Thematic Concentration* (minimum of 20 units, at least five courses, one each from among those designated on the appropriate concentration course list as foundational and advanced). Thematic concentrations are organized around an STS-related problem or area:
  - Aesthetics, Science, and Technology
  - Development, Science, and Technology
  - History and Philosophy of Science and Technology
  - Information Science and Technology in Society
  - Public Policy, Science and Technology
  - Science, Technology, and Social Change
  - Work, Technology, and Social Organizations

Course lists for these thematic concentrations areas are available in the STS office and on the STS website. A student choosing one of the certified topics may petition one or more courses not on the corresponding course list if they are germane to the concentration, meet the student's special interests, and are approved by the STS associate director and thematic concentration adviser.

Alternatively, subject to program approval, the student may choose to design a unique thematic concentration topic and course package.

Each thematic concentration, certified or self-designed, requires the signature of an appropriate faculty adviser. See the STS undergraduate adviser for details.

## HONORS PROGRAM

STS offers students an opportunity to achieve honors through in-depth study of the interaction of science and technology with society. The honors program is open to students majoring in any field, including STS. Students accepted for this program carry out an honors research project, typically beginning in the Winter or Spring Quarter of junior year and finishing by May of senior year. Students who want their projects to be considered for University awards must complete their theses by early May. STS projects usually involve researching and writing an original scholarly essay, although occasionally students have chosen to produce a technical artifact or carry out some other work that itself represents original, creative thinking. When an honors project results in a work other than an essay, the student must also submit an accompanying scholarly exegesis of the work in question. Past honors projects are on file in the STS office library.

## ADMISSION

Application for admission to the STS honors program is due in the junior year before the end of Spring quarter. Each student seeking admission to the honors program must submit a research proposal with the name of one potential thesis faculty adviser. For proposal parameters, see the document STS Honors Program, available on the STS web site. Students are also encouraged to apply to join the STS contingent at the Bing Honors College in early September to get a running start on their theses.

## REQUIREMENTS

- Course Work for STS Majors*—Majors must complete STS Core requirements, for a letter grade where available, with a GPA of 3.4 or higher.
- Course Work for Non-Majors*—Non-majors must complete one course from each of the following categories, for a letter grade where available, with a GPA of 3.4 or higher:
  - Foundational Course: STS 101 or 101Q
  - Philosophical/Ethical/Aesthetic Perspectives Course: STS 110, 112, 114, 210; ARTHIST 158A; COMM 131, 137W; CS 181; ENGLISH 176; ME 120, 214/314; PHIL 60, 163H
  - Historical Perspectives Course: ARTHIST 158A; CEE 64; CLASSGEN 123, 133; EARTHSYS 145; ECON 116, 226; HISTORY 31/131, 40/140, 41A/141A, 130A, 140A, 208A, 242G, 243G; ME 120; PHIL 163H; POLISCI 1
  - Social Science Perspectives Course: STS 190; AA 116N; ANTHRO 82, 180; COMM 1B, 108, 120, 166, 168, 169, 172, 182; COMPMED 87Q; EARTHSYS 57Q, 111, 173, 184; ECON 113, 224, 225; EDUC 358X; ENGR 110; HUMBIO 175; MS&E 181, 185, 189, 193; POLISCI 114S, 122; PUBLPOL 194; SOC 114, 160, 161
- Honors Thesis Credit*—All STS honors students must sign up for STS 299, advanced individual work (1-5 units depending on quarterly workload) each quarter of the senior year. For assistance enrolling in a section directly with your faculty adviser contact the STS undergraduate adviser.
- To Graduate with Honors*—Students must complete course requirements listed above with a 3.4 GPA or higher and earn at least a 'B' on the completed thesis. If all these requirements are met, the designation "Honors Program in Science, Technology, and Society" is affixed to the student's permanent record and appears in the Commencement program.

## COGNATE COURSES

The following cognate courses offered by other programs or departments may be used to fulfill STS major, minor, and honors core requirements.

- Disciplinary Analysis: Philosophical/Ethical/Aesthetic Perspectives*—
  - ARTHIST 158A. History of Photography
  - COMM 131. Media Ethics and Responsibility
  - COMM 137W. The Dialogue of Democracy
  - CS 181. Computers, Ethics, and Public Policy
  - ENGLISH 176. Science Fiction: Techno Dreams and Nightmares
  - ME 120. History and Philosophy of Design
  - ME 214/314. Good Products, Bad Products
  - PHIL 60. Introduction to Philosophy of Science
  - PHIL 163H. The History of Scientific Methods, Pythagoras to Popper
- Disciplinary Analysis: Historical Perspectives*—
  - ARTHIST 158A. History of Photography
  - CEE 64. Air Pollution and Global Warming: History, Science, and Solutions
  - CLASSGEN 123. Urban Sustainability: Long-Term Archaeological Perspectives
  - CLASSGEN 133. Invention of Science
  - EARTHSYS 145. The Environmental History of North America
  - ECON 116. American Economic History
  - ECON 226. U.S. Economic History
  - HISTORY 31/131. Science, Technology and Art: The Worlds of Leonardo da Vinci
  - HISTORY 40/140. World History of Science: From Prehistory to the Scientific Revolution
  - HISTORY 41A/141A. The Emergence of Medicine: The Middle Age and the Renaissance
  - HISTORY 130A. The Rise of Scientific Medicine in the United States, 1825-Present
  - HISTORY 140A. The Scientific Revolution
  - HISTORY 208A. Science and Law in History
  - HISTORY 242G. Einstein: Science, Technology, and Culture
  - HISTORY 243G. Tobacco and Health in World History
  - ME 120. History and Philosophy of Design
  - PHIL 163H. The History of Scientific Methods, Pythagoras to Popper
  - POLISCI 116. History of Nuclear Weapons
- Disciplinary Analysis: Social Science Perspectives*—
  - AA 116N. Electric Automobiles and Aircraft
  - ANTHRO 82. Medical Anthropology
  - ANTHRO 180. Science, Technology, and Gender
  - COMM 1B. Media, Culture, and Society
  - COMM 108. Media Processes and Effects
  - COMM 120. Digital Media in Society
  - COMM 166. Virtual People
  - COMM 168. Experimental Research in Advanced User Interfaces
  - COMM 169. Computers and Interfaces
  - COMM 172. Media Psychology
  - COMM 182. Virtual Communities and Social Media
  - COMPMED 87Q. Introduction to the Mouse in Biomedical Research
  - EARTHSYS 57Q. Climate Change from the Past to the Future
  - EARTHSYS 111. Biology and Global Change
  - EARTHSYS 173. Aquaculture and the Environment: Science, History, and Policy
  - EARTHSYS 184. Climate and Agriculture
  - ECON 113. Economics of Innovation
  - ECON 224. Science and Technology in Economic Growth
  - ECON 225. Economics of Technology and Innovation
  - EDUC 358X. Developments in Access to Knowledge & Scholarly Communication
  - ENGR 110. Perspectives in Assistive Technology
  - HUMBIO 175. Health Care as Seen Through Medical History, Literature, and the Arts

- MS&E 181. Issues in Technology and Work for a Post-Industrial Economy
- MS&E 185. Global Work
- MS&E 189. Social Networks - Theory, Methods, and Applications
- MS&E 193. Technology and National Security
- POLISCI 114S. International Security in a Changing World
- POLISCI 122. Introduction to American Law
- PUBLPOL 194. Technology Policy
- SOC 114. Economic Sociology
- SOC 160. Formal Organizations
- SOC 161. The Social Science of Entrepreneurship

## BACHELOR OF SCIENCE IN SCIENCE, TECHNOLOGY, AND SOCIETY

The student pursuing the B.S. degree must complete the STS Core (see requirement 1 in "Bachelor of Arts in Science, Technology, and Society" above) and a structured package of at least 50 units of technical courses intended to enable students to understand socially significant technical phenomena in some field of engineering or science.

The B.S. candidate follows one of two models in fulfilling the minimum 50-unit technical depth requirement:

1. *Focused Depth*—at least seven courses amounting to at least 25 units in a single field of science or engineering, with the remaining units (except for at most two stand-alone courses) grouped in sequences of at least three courses each in other fields of science or engineering. For example, a focused depth package might contain eight mechanical engineering, three physics, three mathematics, and three computer science courses, and one course each in electrical engineering and chemistry. At least four of the seven courses in the focused depth area must be advanced, that is, not normally taken in the first year of study in that field.
2. *Clustered Depth*—two or more clusters of at least five courses and 15 units each in different fields of science or engineering, with at most two stand-alone courses, and remaining courses, if any, in sequences of three or more courses. For example, a clustered depth package might contain five-course clusters in computer science, electrical engineering, and physics, three courses in civil engineering, and one course each in biology and chemical engineering. At least two courses in each cluster area must be advanced.  
It is recommended that B.S. majors complete CS 106A or its equivalent.

## MINOR IN SCIENCE, TECHNOLOGY, AND SOCIETY

Students planning careers in many technical and non-technical fields, including business, education, engineering, science, law, medicine, and public affairs, are faced with important STS issues in their professional practice. Therefore, a minor in STS is likely to prove practically valuable as well as intellectually stimulating.

*Requirements*—The STS minor requires completion of six courses satisfying the following requirements:

1. *Interdisciplinary Foundational Course*: STS 101 or 101Q
2. *Disciplinary Analyses*: five courses, with one in each area, and at least two of which must be upper-level (targeted primarily at juniors and seniors)
  - a. Philosophical/Ethical/Aesthetic Perspectives: STS 110, 112, 114, 210; ARTHIST 158A; COMM 131, 137W; CS 181; ENGLISH 176; ME 120, 214/314; PHIL 60, 163H
  - b. Historical Perspectives: ARTHIST 158A; CEE 64; CLASSGEN 123, 133; EARTHSYS 145; ECON 116, 226; HISTORY 31/131, 40/140, 41A/141A, 130A, 140A, 208A, 242G, 243G; ME 120; PHIL 163H; POLISCI 116
  - c. Social Science Perspectives: STS 190; AA 116N; ANTHRO 82, 180; COMM 1B, 108, 120, 166, 168, 169,

172, 182; COMPMED 87Q; EARTHSYS 57Q, 111, 173, 184; ECON 113, 224, 225; EDUC 358X; ENGR 110; HUMBIO 175; MS&E 181, 185, 189, 193; POLISCI 114S, 122; PUBLPOL 194; SOC 114, 160, 161

All courses taken to satisfy STS minor requirements must be taken for a letter grade where available. Courses should be chosen so as to realize a measure of intellectual coherence and interrelatedness. Students wishing to use a course not listed above to satisfy one of the requirements for a minor in STS may petition to do so. See the STS undergraduate adviser for details.

## OVERSEAS STUDIES COURSES IN SCIENCE, TECHNOLOGY, AND SOCIETY

For course descriptions and additional offerings, see the listings in the *Stanford Bulletin's* ExploreCourses web site (<http://explorecourses.stanford.edu>) or the Bing Overseas Studies web site (<http://bosp.stanford.edu>). Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

### AUTUMN QUARTER

#### FLORENCE

- OSPFLOR 63. Technology Entrepreneurship. 3 units, Thomas Byers, GER:DB:SocSci
- OSPFLOR 134F. Modernist Italian Cinema. 5 units, Ermelinda Campani, GER:DB:Hum

## SLAVIC LANGUAGES AND LITERATURES

*Emeriti: (Professors)* Joseph Frank, Richard D. Schupbach, Joseph A. Van Campen

*Director:* Gabriella Safran

*Chair of Graduate Studies:* Monika Greenleaf

*Chair of Undergraduate Studies:* Gregory Freidin

*Professors:* Lazar Fleishman (on leave, Autumn), Gregory Freidin, Gabriella Safran

*Associate Professor:* Monika Greenleaf

*Assistant Professor:* Nariman Ruttenberg

*Courtesy Professor:* Nancy Ruttenberg

*Senior Lecturer:* Rima Greenhill

*Lecturers:* Julie S. Draskoczy (Humanities Fellow), Ilja Gruen, Eugenia Khassina

*Department Offices:* Building 240, Room 102

*Mail Code:* 94305-2006

*Phone:* (650) 723-4438

*Email:* [slavic@stanford.edu](mailto:slavic@stanford.edu)

*Web Site:* <http://slavic.stanford.edu>

Courses offered by the Department of Slavic Languages and Literatures are listed on the *Stanford Bulletin's* ExploreCourses web site under the subject codes SLAVGEN (Slavic General), SLAVLANG (Slavic Language), and SLAVLIT (Slavic Literature).

The department supports coordinated study of Russian language, literature, literary and cultural history, theory, and criticism. The department's programs may also be combined with the programs in Russian, East European and Eurasian Studies, Jewish Studies, Film Studies, Drama, International Relations, Stanford's Overseas Studies, and the Special Languages Program.

A full undergraduate program provides a choice of several tracks leading to a B.A. (with a major or a minor) or to a B.A. with honors. The department offers a full graduate program leading to an M.A. in Russian and a Ph.D. in Slavic Languages and Literatures. Stanford undergraduates are eligible to apply to the department for a coterminal B.A./M.A. degree. Students in the department's Ph.D. program are required to choose among minor



programs in other national literatures, linguistics, Russian, East European, and Eurasian Studies, Jewish Studies, art and music history, theater, or film studies; or they may design their own minor or choose the related field option.

The department runs a colloquium series, which brings distinguished speakers to Stanford; organizes international conferences and symposia; and since 1987 maintains a continuing publication series, *Stanford Slavic Studies*. Along with the Center for Russian, East European and Eurasian Studies, the department offers qualified undergraduates summer grants (on a competitive basis) for intensive Russian language instruction in accredited programs in Russia and the U.S.

Improving cultural understanding is a critical part of the department's mission, and the department offers a full range of courses at all levels devoted to Russian literature, music and visual arts that do not require specialized knowledge, as well as advanced research seminars for graduate students. The Slavic theme house, Slavianskii Dom, serves as an undergraduate residence for many students in the program and hosts program-related activities. Undergraduates may also choose to study in Moscow through the Stanford Overseas Studies Program. The undergraduate program has attracted students seeking careers in journalism, business, international relations, law, medicine, and human rights, as well as academia. Russian is still the *lingua franca* over the vast territory of the former Soviet Union, and a good command of this language offers a gateway to Eurasia's diverse cultures, ethnicities, economies, and religions.

Stanford students are in a privileged position in relation to Russian, East European and Eurasian Studies, because of Stanford's faculty resources that are without peer in the U.S. Green Library and the Hoover Institution libraries and archives hold the premier Russian and East European collections, which undergraduates and graduate students use in their research. Department students master a difficult language and a rich and challenging literature, and are rewarded by gaining entry into a unique, powerful, and diverse civilization that defined major trends in the past century and plays an increasingly significant role in the world today.

## MISSION OF THE UNDERGRADUATE PROGRAM IN SLAVIC LANGUAGES AND LITERATURES

The mission of the undergraduate program in Slavic Language and Literatures is to expose students to a variety of perspectives on Russian language, history, culture, literature, and philosophical thought. The program offers three tracks. Courses in the Russian Language and Literature track focus on the linguistic and philological study of literature, as well as the history of Russian literature. The Russian Language, Culture, and History track guides students through a comprehensive interdisciplinary study of Russian literature and culture in historic context. The Russian and Philosophy track provides students with a background in the Russian language and literary tradition with emphasis on philosophical thought.

## LEARNING OUTCOMES

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. the ability to develop effective and nuanced lines of interpretation.
2. critical thinking skills using Russian literary materials.
3. analytical writing skills and close reading skills in Russian and English.
4. skills in active listening and productive communication.
5. a minimum of Intermediate High Oral Proficiency level (established through an OPI test) in Russian or another Slavic language.

## SLAVIC THEME HOUSE

Slavianskii Dom, at 650 Mayfield Avenue, is an undergraduate residence that offers opportunities for students to expand their knowledge, understanding, and appreciation of Russia, Eastern Europe, and Eurasia.

## BACHELOR OF ARTS IN SLAVIC LANGUAGES AND LITERATURES

The major tracks in Russian Language and Literature and Russian Language, Culture, and History are declared on Axess and appear on the transcript but not on the diploma. The degree option in Russian and Philosophy is not declared on Axess and does not appear on the transcript or the diploma.

*Writing in the Major*—Undergraduates are required by the University to pass at least one writing-intensive course in their field of concentration in order to graduate. Majors in any Slavic track may satisfy the writing requirement in 2011-12 by passing SLAVGEN 156, Nabokov in the Transnational Context.

## RUSSIAN LANGUAGE AND LITERATURE

The Russian Language and Literature field of study is designed for those students who wish to gain command of the Russian language and to study the nation's literary tradition. Emphasis is placed on the linguistic and philological study of literature, as well as the history of Russian literature and related media in the broader context of Russian culture. This major also welcomes students with an interest in Russian and Slavic linguistics.

Majors who concentrate in Russian Language and Literature must earn a grade point average (GPA) of 2.0 (C) or better in order to receive credit toward the major.

*Prerequisites*—Completion of first year Russian, or the equivalent, as determined by the Language Center placement examination.

*Requirements*—Candidates for the B.A. degree with a Russian Language and Literature field of study must complete an additional 56 units according to the following distribution:

*Russian Language*—A minimum of 12 units from:

- SLAVLANG 111, 112, 113. Third year Russian language
- SLAVLANG 177, 178, 179. Fourth year Russian language
- SLAVLANG 181, 182, 183. Fifth year Russian language

*Russian Literature*—The 20-unit core literature sequence consisting of:

- SLAVGEN 145. Age of Experiment
- SLAVGEN 146. The Great Russian Novel
- *Either* SLAVGEN 147. The Age of Revolution *or* SLAVGEN 148. Dissent and Disenchantment
- SLAVLIT 188. Russian Poetry, or another poetry course offered by the Slavic Department

*Electives*—Students must take 24 units of electives. These courses are chosen in consultation with the department's chair of undergraduate studies. With department consent, work in related academic fields may be applied toward the degree requirements. Students who have completed IHUM 28A,B, Poetic Justice: Order and Imagination in Russian Culture, with a grade of 'B' or better may count these 10 units towards elective courses required for the major, as may students who have completed the SLE sequence.

Russian courses for 2011-12 include:

- SLAVLIT 188. Russian Poetry
- SLAVGEN 156/256. Nabokov in the Transnational Context
- SLAVGEN 185. Cinemato-graph
- SLAVGEN 190. Anna Karenina and the Social Thought of Its Time
- SLAVGEN 196. Prison Literature

*Capstone*—Students must designate a 200-level course taken in their junior or senior year as a capstone course. Before graduation, skills in writing, textual analysis, and discussion will be evaluated

by the Chair of Undergraduate Studies based on work submitted for the capstone course.

## RUSSIAN LANGUAGE, CULTURE, AND HISTORY

The Russian Language, Culture, and History field of study is for students who want to obtain command of the Russian language and to pursue a broad, interdisciplinary study of Russian literature and culture in historical context. Emphasis is on the relation of the Russian literary tradition to other arts, including film, as well as the disciplines that have enriched the historical understanding of Russian literature: history, anthropology, art history, political science, and sociology. Majors in the Russian Language, Culture, and History must earn a GPA of 2.0 (C) or better in order to receive credit toward the major.

*Prerequisites*—Completion of first year Russian, or the equivalent, as determined by the Language Center placement examination.

*Requirements*—Candidates for the B.A. degree with a Russian Language, Culture, and History field of study must complete an additional 56 units according to the following distribution.

*Russian Language*—A minimum of 12 units from:

- SLAVLANG 111, 112, 113. Third year Russian language
- SLAVLANG 177, 178, 179. Fourth year Russian language
- SLAVLANG 181, 182, 183. Fifth year Russian language

*19th-Century Russian Literature and History*—A minimum of 10 units chosen from the following courses or the equivalent; students must choose one course from Slavic and one course from History:

- Either SLAVGEN 145. Age of Experiment *or* SLAVGEN 146. The Great Russian Novel
- A pre-revolutionary Russian history course. 2011-2012 course options are:
  - HISTORY 120B. The Russian Empire
  - HISTORY 221A. Men, Women, and Power in Early Modern Russia

*20th-Century Russian Literature and History*—A minimum of 10 units chosen from the following or the equivalent; students must choose one course from Slavic and one course from History.

- Either SLAVGEN 147. The Age of Revolution *or* SLAVGEN 148. Dissent and Disenchantment
- A post-revolutionary Russian history course
- History 22N, 20Q, 120-129, or 220-229 will satisfy the history requirements. Contact the Chair of Undergraduate Studies with questions.

*Electives*—Students must take 24 additional units of course work in Russian language, literature, history, or other fields, chosen in consultation with the Chair of Undergraduate Studies. Students who have completed IHUM 28A, B, Poetic Justice: Order and Imagination in Russian Culture, with a grade of 'B' or better may count these 10 units towards elective courses required for the major, as may students who have completed the SLE sequence.

Russian courses for 2011-12 include:

- SLAVLIT 188. Russian Poetry
- SLAVGEN 156/256. Nabokov in the Transnational Context
- SLAVGEN 186. Cinematograph
- SLAVGEN 190. Anna Karenina and the Social Thought of Its Time
- SLAVGEN 196. Prison Literature

*Capstone*—Students must designate a 200-level course taken in their junior or senior year as a capstone course. Before graduation, skills in writing, textual analysis, and discussion will be evaluated by the CUS based on work submitted for the capstone course.

### COGNATE COURSES

Units earned for completion of cognate courses in History, Political Science, Religious Studies, Sociology, Art History, Drama, and REEES may be applied to unit requirements for the

departmental major. Consult the Chair of Undergraduate Studies to find out whether a given cognate course is acceptable.

## RUSSIAN AND PHILOSOPHY

The Russian and Philosophy option offers students the opportunity to gain a command of the Russian language and literary tradition, while gaining a background in philosophical thought, broadly construed. They take courses alongside students in other departments participating in the program in Philosophical and Literary Thought, administered through the DLCL. This option is not declared on Axess. Majors who concentrate in Russian and Philosophy must earn a grade point average (GPA) of 2.0 (C) or better in order to receive credit toward the major.

*Prerequisites*—Completion of first year Russian, or the equivalent, as determined by the Language Center placement examination.

*Requirements*—Candidates for the B.A. degree with a concentration in Russian and Philosophy must complete an additional 67 units according to the following distribution:

*Russian Language*—A minimum of 12 units from:

- SLAVLANG 111, 112, 113. Third year Russian language
- SLAVLANG 177, 178, 179. Fourth year Russian language
- SLAVLANG 181, 182, 183. Fifth year Russian language

*Russian Literature*—A minimum of 16 units of Russian literature, including the following:

- SLAVGEN 145. Age of Experiment
- SLAVGEN 146. The Great Russian Novel
- Either SLAVGEN 147. The Age of Revolution *or* SLAVGEN 148. Dissent and Disenchantment
- SLAVLIT 188. Russian Poetry, *or* another poetry course offered by the Slavic Department

*Electives*—At least 12 units of electives in Russian language and literature, chosen in consultation with the Chair of Undergraduate Studies.

*Philosophy and Literature Gateway Course* (4 units)—SLAVGEN 181. Philosophy and Literature (same as PHIL 81)

*Philosophy Writing in the Major* (5 units)—PHIL 80. Mind, Matter, and Meaning (prerequisite: introductory philosophy course)

*Philosophy Core*—12 units, including the following:

- Value Theory: one course in the PHIL 170 series
- Theories of Mind, Language, Action: one course in the PHIL 180 series
- History of Philosophy: one course from the PHIL 100-139 series

*Related Course*—An upper-division course of special relevance to philosophy and literature. A list of approved courses is available from the program director.

*Capstone Seminar*—One capstone seminar must be taken in the student's senior year. This year's capstone seminars are:

- COMPLIT 226. Narrative and Ethics
- PHIL 194L. Montaigne

## HONORS PROGRAM

Majors in any track or option with a grade point average (GPA) of 3.3 (B+) or better in their major courses are eligible to participate in the department's honors program. Prospective honors students must choose a senior thesis tutor from among the department's regular faculty in their junior year and may enroll for 2 units of credit in SLAVLIT 189B in Spring Quarter of the junior year to conduct preliminary research and draft an honors proposal under the guidance of their tutor. In addition to the program requirements above, students must also complete the following:

1. Majors who propose a senior project in literature must take a course in literary or cultural theory, such as SLAVLIT 200 (Proseminar in Literary Theory and Study of Russian Literature), a graduate seminar in the area of their topic, or

DLCL 189, a 5 unit seminar that focuses on researching and writing the honors thesis. DLCL 189 is taken in Autumn Quarter of the senior year.

2. SLAVLIT 189A, taken for 5 units of credit while composing the thesis during Winter Quarter. Students who did not enroll in a 189B course in the junior year may enroll in SLAVLIT 189B in Spring Quarter of the senior year while revising the thesis, if approved by the thesis adviser.
3. To qualify for honors, the candidate must receive a grade of 'B' or better on the thesis or project completed during this period. Up to 12 units may be awarded for completion of honors course work, independent study, and the finished thesis.

## MINORS IN SLAVIC LANGUAGES AND LITERATURES

The Department of Slavic Languages and Literatures offers three undergraduate minor options.

The minor is designed for students who, while pursuing a major in another program, seek a comprehensive introduction to Russian culture through Russian language courses, a combination of minimal proficiency in Russian and courses in the history of Russian culture, or a multidisciplinary introduction to Russian, East European, and Eurasian studies. Students seeking a Slavic minor are encouraged to take advantage of the Bing Overseas Studies Program in Moscow. Students who have chosen one of the minor programs in Russian may use 5 units of IHUM 28A,B, Poetic Justice: Order and Imagination in Russian Culture, with a grade of 'B' or better towards their electives.

### MINOR IN RUSSIAN LANGUAGE

*Prerequisites*—The minor option in Russian Language requires completion of second year Russian, or the equivalent, as determined by the results of the Language Center placement examination.

*Requirements*—Candidates for the B.A. degree with a minor option in Russian Language must complete 24 units of Russian language and literature courses according to the following distribution:

12 to 15 units of Russian language:

SLAVLANG 111, 112, 113. Third year Russian Language

SLAVLANG 177, 178, 179. Fourth year Russian language

The remaining 9-12 units should be chosen from SLAVGEN 145, 146, 147, 148; SLAVLIT 187, 188; other courses offered by the department, or, with the approval of the department's Chair of Undergraduate Studies, courses in history, politics, linguistics, or other relevant programs.

### MINOR IN RUSSIAN LANGUAGE, LITERATURE, AND CULTURE

*Prerequisites*—The minor option in Russian Language, Literature, and Culture requires completion of first year Russian, or the equivalent, as determined by the results of the Language Center placement examination.

*Requirements*—Candidates for the B.A. degree with the minor option in Russian Language, Literature, and Culture must complete 28 units according to the following distribution:

A minimum of 16 units of courses on literature and culture including two from the SLAVGEN 145, 146, 147, 148 sequence (Russian Literature in English Translation), or one from the SLAVGEN 145, 146, 147, 148 sequence and one from the SLAVLIT 187, 188 sequence.

12 units of elective courses either in the Department of Slavic Languages and Literatures or, with the approval of the Slavic Department's Chair of Undergraduate Studies, in other relevant programs dealing with Russian culture, politics, society, and history.

## MINOR IN RUSSIAN, EAST EUROPEAN, AND EURASIAN STUDIES

The minor in Russian, East European and Eurasian Studies offers students the opportunity to choose courses offered by the Center for Russian, East European and Eurasian Studies (subject code REES) in various departments for their minor.

*Requirements*—Candidates for the B.A. degree with the minor option in Russian, East European, and Eurasian Studies must complete 28 units according to the following distribution:

1. Two core courses: one on Russia and one on Eastern Europe or Eurasia, to be chosen by the student from an annual list of qualifying courses issued by CREEES for their M.A. students.
2. At least four additional REES courses, totaling at least 20 units.
3. The student's core and additional courses must include 9 units of course work in the Slavic Department, either literature courses or Russian language in the third year or above. Courses must be distributed among at least three disciplines, such as Slavic, History, Political Science, Anthropology, Art and Art History, Economics, Religious Studies, and Sociology. The Slavic Chair of Undergraduate Studies determines which courses qualify for the minor.
4. A capstone experience in CREEES, including, but not limited to, one of the following:
  - a. a departmental seminar course for advanced undergraduates.
  - b. directed reading and research with a Stanford faculty member or a CREEES-approved resident or visiting scholar.
  - c. participation in the Stanford Overseas Studies Program in Moscow or Berlin.

*Foreign Language*—The Slavic/REES minor has no language requirement, but students are strongly encouraged to attain working competence in Russian or another relevant language. Courses at the third-year level or above in Russian or another language of Central Asia, the Caucasus, or Eastern Europe may be counted towards the Slavic/REES minor, up to a maximum of 3 units per academic quarter, 9 units total.

*Additional Information*—Courses taken at Stanford overseas campuses in Moscow and Berlin may count towards the REES minor, with the approval of the Slavic Chair of Undergraduate Studies; at least three courses for the minor must be taken in residence at Stanford.

*Approval of Slavic Chair of Undergraduate Studies*—Students interested in pursuing the Slavic/REES minor should consult the Slavic Chair of Undergraduate Studies.

### MINOR IN MODERN LANGUAGES

The Division of Literatures, Cultures, and Languages offers a minor in Modern Languages. This minor draws on literature and language courses offered in this and other literature departments. See the "Literatures, Cultures, and Languages" section of this bulletin for further details about this minor and its requirements.

## COTERMINAL BACHELOR'S AND MASTER'S PROGRAM IN SLAVIC LANGUAGES AND LITERATURES

University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees" section of this bulletin.

The department allows a limited number of undergraduates to work for coterminal B.A. and M.A. degrees in Slavic Languages and Literatures with a concentration in Russian. In addition to University requirements for the B.A. degree, the student must:

1. Submit an application for admission by January 31 of the senior year. Applicants must meet the same general standards as those seeking admission to the M.A. program. Applicants must submit: an application for admission; a written statement

of purpose; a transcript; and three letters of recommendation, at least two of which should be from members of the Department of Slavic Languages and Literatures faculty.

2. Meet all requirements for both the B.A. and M.A. degrees. Applicants must complete 15 full-time quarters (or the equivalent), or three full-time quarters after completing 180 units, for a total of 225 units. During the senior year they may, with the consent of the instructors, register for as many as two graduate courses. In the final year of study, they must complete at least three graduate-level courses.

## MASTER OF ARTS IN SLAVIC LANGUAGES AND LITERATURES

University requirements for the M.A. degree are discussed in the "Graduate Degrees" section of this bulletin.

*Admission*—The requirements for admission to the master's degree program in Russian are:

1. A B.A. (or its equivalent) from an accredited college or university.
2. A command of the Russian language sufficient to permit the student to do satisfactory graduate work.
3. A familiarity with Russian literature sufficient to permit the student to perform adequately in courses at the graduate level.

The applicant's previous academic training in Russian language and literature normally serves as an indication of competence. Accordingly, the department does not ordinarily consider applications from students who have not had at least three years of college Russian and some undergraduate training in Russian literature of the 19th and 20th centuries. Before registering for the first quarter's work in the department, entering graduate students are required to take placement examinations in Russian. Students who fail to perform satisfactorily on such examinations must register for remedial courses in the areas in which they are deficient. Course work in third-year Russian and below carries no credit toward the M.A. degree.

*Course Requirements*—Candidates for the M.A. should plan course work that ensures adequate preparation for the M.A. final examination at the end of the third quarter of work. Course work should be planned in consultation with the graduate adviser, whose approval of the overall course load is required.

Candidates for the M.A. must complete a program of 45 units, of which 36 units must be selected from courses given by the department.

*The M.A. Thesis*—The M.A. thesis represents a complete article-length research paper (6,000-9,000 words) that, in both form and substance, qualifies for submission to English-language professional publications in the Slavic field. The M.A. thesis must be submitted to the thesis adviser no later than the eighth week of your final quarter of registration.

*Final Examination*—A final examination may substitute for the M.A. thesis requirement. The final examination requires a student to demonstrate in a written examination

1. command of the phonology, morphology, syntax, and lexicology of contemporary Standard Russian sufficient to teach beginning and intermediate courses at the college level
2. an ability to read contemporary Standard Russian sufficiently to assist students studying contemporary Russian poetry or literary prose
3. sufficient familiarity with Russian literature of either the 19th or 20th century to successfully handle survey courses dealing with the chosen period of specialization.

The examination should be taken at the end of the final quarter of required course work.

## DOCTOR OF PHILOSOPHY IN SLAVIC LANGUAGES AND LITERATURES

University requirements for the Ph.D. are discussed in the "Graduate Degrees" section of this bulletin.

Students enrolled in the Ph.D. program in Slavic Languages and Literatures are expected to fulfill the following requirements while meeting the program's deadlines in the course of their progress toward the degree:

1. *Course Work, Breadth Requirements, and Overall Scheduling*—In consultation with the Chair of Graduate Studies, students are expected to take 18 units of credit each quarter of their first year, 10 units each funded summer, and 10 units each quarter thereafter. They are expected to reach 135 units and attain TGR status in the winter of their fourth year. Entering graduate students must enroll in SLAVLIT 200. For the Ph.D. degree students are free to select course work to suit their individual program of study. However, candidates must do so in consultation with their adviser (Chair of Graduate Studies or principal dissertation adviser) and are held responsible for all of the areas covered by the general examinations, regardless of whether they have registered for the department's offerings in a given field. For this reason, it is strongly recommended that before taking Ph.D. examinations, students complete seminar-level work directly related to the following broad areas:
  - a. Russian Poetry
  - b. the Russian novel
  - c. 20th-century Russian literature
  - d. 19th-century Russian literature (the Age of Pushkin and after)
  - e. 18th-century Russian literature (the early 1700's to the Age of Pushkin)
  - f. medieval Russian literature
  - g. a monograph course on a major Russian author
  - h. theory of literature relevant to the major field
2. *Minor or Related Fields*—During the course of study, students must develop substantial expertise in a field contiguous to the area of specialization. A candidate may elect to present a full minor or, in consultation with the graduate adviser, develop a special program in a related field, preferably no later than the second quarter of enrollment.
  - a. *Related Field*—A student is required to complete a sequence of basic courses (12 units) in a chosen discipline outside the department of Slavic Languages and Literatures. The choice of patterns is one of the following:
    1. a sequence of three courses in one West European literature, selected in consultation with the adviser, or
    2. three basic courses in comparative literature chosen in consultation with the Chair of Graduate Studies (CGS), or
    3. a sequence of three courses in another department selected in consultation with the CGS.
  - b. *Minor*—Students electing a minor should take a minimum of 20 units in graduate-level courses in the minor department or fulfill the Ph.D. minor requirements established by that department. Students considering minors should consult with their adviser, the CGS, the Chair of Slavic Languages and Literatures, and the Chair of the minor department.
3. *Admission to Candidacy*—Candidates should read carefully the general regulations governing the degree, as described in the "Graduate Degrees" section of this bulletin. Department faculty make the decision to advance students to candidacy on the basis of the student's overall progress and promise in the sixth quarter of registration. The candidate by that time must have demonstrated commitment to graduate studies by completing a minimum of 21 content courses (not counting Summer Quarter) with a grade point average (GPA) of 3.3 or better. These must include 14 seminars in the Slavic Department.
4. *M.A. Thesis*—The candidate must submit a complete draft of an M.A. thesis approved by the thesis adviser. The M.A. thesis represents a complete article-length research paper (6,000-9,000 words) that qualifies in both form and substance for submission to an English language professional publication

in the Slavic field. The deadline for the M.A. thesis approval is the eighth week of the sixth quarter of registration. Failure to meet these requirements results in termination of enrollment from the Ph.D. program. Following such termination, the student who has fulfilled all of the M.A. requirements may be given the opportunity to take the M.A. written examination in the history of Russian literature. If successful, the student is then awarded the terminal M.A. degree. In exceptional cases, the written examination requirement may be waived at the discretion of the Chair of Graduate Studies and the Chair of the department.

5. *Proficiency Test*—Administered to all entering graduate students, this test determines whether the student's knowledge of Russian language and literature falls below the department's standard (Advanced Low on the OPI test). Students who fail are required to compete appropriate courses in the first year of graduate study. Courses required to meet the language proficiency are not counted towards the Course Work requirement of the Ph.D. degree.
6. *Foreign Languages*—A candidate must demonstrate reading knowledge of French or German, plus another language useful for the student's area of concentration, by passing written examinations, or receiving a grade of 'A-' or better in a qualifying class with consent of the CGS. The reading examination in German or French must be passed by the end of the first year of study. The reading examination in the second language of choice must be passed by the end of the second year of study.
7. *Examinations*—A candidate must pass the departmental general qualifying examinations, which have written and oral parts. These must be scheduled early in the seventh quarter of enrollment (preferably a day or two before the beginning of academic instruction). The written part covers the history of Russian literature from the medieval period through the twentieth century. The departmental oral qualifying examination follows no later than two weeks after completion of the written exams. The oral examination committee consists of four faculty members and may include one member representing the student's minor or related field; the rest must be drawn from among the Slavic Department faculty. The student makes a 20-minute presentation, following an academic conference format, and based possibly on the student's M.A. thesis. Each examiner questions the student on the presentation and related topics in the history of Russian literature and the minor related field. Following the departmental examinations, a candidate must pass a University Oral examination, consisting of a defense of a doctoral dissertation prospectus and covering content relevant to the area of study, rationale for the proposed investigation, and strategy to be employed in the dissertation research. The prospectus defense is expected to be scheduled at the end of the ninth and, in any case, no later than the beginning of the tenth quarter of registration. Note: Ph.D. examinations are scheduled by the graduate student in consultation with the CGS.
8. *Teaching*—Students are required to complete five quarters of teaching within the funding period, including three quarters of first-year Russian and one quarter as a teaching assistant of literature for a faculty member, usually for one of the survey courses in translation: SLAVGEN 145, 146, 147, 148. Students are required to take DLCL 201 in preparation for teaching.
9. *Continuation*—Continuation in the Ph.D. program is contingent on fulfilling the following criteria: for first-year students, a high quality of performance in course work (decided by department evaluation); for second-year students, satisfactory academic progress, including an M.A. thesis, which should be completed and approved by the eighth week of the sixth quarter of registration. The principal conditions for continued registration of a graduate student are the timely and satisfactory completion of the university, department, and

program requirements for the degree, and fulfillment of minimum progress requirements. Failure to meet these requirements will result in corrective measures, which may include a written warning, academic probation, and/or release from the program.

## OVERSEAS STUDIES COURSES IN SLAVIC LANGUAGES AND LITERATURES

For course descriptions and additional offerings, see the listings in the *Stanford Bulletin's* ExploreCourses web site (<http://explorecourses.stanford.edu>) or the Bing Overseas Studies web site (<http://bosp.stanford.edu>). Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

### AUTUMN QUARTER

#### MOSCOW

- OSPMOSC 12. 20th Century Russian Literature: Bulgakov's *The Master and Margarita* and Boris Pasternak's *Doctor Zhivago*. 3 units, Lazar Fleishman
- OSPMOSC 18. Poetry, Painting and Music of the Russian Avant-garde. 3 units, Lazar Fleishman
- OSPMOSC 62. Economic Reform and Economic Policy in Modern Russia. 5 units, Vladimir Mau, DB:SocSci, EC:GlobalCom
- OSPMOSC 72. Space, Politics and Modernity in Russia. 5 units, Sergei Medvedev, DB:SocSci, EC:GlobalCom
- OSPMOSC 74. Post-Soviet Eurasia and SCO: Society, Politics, Integration. 5 units, Maxim Bratersky, Sergey Kortunov, DB:SocSci, EC:GlobalCom
- OSPMOSC 78. Russian-American Relations: from the War of Independence to the War on Terror. 5 units, Edward A. Ivanian, DB:SocSci

## SOCIOLOGY

*Emeriti: (Professors)* Joseph Berger, Bernard P. Cohen, Sanford M. Dornbusch, James G. March, John W. Meyer, W. Richard Scott, Nancy B. Tuma, Morris Zelditch Jr.

*Chair:* Andrew Walder

*Professors:* Karen Cook, Mark Granovetter, David Grusky, Michael T. Hannan, Douglas McAdam, Susan Olzak, Cecilia Ridgeway, Gi-Wook Shin, C. Matthew Snipp, Andrew Walder, Xueguang Zhou

*Associate Professors:* Shelley Correll, Michael Rosenfeld

*Assistant Professors:* Corey Fields, Tomás Jiménez, Paolo Parigi, Aliya Saperstein, Cristobal Young

*Courtesy Professors:* Glenn Carroll, Michele Landis Dauber, Larry Diamond, Clifford J. Nass, Walter Powell, Francisco Ramirez, Jesper Sorensen, Sarah Soule

*Courtesy Associate Professors:* Prudence Carter, Daniel McFarland, Sean Reardon, Mitchell Stevens

*Courtesy Assistant Professor:* Christine Min Wotipka

*Lecturer:* Patricia Chang

*Consulting Professor:* Ruth Cronkite

*Visiting Associate Professors:* Eva-Maria Meyersson Milgrom, Patricia Thornton

*Department Offices:* Building 120, Room 160

*Mail Code:* 94305-2047

*Phone:* (650) 723-3956

*Web Site:* <http://sociology.stanford.edu>

Courses offered by the Department of Sociology are listed under the subject code SOC on the *Stanford Bulletin's* ExploreCourses web site.

Sociology seeks to understand all aspects of human social behavior, including the behavior of individuals as well as the social dynamics of small groups, large organizations, communities, institutions, and entire societies. Sociologists are typically

motivated both by the desire to better understand the principles of social life and by the conviction that understanding these principles may aid in the formulation of enlightened and effective social policy. Sociology provides an intellectual background for students considering careers in the professions or business. Students may pursue degrees in sociology at the bachelor's, master's, or doctoral levels. The department organizes its courses by areas of study to assist students in tailoring their education and research to their academic interests and career goals.

## MISSION OF THE UNDERGRADUATE PROGRAM IN SOCIOLOGY

The mission of the undergraduate program in Sociology is to provide students with the skills necessary to understand and address social problems and inequalities in global, institutional, and interpersonal social relations. At its core, the curriculum in the major is rooted in social theory and the scientific method. Sociology majors are given opportunities to develop a broad understanding of core sociological theories and the methodological skills used to evaluate human behavior and social organizations. Sociology provides an intellectual background for students considering careers in business, social services, public policy, government service, international nongovernmental organizations, foundations, or academia.

The Sociology major consists of a core curriculum plus elective courses intended to provide breadth of exposure to the variety of areas encompassed by sociology.

## LEARNING OUTCOMES

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. an understanding of core knowledge within the discipline of sociology.
2. the ability to communicate ideas clearly and persuasively in writing.
3. the ability to analyze a problem and draw correct inferences using qualitative and/or quantitative analysis.
4. the ability to evaluate theory and critique research within the discipline of sociology.

## GRADUATE PROGRAMS IN SOCIOLOGY

The Department of Sociology offers three types of advanced degrees:

- the Doctor of Philosophy
- the coterminal Master of Arts in Sociology which is restricted to currently enrolled Stanford undergraduates
- the Master of Arts in Sociology which is available to Stanford students who are currently enrolled in other advanced degree programs.

The department does not have a terminal M.A. program for external applicants.

## AREAS OF STUDY

The Department of Sociology specializes in four general areas of study, allowing students to tailor their education and research to their academic interests and career goals. The four areas of study supported by the department are:

### ORGANIZATIONS, BUSINESS, AND THE ECONOMY

Focus is on the arrangements which societies construct for the provision of material goods or services. A formal organization which provides goods or services for profit and sells them through a market is called a business, and the economic system is capitalism. Social needs are also met through government and not-for-profit organizations, such as garden clubs, hospitals, prisons, and the Red Cross; some private and social needs are met outside of organizations, such as health care provided by family members

and exchange of favors among friends. Courses stress the factors that determine whether needs that people define are met through markets or non-market allocation, through organizations, or by other means. They also investigate the environmental and technical factors that shape organization structure, the determinants of how efficiently organizations operate, and the interpersonal processes that shape individual behavior within organizations. Careers related to this field include management and administration in business or public settings, management consulting and analysis, and legal studies related to corporations, organizations, and business.

### SOCIAL MOVEMENTS, COMPARATIVE POLITICS, AND SOCIAL CHANGE

Focus is on the emergence, reproduction, and change of political systems and institutions, especially on why and how different political systems and social movements appear in different times and places, and how differences in political regimes and economic systems influence attempts to change these systems. The origins and significance of national and transnational social movements, transition to democracy, including revolution, nationalism, and other forms of collective action, in creating and sustaining these changes analyzed across countries and over time. Careers that are relevant to this field include law, public policy, government service, nonprofit and international nongovernmental organizations, business organizations (especially those with international interests), consulting, and managerial jobs.

### SOCIAL PSYCHOLOGY AND INTERPERSONAL PROCESSES

Focus is on the social organization of individual identity, beliefs, and behavior, and upon social structures and processes which emerge in and define interpersonal interactions. Processes studied include social acceptance and competition for prestige and status, the generation of power differences, the development of intimacy bonds, the formation of expectation states which govern performance in task oriented groups, and social pressures to constrain deviance. Foundation courses emphasize the effect of social processes on individual behavior and the analysis of group processes. This field provides training for careers with a significant interpersonal component, including advertising and marketing, business, education, law, management, medicine and health, or social work.

### SOCIAL INEQUALITY

Focus is on forms of social inequality, including fields such as: the shape and nature of social inequalities; competition for power; allocation of privilege; production and reproduction of social cleavages; and consequences of class, race, and gender for outcomes such as attitudes, political behavior, and life styles. Many courses emphasize changes in the structure of social inequalities over time, and the processes which produce similarities or differences in stratification across nations. Topics include educational inequality, employment history, gender differences, income distributions, poverty, race, and ethnic relations, social mobility, and status attainment. Careers related to this field include administration, advertising, education, foreign service, journalism, industrial relations, law, management consulting, market research, public policy, and social service.

## BACHELOR OF ARTS IN SOCIOLOGY

*Declaring the Major in Sociology* — To declare a major in Sociology, students should declare the BA in Axess, then download the major declaration form from the department website. Complete the top portion of the form, sign, and email the Director of the Undergraduate Program in Sociology to set up an entrance advising meeting.

*Major Requirements* — A 3.0 GPA is required to enter the Sociology major. The BA in Sociology requires 60 units of course work. Units applied to the major must be taken for a letter grade

(except for independent study or directed reading), and all earned grades must be 'C' or better.

## CORE CURRICULUM FOR ALL SOCIOLOGY MAJORS

Students are encouraged to complete some course work at the 200-level. Sociology majors are encouraged to participate in directed research or undertake independent research with Sociology faculty. See the department web site for additional information.

Units required for the Sociology BA are:

Sociology Core Courses	Units	
Sociology Foundation Courses		20
Social Science Electives		15
Statistics		20
		5
Total units required for the major		60

### CORE COURSES REQUIRED FOR THE MAJOR

The following core courses are required of all Sociology majors.

1. SOC 170. Classics of Modern Social Theory
2. SOC 180A. Foundations of Social Research
3. SOC 180B. Introduction to Data Analysis
4. SOC 200 or SOC 202. Junior/Senior Seminar for Majors or Preparation for Honors Thesis.
  - It is recommended that students take this required course during Junior year or as early as possible during Senior year. Students pursuing the regular B.A. should take SOC 200. Students considering honors are encouraged to enroll in SOC 202 instead of SOC 200.

### FOUNDATION COURSES REQUIRED FOR THE MAJOR

Sociology majors must complete 15 units of foundation courses; one course in three different areas for a total of three courses. For further information about Sociology areas of study, see the department web site.

Foundation courses, classified by area of study, are as follows:

#### *Organizations, Business, and the Economy*

- SOC 114. Economic Sociology
- SOC 160. Formal Organizations
- SOC 162. Markets and Governance

#### *Social Movements, Comparative Politics, and Social Change*

- SOC 106. Political Sociology
- SOC 118. Social Movements and Collective Action
- SOC 130. Education and Society

#### *Social Psychology and Interpersonal Processes*

- SOC 120. Interpersonal Relations
- SOC 121. The Individual in Social Structure: Foundations in Sociological Social Psychology
- SOC 127. Bargaining, Power, and Influence in Social Interaction

#### *Social Inequality*

- SOC 140. Introduction to Social Stratification
- SOC 141. Controversies About Inequality
- SOC 144. Inequality in the Workplace
- SOC 149. The Urban Underclass

#### *Race, Gender, Immigration, Identity, and Policy*

- SOC 142. Sociology of Gender
- SOC 145. Race and Ethnic Relations
- SOC 150. Race and Political Sociology
- SOC 155. The Changing American Family
- SOC 164. Immigration and the Changing United States

### SOCIAL SCIENCE ELECTIVE COURSES

Four Social Science electives (20 units) are required for the major. You may take all four courses in Sociology if you wish. Students may choose their elective courses according to personal interest. Non-Sociology courses must be approved by the director

of undergraduate studies. A maximum of 10 units taken in other Social Science departments (Anthropology, Communication, Economics, Political Science, Psychology) may be counted towards the 60 units required for the Sociology B.A.

### STATISTICS REQUIREMENT

Sociology majors are required to take at least one statistics course (5 units). The department suggests the courses listed below, or other comparable course with approval of the director of undergraduate studies.

Suggested Statistics courses for Sociology majors:

- SOC 181B. Sociological Methods: Statistics
- STATS 60. Introduction to Statistical Methods: Precalculus
- PSYCH 60. Introduction to Statistical Methods: Precalculus

### HONORS PROGRAM

Sociology majors who wish to complete an independent scholarly project under the direction of a faculty member are encouraged to apply for admission to the department's honors program. Admission to the program requires a grade point average (GPA) of 3.5 or higher in courses taken within the major, and an overall GPA of 3.3 (B+) or higher in all undergraduate course work. Applicants are required to identify a Sociology faculty member to advise on the research and writing of the essay. With the approval of the Director of Undergraduate Studies, students may work with faculty advisors in other departments.

Students are encouraged to begin planning their honors thesis in their junior year; at this time they should enroll in SOC 202, Preparation for Honors Thesis or SOC 200, Junior/Senior Seminar. Students begin designing their honors project in connection with this seminar and in consultation with the seminar leader. To apply for the honors program, students should complete the honors application, obtain an advisor's approval and signature, and submit the application with a brief description of the proposed project, and a copy of the student's unofficial undergraduate transcript, to the Director of Undergraduate Studies. Prospective candidates are asked to submit an honors application as soon as possible in their junior or senior year, ideally no later than the end of the fourth quarter prior to graduation (typically Spring Quarter of the junior year). Honors students may earn up to 12 independent study units for work leading to completion of the required honors thesis, excluding units associated with the Junior/Senior Seminar.

If the student is admitted to the program, students will be directed to declare the B.A.H. in Axess and drop the general B.A. Completion of honors in Sociology requires:

1. Application and acceptance into the Sociology Honors Program
2. Completion of all requirements of the Sociology major
3. Completion of an honors thesis with a grade of A- or higher
4. Participation in the Sociology Honors Colloquium in the Spring quarter prior to graduation.

If honors program requirements are not met, students must drop the BAH degree program in Axess and declare the BA before applying to graduate.

### MINOR IN SOCIOLOGY

Students must complete a minimum of 35 units in Sociology for the minor. Courses must be taken for a letter grade, and a minimum grade point average (GPA) of 2.0 (C) must be achieved. Students are encouraged to complete a course in sociological theory, such as SOC 170, and to obtain exposure to one of the areas of study. Students who wish to declare a minor in Sociology must do so no later than the deadline for their application to graduate. Related course work from other departments may fulfill a minor requirement. All course substitutions must be pre-approved by the Sociology student services office and the Undergraduate Program Director; a student may not exceed 5 substitution units for the minor.

Course requirements for a minor in Sociology are as follows:

SOC 1. Introduction to Sociology  
 SOC 180A. Foundations of Social Research, and/or SOC 180B. Evaluation of Evidence  
 Two foundation courses; see foundation courses required for the major above  
 Additional course work in the department (100- or 200-level courses)  
 Total course work required

Units information regarding the Sociology coterminal M.A. and how to apply, see  
 5 <http://www.stanford.edu/dept/soc/coterminal/index.html>.  
 5

## 10 **MASTER OF ARTS IN SOCIOLOGY FOR CURRENT STANFORD GRADUATE STUDENTS**

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The M.A. degree in Sociology is available to current Ph.D. candidates in Sociology and to students in advanced degree programs (Ph.D., J.D., M.D.) from other Stanford departments and schools.

For the M.A. degree, students must complete a minimum of 45 units of Sociology course work with a grade point average (GPA) of 3.0 (B) or better. All 45 units must be taken in courses taught by Sociology faculty. Students must enroll in SOC course offerings; crosslisted offerings are not accepted. All courses must be taken for a letter grade if possible. Workshop, research, directed reading, and independent study units do not count towards the M.A.

University regulations pertaining to the M.A. are listed in the "Graduate Degrees" section of this bulletin.

Students who wish to engage in more in-depth study in a specific area may do so by focusing on course work within an area of study.

No thesis is required.

While formal application to the M.A. program is not required, applicants from outside of the Sociology department must submit to the Sociology student services office:

1. a completed Graduate Authorization Petition form, available electronically through Axxess for submission to the Office of the University Registrar
2. a completed Program Proposal for an M.A. form
3. a short statement of purpose

Sociology Ph.D.s typically receive their M.A. in their second or third year of graduate study. Interested students from other degree programs should visit the department's web site here at <http://www.stanford.edu/dept/soc/doctoral/magrad.html>.

## **DOCTOR OF PHILOSOPHY IN SOCIOLOGY**

The Ph.D. curriculum and degree requirements are designed to provide students with the knowledge and skills to become proficient scholars and teachers. Doctoral students in the department must take required courses for a letter grade if available and are expected to earn a grade of 'B+' or better in each course. Any grade of 'B' or below is considered to be less than satisfactory. Grades of 'B' or below are reviewed by faculty and the following actions may take place: the grade stands and the student's academic performance is monitored to ensure that satisfactory progress is being made; the grade stands and the student is required to revise and resubmit the work associated with that course; or the student may be required to retake the course. The following program requirements apply to students who entered the Ph.D program in 2010-11; students admitted prior to 2010 should consult the department or the Bulletin from their year of admission for requirements specific to their cohort.

Students must complete the following department requirements for the Ph.D. degree in Sociology:

1. Students must enroll in SOC 305, Graduate Proseminar, in Autumn Quarter of the first year; the course provides an introduction and orientation to the field of sociology, and to the department and faculty. One unit of credit is given for this course; grading is on a satisfactory/no credit basis.
2. Students are required to complete 45 units of course work in Sociology in the first academic year, then 15 units of Sociology course work in the second academic year. Course work excludes workshop, independent study, and directed reading units.
3. Theory: Students are required to take at least two courses in sociological theory. One course should be in either macro-

## **COTERMINAL MASTER OF ARTS IN SOCIOLOGY**

Stanford undergraduates, regardless of undergraduate major, who wish to pursue an M.A. in Sociology may apply for the coterminal master's program. The coterminal M.A. in Sociology is a flexible, self-designed program. Most students complete their M.A. in a fifth year at Stanford; occasionally students are able to complete their B.A. and coterminal M.A. in the fourth year.

*Application and admission*—Undergraduates must be admitted to the program and enrolled as a graduate student for at least one quarter prior to their B.A. conferral. A cumulative GPA of at least 3.5 in previous undergraduate work is required for admission; GRE test scores are required. It is highly recommended that applicants have completed at least one Sociology course at the 100 level with a grade of 'B' or better. The department accepts applications once a year; the application deadline is February 15th for admission in the Spring quarter immediately following. There are no exceptions to this deadline. All application materials are submitted directly to the Sociology graduate student services office. The department does not fund coterminal M.A. students. To apply for admission to the Sociology coterminal M.A. program, students must submit the coterminal application and the following:

1. a 2-5 page statement of purpose;
2. a preliminary program proposal that specifies at least 45 units of course work relevant to the degree program with at least 40 units in Sociology;
3. a current unofficial undergraduate transcript;
4. two letters of recommendation from Stanford faculty familiar with the student's academic work;
5. GRE scores.

*Program requirements*—Coterminal M.A. students are required to take 45 units of course work during their graduate career; 40 of these units must be in Sociology courses. Students who wish to engage in more in-depth study in a specific area may do so by focusing on course work within an area of study. All units for the coterminal M.A. must be taken at or above the 100 level; advanced-level course work is encouraged and a minimum of 20 units must be taken at the 200 level. Students who wish to take courses outside the department must seek prior approval from the Sociology student services office; coterminal master's students are limited to 5 units from outside of the department; outside courses must be taken in other Social Science departments. Students may transfer a maximum of 10 units from their undergraduate career; to be eligible for transfer, courses must have been taken in the two quarters preceding admission to the M.A. program. All units applied to the coterminal master's degree must be taken for a letter grade, and an overall grade point average (GPA) of 3.0 (B) or better is required for the degree. Because research methods are an important component of graduate training in the social sciences, coterminal students are encouraged to take SOC 180A, Foundations of Social Research, and 180B, Evaluation of Evidence, in sequence when possible. These methods courses provide skills for research opportunities within the department and in academic or professional careers. Coterminal M.A. students should meet with their assigned faculty adviser upon acceptance to the program.

For University coterminal degree program rules and University application forms, see <http://registrar.stanford.edu/pdf/CotermApplic.pdf>. For detailed



- sociological theory (SOC 370A), or micro-sociological theory (SOC 370B), in the first year of the program. A second course, in research design, should be taken during the second year in the program (SOC 670 or SOC 372, when offered). Students without a background in Sociology are encouraged to enroll in SOC 370A as well as 370B.
4. Methodology: Students are required to complete a series of courses in methodology as well as one methods elective. Students with little background in statistics are encouraged to take an undergraduate statistics course in their first quarter of the program. The required methods sequence, to be taken in order, is: SOC 381, SOC 382, SOC 383, then SOC 384.
  5. Survey Courses: Students must complete four broad survey courses to demonstrate command of a range of sociological literatures. Each year the department specifies which courses meet this requirement, and will undertake to ensure that an adequate selection of such courses is offered. A list of courses that generally fulfill this requirement is listed in the requirements section below. Students should consult with their advisor to ensure that the combination of courses selected to meet this requirement exhibits sufficient breadth. This requirement is normally completed by the end of the second year of residency and must be met by the end of the third year of residency. The most current list of approved survey courses is available on the department website.
  6. Workshops: Beginning in year two, doctoral students are required to enroll in at least one workshop each quarter. First year students may attend workshops but are not required to enroll. Sociology workshops are offered for 1-2 units on a credit/non-credit basis only and attendance is required to receive course credit. The Graduate Studies Director may approve a student's petition to attend a workshop when enrollment is prohibited by unit constraints; such attendance is not noted on the transcript. A list of approved workshops that fulfill this requirement is listed in the requirements section below and also on the department website.
  7. Qualifying Exam #1: The first comprehensive examination is designed to ensure that students will enter their second year with a firm reading knowledge of two substantive subfields. Students will write two essays in response to questions provided by the examining committee. The questions are due exactly one week later. Students will choose one out of two questions to write on for each subfield. Examinations will be offered in seven subject areas, based on comprehensive readings lists that will be available at the beginning of each academic year. Each subject area will have one faculty point person or "group leader." Group leaders are responsible for assembling essay questions and agree to meet with students as requested. Exam subject areas and the for 2011-12 are: Economic Sociology and Organizations; Social Inequality; Gender; Race, Ethnicity, and Immigration; Political Sociology/Social Movements/Collective Action; Historical and Comparative Sociology; Social Psychology. Students may work together to read and discuss the materials on the comprehensive reading lists (and in fact they are encouraged to do so). They may consult with faculty members as they study for the exams. However, once the examination questions are released, all such collaboration and consultation should stop, and students should work independently on their essays.
  8. Qualifying Exam #2: The second qualifying examination is a longer critical essay that focuses on a bibliography devised by the student jointly with their faculty advisor. This exam will provide students with a more focused critical engagement in a specialized subfield or research area, and serves as a test of the student's ability to work and think independently. Exam #2 is due by May 15 of the second year in residence. A two-person committee that includes the primary advisor evaluates the paper. Although the reading committee is usually comprised of two regular faculty members in the department, emeritus and other faculty outside of the department may serve as a committee member with prior approval. Examinations are graded by both committee members, and the grades on these qualifying exams are an important component of the decision to advance a student to candidacy. To accommodate student interests and goals, there are two options for Exam #2, an analytic essay (option 1) or research paper (option 2) – see department website for more detailed information. Students may employ one of the comprehensive examination reading lists (from exam #1) for an area in which they did not take the exam to construct the bibliography. If students would like to be examined in a more specialized sub-area within one of the fields that they took for exam #1, they should consult with their reading committee and receive approval from the Director of Graduate Studies. Students should submit the Second Year Qualifying Paper form to the department (Student Services Officer) by the end of Fall quarter of the 2nd year.
  9. Third Year Paper: In preparation for a career of writing scholarly papers, each student must complete a research paper in the third year of residency. This third-year paper may be on any sociological topic, and may address theoretical, empirical, or methodological issues. The paper is expected to reflect original work and be of publishable quality. Students will select a committee of at least two Sociology faculty members to serve as third year paper readers. To ensure that students are making adequate progress on their paper, students are required to provide a first draft of the paper to readers by April 1st. The final deadline for paper submission is May 15th. The committee will provide a review that speaks to (1) whether the paper is publishable and whether the student should therefore invest in attempting to publish it, and (2) what types of revisions, insofar as the paper is publishable, that the student should be pursuing to ready the paper for publication. These comments will be shared with the Director of Graduate Studies, and copies of the paper and faculty comments will go in the student file.
  10. TA requirement: Students must complete three quarters of teaching apprenticeship in departmental courses, or in other courses by approval. Work as either a teaching assistant (TA) under the supervision of a faculty member or as a teaching fellow (TF) fulfills this requirement. Students are required to take SOC 300, Workshop: Teaching Development, in Spring Quarter of the first year. In addition, students are encouraged to take advantage of department and University teacher training programs. Students for whom English is a second language are expected to acquire sufficient facility in English to be an effective teacher.
  11. RA requirement: As partial preparation for becoming an accomplished researcher, each student must complete three quarters of research experience, working under the supervision of one or more faculty members, including regular, emeritus, and affiliated faculty. The experience may involve paid (or unpaid) work as a Research Assistant (RA). With the approval of the Director of Graduate Studies, research experience may be acquired by involvement in research projects outside the department. It is recommended that students complete their research requirements early in their graduate program; the requirement must be completed by the end of the fourth year of residency.
  12. Students are required to present at least two papers at a major professional meeting (e.g., ASA) in their first five years of graduate study.
  13. In order to demonstrate the ability to conduct independent scholarly work, each student must prepare and defend dissertation prospectus by the end of May during the fourth year in residence.
  14. Dissertation Prospectus and Prospectus Defense: In order to demonstrate the ability to conduct independent scholarly work, each student must prepare and defend dissertation prospectus by the end of May during the fourth year in residence. Students should have their dissertation committee selected by the end of their third year in the program.

15. Each student must complete and defend a doctoral dissertation. At the choice of the student (and in consultation with her or his advisor), the dissertation requirement may be met either by (1) submitting the usual book-length document of the sort now required, or (2) submitting three independent papers. The papers may address the same topic, but should be written as stand-alone, single-authored papers in standard journal format (i.e., AJS or ASR). None of these papers may overlap substantially with one another, and none of them may be co-authored. (The main criterion in judging "substantial overlap" is whether any standard journal, such as AJS, would regard the papers as too similar to publish both.) The dissertation must be submitted to all committee members at least 30 days in advance of the defense date. The dissertation defense serves as the Oral Examination required by the University. Assessment of satisfactory completion is determined by the student's doctoral committee members. All students are invited to present their dissertation findings at an informal department colloquium.

The faculty are responsible for providing students with timely and constructive feedback on their progress toward the Ph.D. In order to evaluate student progress and to identify potential problem areas, the department's faculty reviews the academic progress of each first-year student at the beginning of Winter and Spring quarters and again at the end of the academic year. The first two reviews are primarily intended to identify developing problems that could impede progress. In most cases, students are simply given constructive feedback, but if more serious concerns warrant, a student may be placed on probation with specific guidelines for addressing the problems detected. The review at the end of Spring Quarter is more thorough; each student's performance during the first year is reviewed and discussed. Possible outcomes of the spring review include: (1) continuation of the student in good standing, or (2) placing the student on probation, with specific guidelines for the period of probation and the steps to be taken in order to be returned to good standing. For students on probation at this point (or at any other subsequent points), possible outcomes of a review include: (1) restoration to good standing; (2) continued probation, again with guidelines for necessary remedial steps; or (3) termination from the program. Students leaving the program at the end of the first year are usually allowed to complete the requirements to receive an M.A. degree, if this does not involve additional residence or financial support. All students are given feedback from their advisers at the end of their first year of graduate work, helping them to identify areas of strengths and potential weakness.

At the end of the second year of residency, students who are performing well, as indicated by their coursework, performance on qualifying examinations, and teaching and research assistantship performance, are advanced to candidacy. This step implies that the student has demonstrated the relevant qualities required for successful completion of the Ph.D. Future evaluations are based on the satisfactory completion of specific remaining department and University requirements. Students who are not advanced to candidacy will normally be terminated from the program and awarded an M.A. degree. In some cases, the department may require that a student complete outstanding work or complete unmet requirements before admission to candidacy. The university requires that all students must be admitted to candidacy by the beginning of the third year in residence in order to continue in the Ph.D. program. Therefore all requirements stipulated by the department must be met before registration for the fall quarter of the student's third year.

At any point during the degree program, evidence that a student is performing at a less than satisfactory level may be cause for a formal academic review of that student.

## REQUIREMENTS

### SURVEY COURSES

Students must complete four courses from an approved list. This list is updated and circulated to students at the start of each academic year. *Note:* class offerings rotate; not all approved survey courses are offered every year. The following courses typically fulfill the survey course requirement:

- 310. Political Sociology
- 314. Economic Sociology
- 316. Historical and Comparative Sociology
- 318. Social Movements and Collective Action
- 320. Foundations of Social Psychology
- 322. Social Interaction, Social Structure, and Social Exchange
- 323. Sociology of the Family
- 339. Gender Meanings and Processes
- 340. Social Stratification
- 342B. Gender and Social Structure
- 345. Comparative Race and Ethnic Relations
- 347. Race and Ethnicity in Social Institutions
- 357. Immigration and Assimilation
- 358. Sociology of Immigration
- 360. Foundations of Organizational Sociology
- 362. Organizations and Environments
- 363A. Seminar on Organizational Theory
- 366A. Organizational Ecology
- 376. Perspectives on Organization and Environment

### RESEARCH METHODS

Required methodology courses are listed below. Students are required to enroll in 384, Sociology Methodology IV: New Models and Methods, in their first or second year of the program.

- 381. Sociological Methodology I: Introduction
- 382. Sociological Methodology II: Multivariate Regression
- 383. Sociological Methodology III: Models for Discrete Outcomes
- 384. Sociology Methodology IV: New Models and Methods  
The following course requirements apply to students who entered the Ph.D program in 2004-05 or earlier.
- 281B. Statistics (recommended for students with little statistical background)
- 381A. Sociological Methodology I: Computer Assisted Data Analysis
- 382. Sociological Methodology II: The General Linear Model
- 383. Sociological Methodology III: Advanced Models for Discrete Outcomes
- 388. Advanced Models for Analysis of Tabular Arrays  
• or 389. Mixed Method Research Design

### THEORY

- 370A. Sociological Theory: Social Structure, Inequality, and Conflict
- 370B. Social Interaction and Group Process
- 670. Designing Social Research
- 372. Theoretical Analysis and Design

### WORKSHOPS

- 311A,B,C. Workshop: Comparative Studies of Educational and Political Systems
- 312W. Workshop: Political Sociology, Social Movements, and Collective Action
- 315W. Workshop: Economic Sociology and Organizations
- 317W. Workshop: Social Networks
- 321W. Workshop: Social Psychology and Social Structure
- 338W. Workshop: Sociology of Law
- 341W. Workshop: Inequality
- 350W. Workshop: Migration, Race, Ethnicity and Nation
- 361W. Workshop: Networks and Organizations

- 368W. Workshop: China Social Science
- 374A,B,C. Research Workshop: Philanthropy and Civil Society

## PH.D. MINOR IN SOCIOLOGY

Sociology offers a minor for currently enrolled doctoral students in other Stanford departments and schools. Students must complete a minimum of 30 graduate-level units with a grade point average (GPA) of 3.0 (B) or better. All 30 units for the minor are to be in courses taught by Sociology faculty. Students must enroll in the SOC course offerings (not cross-listed sections). There is one exception: 5 units may be taken in a statistics or methods course taught in another department. All units must be taken for a letter grade. Workshop, research, directed reading, or independent study units do not count towards the Ph.D. Minor. The program must be approved by a Sociology adviser and filed with the Sociology student services office. While there is not a formal application process, candidates must submit a short statement of purpose (2 pages), and a completed Application for Ph.D. Minor to the Sociology student services office. The Application for Ph.D. Minor must have all Sociology or other courses to be applied to the minor listed, including course number, units, and final grades.

## JOINT PROGRAMS IN SOCIOLOGY WITH THE SCHOOL OF LAW

The School of Law and Department of Sociology conduct joint programs leading to either a combined J.D. degree with an M.A. degree in Sociology or to a combined J.D. degree with a Ph.D. in Sociology.

Law students interested in pursuing an M.A. in Sociology apply for admission to the Department of Sociology during the first year of Law school. Once admitted to the Department of Sociology, the student must complete standard departmental master's degree requirements as specified in this bulletin. Applications for the joint J.D./M.A. degree program must be approved by both the department and the Law school. Faculty advisers from each program participate in the planning and supervising of the student's academic program.

The J.D./Ph.D. degree program is designed for students who wish to prepare themselves for research or teaching careers in areas relating to both legal and sociological concerns. Students interested in the joint degree program must be admitted to both the School of Law and the Department of Sociology. Interest in the joint degree program must be noted on each of the student's applications. Alternatively, an enrolled student in either the Law School or the Sociology department may apply to the other program, preferably during their first year of study. Students participating in the joint degree program are not eligible to transfer and receive credit for a masters, or other degree, towards the Sociology Ph.D..

Upon admission, students are assigned a joint program faculty adviser who assists the student in planning an appropriate program and ensuring that all requirements for both degrees are satisfied. The faculty adviser serves in this capacity during the student's course of study regardless of whether the student is enrolled in the School of Law or the Sociology department.

J.D./Ph.D. students may elect to begin their course of study in either the School of Law or the Department of Sociology. Students must be enrolled full-time in the Law school for the first year of Law school, and must enroll full time in the graduate school for the first year of the sociology program. After that time, enrollment may be in the graduate school or the Law school, and students may choose courses from either program regardless of where enrolled. Students must satisfy the requirements for both the J.D. and the Ph.D. degrees. Up to 81 quarter (54 semester) hours of approved courses may be counted toward both degrees, but no more than 36 quarter (24 semester) hours of courses that originate outside the Law school may count toward the Law degree. To the extent that courses under this joint degree program originate outside of the

Law school but count toward the Law degree, the Law school credits permitted under Section 17(1) of the Law School Regulations for cross-registration in other schools or departments of Stanford University are reduced on a unit-per-unit basis, but not below zero. Students must complete the equivalent of 183 quarter units to complete both degrees. Tuition and financial aid arrangements normally are through the school in which the student is currently enrolled.

The law degree may be conferred upon completion of applicable law school requirements; it is not necessary to have both degrees conferred simultaneously.

For more information, see the Sociology web site at <http://sociology.stanford.edu>, and the Law School web site on the J.D./Ph.D. at <http://www.law.stanford.edu/program/degrees/joint/sociology>.

## OVERSEAS STUDIES COURSES IN SOCIOLOGY

For course descriptions and additional offerings, see the listings in the *Stanford Bulletin's* ExploreCourses web site (<http://explorecourses.stanford.edu>) or the Bing Overseas Studies web site (<http://bossp.stanford.edu>). Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

### AUTUMN QUARTER

#### MADRID

- OSPMADRD 61. Society and Cultural Change: The Case of Spain. 5 units, Antonio Muñoz

#### OXFORD

- OSPOXFRD 59. Soccer and English Society. 5 units, Robert Sinclair

### WINTER QUARTER

#### BERLIN

- OSPBER 66. Theory from the Bleachers: Reading German Sports and Culture. 3 units, Wolf Junghanns

#### CAPETOWN

- OSPCPTWN 32. Adult Learning, Development and Social Change: Service-Learning in the Contemporary South African Context. 4-5 units, Janice McMillan

#### FLORENCE

- OSPFLOR 79. Migrations and Migrants: The Sociology of a New Phenomenon. 5 units, Khaled Fouad Allam, GER:DB:SocSci, EC:GlobalCom

#### OXFORD

- OSPOXFRD 117W. Gender and Social Change in Modern Britain. 4-5 units, Amanda Palmer, GER:DB:SocSci, EC:Gender

### SPRING QUARTER

#### BEIJING

- OSPBEIJ 19. Population and Society in East Asia. 4 units, Yun Zhou, GER:DB:SocSci, EC:GlobalCom
- OSPBEIJ 41. Chinese Society and Business Culture. 4 units, Bobai Li, GER:DB:SocSci, EC:GlobalCom

#### CAPETOWN

- OSPCPTWN 32. Adult Learning, Development and Social Change: Service-Learning in the Contemporary South African Context. 4-5 units, Janice McMillan

# STATISTICS

*Emeriti:* Theodore W. Anderson, Jerome H. Friedman, Ingram Olkin, Charles Stein, Paul Switzer

*Chair:* Wing H. Wong

*Professors:* Emmanuel Candes, Thomas M. Cover, Amir Dembo, Persi Diaconis, David L. Donoho, Bradley Efron, Trevor J. Hastie, Iain M. Johnstone, Tze L. Lai, Art Owen, Joseph P. Romano, David O. Siegmund, Robert J. Tibshirani, Guenther Walther, Wing H. Wong

*Associate Professor:* Jonathan Taylor

*Assistant Professors:* Andrea Montanari, Balakanapathy Rajaratnam, Nancy Zhang

*Professor (Teaching):* Susan Holmes

*Courtesy Professors:* Philip W. Lavori, Richard A. Olshen, Hua Tang

*Courtesy Associate Professors:* Simon Jackman, David Rogosa, Chiara Sabatti

*Consulting Professors:* John Chambers, Charles Chui

*Stein Fellow:* Michael Baiocchi

*Mail Code:* 94305-4065

*Phone:* (650) 723-2620

*Web Site:* <http://stat.stanford.edu>

Courses offered by the Department of Statistics are listed under the subject code STATS on the *Stanford Bulletin's* ExploreCourses web site.

The department's goals are to acquaint students with the role played in science and technology by probabilistic and statistical ideas and methods, to provide instruction in the theory and application of techniques that have been found to be commonly useful, and to train research workers in probability and statistics. There are courses for general students as well as those who plan careers in statistics in business, government, industry, and teaching.

The requirements for a degree in Statistics are flexible, depending on the needs and interests of the students. Some students may be interested in the theory of statistics and/or probability, whereas other students may wish to apply statistical and probabilistic methods to a substantive area. The department has long recognized the relation of statistical theory to applications. It has fostered this by encouraging a liaison with other departments in the form of joint and courtesy faculty appointments: Economics (Anderson), Education (Olkin, Rogosa), Electrical Engineering (Cover), Geological and Environmental Sciences (Switzer), Health Research and Policy (Efron, Hastie, Johnstone, Lavori, Olshen, Tibshirani, Wong), Mathematics (Dembo, Diaconis), Political Science (Jackman), and the SLAC National Accelerator Laboratory (Friedman). The research activities of the department reflect an interest in applied and theoretical statistics and probability. There are workshops in biology/medicine and in environmental factors in health.

In addition to courses for Statistics majors, the department offers a number of service courses designed for students in other departments. These tend to emphasize the application of statistical techniques rather than their theoretical development.

The Department of Statistics is well equipped for statistical applications and research in computational statistics. Computer facilities include several networked Unix servers and a PC lab for general research and teaching use. The Mathematical Sciences Library serves the department jointly with the departments of Mathematics and Computer Science.

The department has always drawn visitors from other countries and universities. As a consequence, there is usually a wide range of seminars offered by both the visitors and the department's own faculty.

## UNDERGRADUATE PROGRAMS IN STATISTICS

### MAJORING IN STATISTICS

Students wishing to build a concentration in probability and statistics are encouraged to consider declaring a major in Mathematical and Computational Science. This interdepartmental program is administered in the Department of Statistics and provides core training in computing, mathematics, operations research, and statistics, with opportunities for further elective work and specialization. See the "Mathematical and Computational Science" section of this bulletin.

### GRADUATE PROGRAMS IN STATISTICS

University requirements for the M.S. and Ph.D. degrees are discussed in the "Graduate Degrees" section of this bulletin.

### MINOR IN STATISTICS

The undergraduate minor in Statistics is designed to complement major degree programs primarily in the social and natural sciences. Students with an undergraduate Statistics minor should find broadened possibilities for employment. The Statistics minor provides valued preparation for professional degree studies in postgraduate academic programs.

The minor consists of a minimum of six courses with a total of at least 20 units. There are two required courses (8 units) and four qualifying or elective courses (12 or more units). All courses for the minor must be letter graded. An overall 2.75 grade point average (GPA) is required for courses fulfilling the minor.

1. *Required Courses*—STATS 116 and 200.
2. *Qualifying Courses*—at most, one of these two courses may be counted toward the six course requirement for the minor: MATH 52; STATS 191.
3. *Elective Courses*—at least one of the elective courses should be a STATS 200-level course. The remaining two elective courses may also be 200-level courses. Alternatively, one or two elective courses may be approved courses in other departments. Special topics courses and seminars for undergraduates are offered from time to time by the department, and these may be counted toward the course requirement. Students may not count any Statistics courses below the 100 level toward the minor. Examples of elective course sequences are:
  - STATS 202, 203, 204, emphasizing data analysis and applied statistics
  - STATS 205, 206, 207, emphasizing statistical methodology
  - STATS 206, ECON 160, 181, emphasizing economic optimization
  - STATS 206, PSYCH 156, 160, emphasizing psychology modeling and experiments
  - STATS 207, EE 264, 279, emphasizing signal processing
  - STATS 217, BIO 283, emphasizing genetic and ecologic modeling
  - STATS 217, 218, emphasizing probability and its applications
  - STATS 240, 250, emphasizing mathematical finance

The Statistics Department Chair must approve any exceptions to the list of electives.

### MASTER OF SCIENCE IN STATISTICS

The department requires that the student take 45 units of work from offerings in the Department of Statistics or from authorized courses in other departments. Ordinarily, four or five quarters are needed to complete all requirements.

Students must fulfill the following requirements for the M.S. degree:

1. STATS 116, 191, 200, and 217. All must be taken for a letter grade. Courses previously taken may be waived by the adviser, in which case they must be replaced by other graduate courses offered by the department.

2. One of MATH 104, 113, 115, 171; and one of CS 106A, 106X, 137, 138, 140-181. Substitution of other courses in Mathematics and Computer Science may be made with consent of the adviser.
3. At least four additional Statistics courses from graduate offerings in the department (202-399). All must be taken for a letter grade. Consent of the adviser is required in order to take more than six units of STATS 260A,B,C, 298, 299, 390, or 399.
4. Additional elective units to complete the requirements may be chosen from the list available from the department web site. Other graduate courses (200 or above) may be authorized by the adviser if they provide skills relevant to statistics or deal primarily with an application of statistics or probability and do not overlap courses in the student's program. There is sufficient flexibility to accommodate students with interests in applications to business, computing, economics, engineering, health, operations research, and biological and social sciences.
5. Courses below 200 level are generally not acceptable, with the following exceptions: STATS 116, 191; MATH 103, 113, 115, 171, 180; CS 106A, 106B, 106X, 137, 138, 140-181. At most, one of these two courses may be counted: (1) MATH 151 or STATS 116, (2) MATH 103 or MATH 113.

Students with a strong mathematical background who may wish to go on to a Ph.D. in Statistics should consider applying to the Ph.D. program.

The eight Statistics courses required for the M.S. degree must be taken for letter grades. Courses other than the eight required statistics courses may be taken for a letter grade or Credit/No Credit. There is no thesis requirement. An overall 2.75 grade point average (GPA) is required.

## DOCTOR OF PHILOSOPHY IN STATISTICS

The department looks for students who wish to prepare for research careers in statistics or probability, either applied or theoretical. Advanced undergraduate or master's level work in mathematics and statistics provides a good background for the doctoral program. Quantitatively oriented students with degrees in other scientific fields are also encouraged to apply for admission. In particular, the department is expanding its research and educational activities towards computational biology, mathematical finance and information science, via a VIGRE program. The program normally takes four years to complete.

**Program Summary**—STATS 300A,B,C, 305, 306A,B, and 310A,B,C (first-year core program); pass two of three parts of the qualifying examinations (end of first year); breadth requirement (second or third year); successfully complete the thesis proposal meeting (before end of third year); pass the University oral examination (fourth year); dissertation (fourth year).

In addition, students are required to take 9 units of advanced topics courses offered by the department (including at least two of the following: 314, 317, 318, 315A, or 315B, but not including literature, research, or consulting), and 3 units of 390 statistical consulting. All students who have passed the qualifying exams but have not yet passed the University oral examination must take 319 at least once per year.

**First-Year Core Courses**—STATS 300 systematically surveys the ideas of estimation and of hypothesis testing for parametric and nonparametric models involving small and large samples. 305 is concerned with linear regression and the analysis of variance. 306 surveys a large number of modeling techniques, related to but going beyond the linear models of 305. 310 is a measure-theoretic course in probability theory, beginning with basic concepts of the law of large numbers and martingale theory. Students who do not have enough mathematics background can take 310 after their first year but need to have their first-year program approved by the Ph.D. program adviser.

**Qualifying Examinations**—These are intended to test the student's level of knowledge when the first-year program, common

to all students, has been completed. There are separate examinations in the three core subjects of statistical theory and methods, applied statistics, and probability theory, and all are typically taken during the summer between the student's first and second years. Students may take two or three of these examinations and are expected to show acceptable performance in two examinations.

**Breadth Requirement**—Students are advised to choose an area of concentration in a specific scientific field of statistical applications; this can be realized by taking at least 15 units of course work approved by the Ph.D. program adviser.

Current areas with suggested course options include:

**Computational Biology and Statistical Genomics**—Students are expected to take 9 units of graduate courses in genetics or neurosciences (imaging), such as GENE 203/BIO 203, as well as 9 units of classes in Statistical Genetics or Bioinformatics, GENE 344A,B, STATS 345, STATS 366, STATS 367.

**Machine Learning**—Courses can be chosen from the following list:

Statistical Learning: STATS 315A and 315B

Data Bases: CS 245, 346, 347

Probabilistic Methods in AI: CS 221, 354

Statistical Learning Theory and Pattern Classification: CS 229

**Applied Probability**—Students are expected to take 15 units of graduate courses in some of the following areas:

Control and Stochastic Calculus: MS&E 322, 351, MATH 237, EE 363

Finance: STATS 250, FINANCE 622, MATH 236

Information Theory: EE 376A, 376B

Monte Carlo: STATS 318, 345, 362, MS&E 323

Queuing Theory: GSB 661, 663, MS&E 335

Stochastic Processes: STATS 317, MATH 234

**Earth Science Statistics**—Students are expected to take:

STATS 317, 318, 352

and three courses from the GES or Geophysics departments, such as GES 144 or GEOPHYS 210.

**Social and Behavioral Sciences**—Students are expected to take three advanced courses from the department with an applied orientation such as:

STATS 261/262, 324, 343, 354

and three advanced quantitative courses from departments such as Anthropology, Economics, Political Science, Psychology, and Sociology, and the schools of Education, Business, or Medicine.

**Thesis Proposal Meeting and University Oral Examinations**—The thesis proposal meeting is intended to demonstrate students' depth in some areas of statistics, and to examine the general plan for their research. In the meeting, the student gives a short presentation and discusses his/her ideas for completing a Ph.D. thesis, with a committee consisting of their adviser and thesis committee (a total of three members). The meeting must be completed before the end of the third year. If the student does not pass, the exam must be repeated. Repeated failure can lead to a loss of financial support.

The oral examination consists of a 40-minute presentation on the thesis topic, followed by a question period. The questions relate both to the student's presentation and also explore the student's familiarity with broader statistical topics related to the thesis research. The oral examination is normally completed within the last few months of the student's Ph.D. period. The examining committee usually consists of four faculty members from the Statistics Department and a fifth faculty member from outside the department. Four out of five passing votes are required and no grades are given. Nearly all students can expect to pass this examination, although it is common for specific recommendations to be made regarding completion of the thesis.

A reading committee must also read and approve the thesis. The reading committee is typically the same as the thesis committee from the thesis proposal meeting.

*Transition policy*—The policy above took effect in Autumn Quarter 2009-10. Students beginning their first year in 2008-09 or later must follow this new policy. Other students can choose either the old or new system; students in this category who choose the new scheme and have already finished their third year can have the thesis proposal meeting as soon as they are ready.

For further information on University oral examinations and committees, see the Graduate Academic Policies and Procedures (GAP) Handbook, section 4.7 or the "University Oral Examination" section of this bulletin.

*Financial Support*—Students accepted to the Ph.D. program are offered financial support. All tuition expenses are paid and there is a fixed monthly stipend determined to be sufficient to pay living expenses. Financial support can be continued for five years, department resources permitting, for students in good standing. The resources for student financial support derive from funds made available for student teaching and research assistantships. Students receive both a teaching and research assignment each quarter which, together, do not exceed 20 hours. Students are encouraged to apply for outside scholarships, fellowships, and other forms of financial support.

## PH.D. MINOR IN STATISTICS

Students must complete 30 total units for the Ph.D. minor. 20 units must be from Statistics courses numbered 300 and above and taken for letter grades. The remaining 10 units can be from Statistics courses numbered 200 and above, or courses from other departments that are on the approved list for the M.S. degree. The selection of courses must be approved by one of the M.S. advisers. The Application for the Ph.D. Minor form must be approved by both the student's Ph.D. department and the Statistics department.

## SYMBOLIC SYSTEMS

*Director:* Kenneth Taylor

*Director of Graduate Studies:* Lera Boroditsky

*Associate Director:* Todd Davies

*Program Committee:* Lera Boroditsky, Herbert Clark, Todd Davies, Daniel Jurafsky, Scott Klemmer, Daphne Koller, Krista Lawlor, Christopher Manning, James McClelland, Clifford Nass, Stanley Peters, Christopher Potts, Eric Roberts, Ivan A. Sag, Kenneth A. Taylor, Johan van Benthem, Thomas A. Wasow, Terry Winograd

### *Program Faculty:*

*Applied Physics:* Bernardo Huberman (Consulting Professor)

*Art and Art History:* Scott Bukatman (Associate Professor)

*Classics:* Reviel Netz (Professor)

*Civil and Environmental Engineering:* John Kunz (Lecturer)

*Communication:* Jeremy Bailenson (Associate Professor), Clifford J. Nass (Professor), Byron Reeves (Professor), Frederick Turner (Associate Professor)

*Computer Science:* David Dill (Professor), Michael Genesereth (Associate Professor), Jeffrey Heer (Assistant Professor), Oussama Khatib (Professor), Scott Klemmer (Associate Professor), Daphne Koller (Professor), Jean-Claude Latombe (Professor, emeritus), Marc Levoy (Professor), Christopher Manning (Associate Professor), John McCarthy (Professor, emeritus), Andrew Ng (Associate Professor), Nils Nilsson (Professor, emeritus), Vaughan Pratt (Professor, emeritus), Eric Roberts (Professor, Teaching), Tim Roughgarden (Associate Professor), Mehran Sahami (Associate Professor, Teaching), Sebastian Thrun (Professor), Terry Winograd (Professor)

*Economics:* Muriel Niederle (Associate Professor)

*Education:* Raymond P. McDermott (Professor), Roy Pea (Professor), Daniel Schwartz (Professor)

*Electrical Engineering:* Krishna Shenoy (Associate Professor)

*French and Italian:* Jean-Pierre Dupuy (Professor)

*Genetics:* Russ B. Altman (Professor)

*Graduate School of Business:* Baba Shiv (Professor)

*History:* Jessica G. Riskin (Associate Professor)

*Linguistics:* Arto Anttila (Associate Professor), Joan Bresnan (Professor, emerita), Eve Clark (Professor), Daniel Jurafsky (Associate Professor), Ronald Kaplan (Consulting Professor), Lauri Karttunen (Consulting Professor), Martin Kay (Professor), Beth Levin (Professor), Christopher Manning (Associate Professor), Stanley Peters (Professor, emeritus), Christopher Potts (Associate Professor), Ivan A. Sag (Professor), Meghan Sumner (Assistant Professor), Thomas A. Wasow (Professor), Annie Zaenen (Consulting Professor)

*Management Science and Engineering:* Pamela Hinds (Associate Professor)

*Mathematics:* Persi Diaconis (Professor), Solomon Feferman (Professor, emeritus)

*Medicine:* Russ B. Altman (Professor), Mark Musen (Professor)

*Music:* Jonathan Berger (Professor), Christopher Chafe (Professor), Eleanor Selfridge-Field (Consulting Professor), Ge Wang (Assistant Professor)

*Neurobiology:* Ben Barres (Professor), William T. Newsome (Professor), Jennifer Raymond (Associate Professor)

*Philosophy:* Michael Bratman (Professor), Alexis Burgess (Assistant Professor), Mark Crimmins (Associate Professor), John Etchemendy (Professor), Solomon Feferman (Professor, emeritus), Dagfinn Føllesdal (Professor, emeritus), Krista Lawlor (Associate Professor), Grigori Mints (Professor), John Perry (Professor, emeritus), Brian Skryms (Professor), Kenneth Taylor (Professor), Johan van Benthem (Professor), Thomas A. Wasow (Professor)

*Psychiatry and Behavioral Sciences:* Vinod Menon (Associate Professor, Research)

*Psychology:* Lera Boroditsky (Assistant Professor), Herbert H. Clark (Professor), Anne Fernald (Associate Professor), Michael Frank (Assistant Professor), Noah Goodman (Assistant Professor), Brian Knutson (Associate Professor), Ellen Markman (Professor), James McClelland (Professor), Samuel McClure (Assistant Professor), Barbara Tversky (Professor, emerita), Anthony Wagner (Professor), Brian Wandell (Professor)

*Statistics:* Persi Diaconis (Professor), Susan P. Holmes (Professor, Teaching)

*Symbolic Systems:* Todd Davies (Lecturer), Tracy King (Consulting Associate Professor), Jeff Shrager (Consulting Associate Professor), Paul Skokowski (Consulting Associate Professor)

*Other Affiliates:* David Barker-Plummer (CSLI Engineering Research Associate), Keith Devlin (CSLI Senior Researcher), Daniel Flickinger (CSLI Senior Research Engineer), Stephan Oepen (CSLI Senior Research Engineer)

*Program Offices:* Margaret Jacks Hall, Building 460, Suite 040

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Courses offered by the Program in Symbolic Systems are listed under the subject code SYMSYS on the *Stanford Bulletin's* ExploreCourses web site.

The observation that both human beings and computers can manipulate symbols lies at the heart of Symbolic Systems, an interdisciplinary program focusing on the relationship between natural and artificial systems that represent, process, and act on information. Computer programs, natural languages, the human mind, and the Internet embody concepts whose study forms the core of the Symbolic Systems curriculum, such as computation, representation, communication, and intelligence. A body of knowledge and theory has developed around these notions, from disciplines such as philosophy, computer science, linguistics, psychology, statistics, neurobiology, and communication. Since the invention of computers, researchers have been working across these disciplines to study questions such as: in what ways are computers and computer languages like human beings and their

languages; how can the interaction between people and computers be made easier and more beneficial?

The core requirements of the Symbolic Systems Program (SSP) include courses in symbolic logic, the philosophy of mind, formal linguistics, cognitive psychology, programming, the mathematics of computation, statistical theory, artificial intelligence, and interdisciplinary approaches to cognitive science. These courses prepare students with the vocabulary, theoretical background, and technical skills needed for study and research at the advanced undergraduate and graduate levels. Most of the courses in SSP are drawn from affiliated departments. Courses designed specifically for the program are aimed at integrating and supplementing topics covered by the department-based offerings. The curriculum includes humanistic approaches to questions about language and intelligence, as well as training in science and engineering.

SSP offers B.S. and M.S. degree programs. Both programs require students to master a common core of required courses and to choose an area of specialization.

## MISSION OF THE UNDERGRADUATE PROGRAM IN SYMBOLIC SYSTEMS

The undergraduate program in Symbolic Systems is an interdisciplinary program focusing on the relationship between natural and artificial systems that represent, process, and act on information. The mission of the program is to prepare majors with the vocabulary, theoretical background, and technical skills necessary to research questions about language, information, and intelligence, both human and machine. The curriculum offers a combination of traditional humanistic approaches to these questions as well as a training and familiarity with contemporary developments in the science and technology of computation. Students in the major take courses in cognitive science, computer programming, computational theory, probability, cognitive psychology, linguistics, and artificial intelligence. The program prepares student for careers in corporate and private sectors as well as for further study in graduate school.

## LEARNING OUTCOMES

The program expects its undergraduate majors to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the Symbolic Systems Program. Students are expected to demonstrate:

1. understanding of important concepts from the undergraduate core requirements.
2. ability to apply core concepts to an advanced problem area.
3. ability to apply concepts and methods from more than one discipline to a particular issue.
4. ability to think critically about advanced reading material.
5. ability to present a cogent, coherent, evidence-backed argument.

## BACHELOR OF SCIENCE IN SYMBOLIC SYSTEMS

The program leading to a B.S. in Symbolic Systems provides students with a core of concepts and techniques, drawing on faculty and courses from various departments. The curriculum prepares students for advanced training in the interdisciplinary study of language and information, or for postgraduate study in any of the main contributing disciplines. It is also excellent preparation for employment immediately after graduation.

Symbolic Systems majors must complete a core of required courses plus a field of study consisting of five additional courses. All major courses are to be taken for letter grades unless an approved course is offered satisfactory/no credit only. All core courses must be passed with a grade of 'C-' or better. Students who receive a grade lower than this in a core course must alert the program of this fact so that a decision can be made about whether the student should continue in the major.

## CORE REQUIREMENTS

In order to graduate with a B.S. in Symbolic Systems, a student must complete the following requirements. Some of these courses have other courses as prerequisites; students are responsible for completing each course's prerequisites before they take it. With the exception of the advanced small seminar requirement, courses cannot be used towards more than one area of the core requirements.

1. *Introductory Core Course.*
  - SYMSYS 100. Introduction to Cognitive and Information Sciences
2. *Continuous Fundamentals Level 1—Single Variable Calculus (one of the following):*
  - 10 units of Advanced Placement Calculus credit
  - MATH 19, MATH 20, and MATH 21. Calculus
  - MATH 41 or MATH 41A and MATH 42 or MATH 42A. Calculus (Accelerated)
3. *Continuous Fundamentals Level 2—Multivariable Calculus (one of the following):*
  - CME 100. Vector Calculus for Engineers
  - CME 100A. Vector Calculus for Engineers, ACE
  - MATH 51. Linear Algebra and Differential Calculus for Several Variables
  - MATH 51A. Linear Algebra and Differential Calculus for Several Variables, ACE

Note: MATH 52 and/or 53, or CME 102 and/or 104, are recommended and may be required for some optional higher level courses
4. *Continuous Fundamentals Level 3—Probability and Statistics (one of the following):*
  - CS 109. Introduction to Probability for Computer Scientists
  - STATS 116. Theory of Probability
  - STATS 110. Statistical Methods in Engineering and the Physical Sciences
  - MS&E 120. Probabilistic Analysis
  - EE 178. Probabilistic Systems Analysis
  - MATH 151. Introduction to Probability Theory
  - CME 106/ENGR 155C. Introduction to Probability and Statistics for Engineers
5. *Discrete Fundamentals—*
  - a. Computer Programming (one of the following):
    - CS 106A. Programming Methodology and CS 106B. Programming Abstractions
    - CS 106X. Programming Abstractions (Accelerated)
  - b. Logic and Computational Theory (one of the following):
    - CS 103. Mathematical Foundations of Computing
    - PHIL 150. Basic Concepts in Mathematical Logic
6. *Technical Depth—*

Two courses chosen from the list below, appropriate to a student's concentration (see concentration lists at <http://symsys.stanford.edu/viewing/htmldocument/13607>):

Note: students concentrating in HCI, AI, or Computer Music must take CS 107.

  - Area A. Computer Programming—*
    - CS 107. Computer Organization and Systems
  - Area B. Computational Theory—*
    - CS 154. Introduction to Automata and Complexity Theory
    - CS 156. Calculus of Computation
    - CS 161. Design and Analysis of Algorithms
  - Area C. Logic—*
    - CS 157. Logic and Automated Reasoning
    - PHIL 151. First Order Logic
    - PHIL 152. Computability and Logic
    - PHIL 154. Modal Logic
  - Area D. Decision Theory/Game Theory—*
    - CS 224M. Multi-Agent Systems
    - ECON 160. Game Theory and Economic Applications
    - MS&E 236/236H. Game Theory with Engineering Applications

- MS&E 252. Decision Analysis I: Foundations of Decision Analysis
- Area E. Probability and Statistics—*
- STATS 200. Introduction to Statistical Inference
  - CS 228. Structured Probabilistic Models: Principles and Techniques
7. *Philosophical Foundations Level 1—*Introductory Philosophy (one of the following):
    - PHIL 1. Introduction to Philosophy
    - PHIL 2. Introduction to Moral Philosophy
    - PHIL 60. Introduction to Philosophy of Science
    - PHIL 102. Modern Philosophy, Descartes to Kant
    - IHUM 23A,B. The Fate of Reason
  8. *Philosophical Foundations Level 2—*
    - PHIL 80. Mind, Matter, and Meaning (WIM course)
  9. *Philosophical Foundations Level 3—*Advanced undergraduate course in metaphysics/epistemology (one of the following):
    - PHIL 162. Philosophy of Mathematics
    - PHIL 164. Central Topics in the Philosophy of Science: Theory and Evidence
    - PHIL 166. Probability: Ten Great Ideas About Chance
    - PHIL 168. Theories of Truth
    - PHIL 169. Evolution of the Social Contract
    - PHIL 180. Metaphysics
    - PHIL 180A. Realism, Anti-Realism, Irrealism, Quasi-Realism
    - PHIL 181. Philosophy of Language
    - PHIL 182. Truth
    - PHIL 184. Theory of Knowledge
    - PHIL 184B. Philosophy of the Body
    - PHIL 184F. Feminist Theories of Knowledge
    - PHIL 184P. Probability and Epistemology
    - PHIL 185. Memory
    - PHIL 186. Philosophy of Mind
    - PHIL 187. Philosophy of Action
    - PHIL 188. Personal Identity
    - PHIL 189. Examples of Free Will
  10. *Cognition and Neuroscience—*
    - a. PSYCH 55. Introduction to Cognition and the Brain
    - b. An additional undergraduate course in cognition and/or neurosciences (one of the following):
      - BIO 20. Introduction to Brain and Behavior
      - PSYCH 30. Introduction to Perception
      - PSYCH 45. Introduction to Learning and Memory
      - PSYCH 50. Introduction to Cognitive Neuroscience
      - PSYCH 60. Introduction to Developmental Psychology
      - PSYCH 70. Introduction to Social Psychology
      - PSYCH 131. Language and Thought
      - PSYCH 133. Human Cognitive Abilities
      - PSYCH 141. Cognitive Development
      - PSYCH 154. Judgement and Decision Making
  11. *Natural Language—*
    - a. Language and Mind (one of the following):
      - LINGUIST 1. Introduction to Linguistics
      - LINGUIST 106. Introduction to Speech Perception
      - LINGUIST 140. Language Acquisition I
      - PSYCH 131. Language and Thought
    - b. Linguistic Theory (one of the following):
      - LINGUIST 110. Introduction to Phonetics and Phonology
      - LINGUIST 120. Introduction to Syntax
      - LINGUIST 130A/230A. Introduction to Semantics and Pragmatics
  12. *Computation and Cognition—*A course applying core technical skills to cognition (one of the following):
    - BIOE 341. Computational Neural Networks
    - CS 121. Introduction to Artificial Intelligence
    - CS 221. Artificial Intelligence: Principles and Techniques
    - CS 222. Rational Agency and Intelligent Interaction
    - CS 224M. Multi-Agent Systems
  - CS 227. Knowledge Representation and Reasoning
  - CS 228. Probabilistic Graphical Models: Principles and Techniques
  - CS 229. Machine Learning
  - LINGUIST 180/CS 124. From Languages to Information
  - LINGUIST 182. Computational Theories of Syntax
  - PSYCH 204. Computation and Cognition: the Probabilistic Approach
  - PSYCH 209A. The Neural Basis of Cognition: A Parallel Distributed Processing Approach
  - PSYCH 239. Formal and Computational Approaches in Psychology and Cognitive Science
    13. *Advanced Small Seminar Requirement*  
An upper-division, limited-enrollment seminar drawing on material from other courses in the core. Courses listed under Symbolic Systems Program offerings with numbers from SYMSYS 200 through 209 are acceptable, as are other courses which are announced at the beginning of each academic year. A course taken to fulfill this requirement can also be counted toward another requirement, as part of either the core or a student's concentration (see below), but not both.

### FIELDS OF STUDY

In addition to the core requirements listed above, the Symbolic Systems major requires each student to complete a field of study consisting of five courses that are thematically related to each other. Students select concentrations from the list below or design others in consultation with their advisers. The field of study is declared on Axxess; it appears on the transcript but not on the diploma.

- Applied Logic
- Artificial Intelligence
- Cognitive Science
- Computer Music
- Decision Making and Rationality
- Human-Computer Interaction
- Learning
- Natural Language
- Neurosciences
- Philosophical Foundations

### UNDERGRADUATE RESEARCH

The program strongly encourages all SSP majors to gain experience in directed research by participating in faculty research projects or by pursuing independent study. In addition to the Symbolic Systems Honors Program (see below), the following avenues are offered.

1. *Summer Internships:* students work on SSP-related faculty research projects. Application procedures are announced in the winter quarter for SSP majors.
2. *Research Assistantships:* other opportunities to work on faculty research projects are typically announced to SSP majors as they arise during the academic year.
3. *Independent Study:* under faculty supervision. For course credit, students should enroll in SYMSYS 196.

Contact SSP for more information on any of these possibilities, or see <http://symsys.stanford.edu>. In addition, the Undergraduate Advising and Research office offers grants and scholarships supporting student research projects at all levels; see [http://ual.stanford.edu/OO/research\\_opps/Grants](http://ual.stanford.edu/OO/research_opps/Grants) [http://ual.stanford.edu/OO/research\\_opps/Grants](http://ual.stanford.edu/OO/research_opps/Grants).

### HONORS PROGRAM

Seniors in SSP may apply for admission to the Symbolic Systems honors program prior to the beginning of their final year of study. Students who are accepted into the honors program can graduate with honors by completing an honors thesis under the supervision of a faculty member. Course credit for the honors project may be obtained by registering for SYMSYS 190, Honors Tutorial, for any quarters while a student is working on an honors



project. Juniors who are interested in doing an honors project during their senior year are advised to take SYMSYS 200, Symbolic Systems in Practice. SYMSYS 191, Senior Honors Seminar, is recommended for honors students during the senior year. Contact SSP or visit the program's web site for more information on the honors program, including deadlines and policies.

### COGNATE COURSES

The following is a list of cognate courses that may be applied to the B.S. in Symbolic Systems. See respective department listings for course descriptions and General Education Requirements (GER) information.

- BIO 20. Introduction to Brain and Behavior (HUMBIO 21)
- BIO 150/250. Human Behavioral Biology (HUMBIO 160)
- BIO 153. Cellular Neuroscience: Cell Signaling and Behavior (PSYCH 120)
- BIO 154. Molecular and Cellular Neurobiology
- BIO 158/258. Developmental Neurobiology
- BIO 163/263. Neural Systems and Behavior (HUMBIO 163)
- BIO 222. Exploring Neural Circuits
- BIOE 341. Computational Neural Networks
- BIOMEDIN 251. Outcomes Analysis (HRP 252)
- CME 100. Vector Calculus for Engineers (ENGR 154)
- CME 100A. Vector Calculus for Engineers, ACE
- CME 106. Introduction to Probability and Statistics for Engineers (ENGR 155C)
- CME 108. Introduction to Scientific Computing
- COMM 106/206. Communication Research Methods
- COMM 120/220. Digital Media in Society (AMSTUD 120)
- COMM 168/268. Experimental Research in Advanced User Interfaces (ME 468)
- COMM 169/269. Computers and Interfaces
- COMM 172/272. Media Psychology
- CS 21N. Can Machines Know? Can Machines Feel?
- CS 26N. Motion Planning for Robots, Digital Actors, and Other Moving Objects
- CS 47N. Computers and the Open Society
- CS 74N. Digital Dilemmas
- CS 103. Mathematical Foundations of Computing
- CS 106A. Programming Methodology (ENGR 70A)
- CS 106B. Programming Abstractions (ENGR 70B)
- CS 106X. Programming Abstractions (Accelerated) (ENGR 70X)
- CS 107. Computer Organization and Systems
- CS 108. Object-Oriented Systems Design
- CS 109. Introduction to Probability for Computer Scientists
- CS 121. Introduction to Artificial Intelligence
- CS 124. From Languages to Information (LINGUIST 180, LINGUIST 280)
- CS 142. Web Applications
- CS 147. Introduction to Human-Computer Interaction Design
- CS 148. Introduction to Computer Graphics and Imaging
- CS 154. Introduction to Automata and Complexity Theory
- CS 157. Logic and Automated Reasoning
- CS 161. Design and Analysis of Algorithms
- CS 170. Stanford Laptop Orchestra: Composition, Coding, and Performance (MUSIC 128)
- CS 181. Computers, Ethics, and Public Policy
- CS 193D. Professional Software Development with C++
- CS 204. Computational Law
- CS 205A. Mathematical Methods for Robotics, Vision, and Graphics
- CS 207. The Economics of Software
- CS 221. Artificial Intelligence: Principles and Techniques
- CS 222. Rational Agency and Intelligent Interaction (PHIL 358)
- CS 223A. Introduction to Robotics (ME 320)
- CS 224M. Multi-Agent Systems
- CS 224N. Natural Language Processing (LINGUIST 284)
- CS 224S. Speech Recognition and Synthesis (LINGUIST 285)
- CS 224U. Natural Language Understanding (LINGUIST 188, LINGUIST 288)
- CS 225A. Experimental Robotics
- CS 225B. Robot Programming Laboratory
- CS 226. Statistical Techniques in Robotics
- CS 227. Knowledge Representation and Reasoning
- CS 227B. General Game Playing
- CS 228. Probabilistic Graphical Models: Principles and Techniques
- CS 228T. Probabilistic Graphical Models: Advanced Methods
- CS 229. Machine Learning
- CS 247. Human-Computer Interaction Design Studio
- CS 261. Optimization and Algorithmic Paradigms
- CS 270. Modeling Biomedical Systems: Ontology, Terminology, Problem Solving (BIOMEDIN 210)
- CS 271. Smart Health through Effective Design (BIOMEDIN 211)
- CS 274. Representations and Algorithms for Computational Molecular Biology (BIOE 214, BIOMEDIN 214, GENE 214)
- CS 276. Information Retrieval and Web Search (LINGUIST 286)
- CS 278. Systems Biology (BIOE 310, CSB 278)
- CS 294H. Research Project in Human-Computer Interaction
- CS 303. Designing Computer Science Experiments
- CS 326A. Motion Planning
- CS 364A. Algorithmic Game Theory
- CS 376. Research Topics in Human-Computer Interaction
- CS 377. Topics in Human-Computer Interaction
- CS 377L. Learning in a Networked World (EDUC 298)
- CS 378. Phenomenological Foundations of Cognition, Language, and Computation
- CS 447. Software Design Experiences
- CS 448B. Data Visualization
- ECON 50. Economic Analysis I
- ECON 51. Economic Analysis II
- ECON 90/190. Introduction to Financial Accounting
- ECON 102B. Introduction to Econometrics
- ECON 102C. Advanced Topics in Econometrics
- ECON 135. Finance for Non-MBAs (MS&E 245G)
- ECON 136. Market Design
- ECON 137. Information and Incentives
- ECON 138. Risk and Insurance
- ECON 141. Public Finance and Fiscal Policy (PUBLPOL 107)
- ECON 150. Economic Policy Analysis (PUBLPOL 104, PUBLPOL 204)
- ECON 153. Economics of the Internet
- ECON 155. Environmental Economics and Policy
- ECON 160. Game Theory and Economic Applications
- ECON 179. Experimental Economics
- ECON 281. Normative Decision Theory and Social Choice
- ECON 286. Game Theory and Economic Application
- ECON 288. Computational Economics
- ECON 289. Advanced Topics in Game Theory and Information Economics
- ECON 290. Multiperson Decision Theory
- EDUC 124. Collaborative Design and Research of Technology-integrated Curriculum
- EDUC 218. Topics in Cognition and Learning: Visualization
- EDUC 247. Moral Education
- EDUC 298. Learning in a Networked World (CS 377L)
- EDUC 303X. Designing Learning Spaces
- EDUC 333A. Understanding Learning Environments

- EDUC 342. Child Development and New Technologies
- EDUC 366X. Learning in Formal and Informal Environments
- EDUC 375A. Seminar on Organizational Theory (MS&E 389, SOC 363A)
- EDUC 391X. Web-Based Technologies in Teaching and Learning
- EE 178/278A. Probabilistic Systems Analysis
- EE 263. Introduction to Linear Dynamical Systems (CME 263)
- EE 364A. Convex Optimization I (CME 364A)
- EE 364B. Convex Optimization II (CME 364B)
- EE 373B. Adaptive Neural Networks
- EE 376A. Information Theory (STATS 376A)
- EE 376B. Information Theory (STATS 376B)
- ENGR 60. Engineering Economy
- ENGR 62. Introduction to Optimization (MS&E 111)
- ENGR 155C. Introduction to Probability and Statistics for Engineers (CME 106)
- ENGR 205. Introduction to Control Design Techniques
- ENGR 209A. Analysis and Control of Nonlinear Systems
- ETHICSOC 20. Introduction to Moral Philosophy (PHIL 2)
- ETHICSOC 108. Ethics and the Professions
- HUMBIO 21. Introduction to Brain and Behavior (BIO 20)
- HUMBIO 145. Birds to Words: Cognition, Communication, and Language (PSYCH 137, PSYCH 239A)
- HUMBIO 160. Human Behavioral Biology (BIO 150, BIO 250)
- HUMBIO 163. Neural Systems and Behavior (BIO 163, BIO 263)
- IHUM 23A. The Fate of Reason
- LINGUIST 1. Introduction to Linguistics
- LINGUIST 105/205A. Phonetics
- LINGUIST 106. Introduction to Speech Perception
- LINGUIST 110. Introduction to Phonetics and Phonology
- LINGUIST 116. Morphology
- LINGUIST 120. Introduction to Syntax
- LINGUIST 124/224. Introduction to Lexical Function Grammar
- LINGUIST 130A/230A. Introduction to Semantics and Pragmatics
- LINGUIST 130B. Introduction to Lexical Semantics
- LINGUIST 140/240. Language Acquisition I
- LINGUIST 180/280. From Languages to Information (CS 124)
- LINGUIST 181/281. Grammar Engineering
- LINGUIST 182/282. Computational Theories of Syntax
- LINGUIST 188/288. Natural Language Understanding (CS 224U)
- LINGUIST 205B. Advanced Phonetics
- LINGUIST 210A. Phonology
- LINGUIST 210B. Advanced Phonology
- LINGUIST 221A. Foundations of English Grammar
- LINGUIST 221B. Studies in Universal Grammar
- LINGUIST 222A. Foundations of Syntactic Theory I
- LINGUIST 224B. Advanced Topics in Lexical Functional Grammar
- LINGUIST 230B. Advanced Semantics and Pragmatics
- LINGUIST 232A. Lexical Semantics
- LINGUIST 241. Language Acquisition II
- LINGUIST 247. Seminar in Psycholinguistics: Information-Theoretic Models of Language and Cognition (PSYCH 227)
- LINGUIST 284. Natural Language Processing (CS 224N)
- LINGUIST 285. Speech Recognition and Synthesis (CS 224S)
- LINGUIST 286. Information Retrieval and Web Search (CS 276)
- MATH 19. Calculus
- MATH 20. Calculus
- MATH 21. Calculus
- MATH 41. Calculus (accelerated)
- MATH 41A. Calculus ACE
- MATH 42. Calculus (Accelerated)
- MATH 42A. Calculus ACE
- MATH 51. Linear Algebra and Differential Calculus of Several Variables
- MATH 51A. Linear Algebra and Differential Calculus of Several Variables, ACE
- MATH 103. Matrix Theory and Its Applications
- MATH 113. Linear Algebra and Matrix Theory
- MATH 151. Introduction to Probability Theory
- MATH 161. Set Theory
- MATH 162. Philosophy of Mathematics (PHIL 162, PHIL 262)
- MATH 292A. Set Theory (PHIL 352A)
- ME 115A. Introduction to Human Values in Design
- ME 115B. Product Design Methods
- MS&E 111. Introduction to Optimization (ENGR 62)
- MS&E 120. Probabilistic Analysis
- MS&E 121. Introduction to Stochastic Modeling
- MS&E 134/234. Organization Change and Information Systems
- MS&E 180. Organizations: Theory and Management
- MS&E 197. Ethics and Public Policy (PUBLPOL 103B, STS 110)
- MS&E 201. Dynamic Systems
- MS&E 236. Game Theory with Engineering Applications
- MS&E 236H. Game Theory with Engineering Applications
- MS&E 248. Economics of Natural Resources
- MS&E 250A. Engineering Risk Analysis (PUBLPOL 355)
- MS&E 250B. Project Course in Engineering Risk Analysis
- MS&E 251. Stochastic Decision Models
- MS&E 252. Decision Analysis I: Foundations of Decision Analysis
- MS&E 254. The Ethical Analyst
- MS&E 299. Voluntary Social Systems
- MS&E 339. Approximate Dynamic Programming
- MS&E 352. Decision Analysis II: Professional Decision Analysis
- MS&E 355. Influence Diagrams and Probabilistic Networks
- MUSIC 128. Stanford Laptop Orchestra: Composition, Coding, and Performance (CS 170)
- MUSIC 220A. Fundamentals of Computer-Generated Sound
- MUSIC 220B. Compositional Algorithms, Psychoacoustics, and Computational Music
- MUSIC 220C. Research Seminar in Computer-Generated Music
- MUSIC 250A. HCI Theory and Practice
- MUSIC 251. Psychophysics and Music Cognition
- MUSIC 253. Music Notation and Representation Software
- MUSIC 254. Symbolic Music Analysis and Retrieval
- NBIO 206. The Nervous System
- NBIO 218. Neural Basis of Behavior
- NBIO 220. Central Mechanisms in Vision-based Cognition
- NENS 220. Computational Neuroscience
- PHIL 1. Introduction to Philosophy
- PHIL 2. Introduction to Moral Philosophy (ETHICSOC 20)
- PHIL 9N. Philosophical Classics of the 20th Century
- PHIL 14N. Belief
- PHIL 60. Introduction to Philosophy of Science (HPS 60)
- PHIL 80. Mind, Matter, and Meaning
- PHIL 102. Modern Philosophy, Descartes to Kant
- PHIL 143. Quine (PHIL 243)
- PHIL 150/250. Basic Concepts in Mathematical Logic
- PHIL 151/251. First-Order Logic
- PHIL 152/252. Computability and Logic

- PHIL 154/254. Modal Logic
- PHIL 155/255. Concepts of Freedom
- PHIL 157/257. Topics in Philosophy of Logic
- PHIL 162/262. Philosophy of Mathematics (MATH 162)
- PHIL 164/264. Central Topics in the Philosophy of Science: Theory and Evidence
- PHIL 165/265. Philosophy of Physics
- PHIL 166/266. Probability: Ten Great Ideas About Chance (STATS 167, STATS 267)
- PHIL 167B/267B. Philosophy, Biology, and Behavior
- PHIL 169/269. Evolution of the Social Contract
- PHIL 170/270. Ethical Theory (ETHICSOC 170)
- PHIL 180/280. Metaphysics
- PHIL 180A/280A. Realism, Anti-Realism, Irrealism, Quasi-Realism
- PHIL 181/281. Philosophy of Language
- PHIL 182/282. Truth
- PHIL 184/284. Theory of Knowledge
- PHIL 184B. Philosophy of the Body
- PHIL 184F/284F. Feminist Theories of Knowledge (FEMST 166)
- PHIL 184P. Probability and Epistemology
- PHIL 185. Memory
- PHIL 186/286. Philosophy of Mind
- PHIL 187/287. Philosophy of Action
- PHIL 188/288. Personal Identity
- PHIL 189/289. Examples of Free Will
- PHIL 194C. Time and Free Will
- PHIL 194R. Epistemic Paradoxes
- PHIL 279. Collectivities (POLISCI 336J)
- PHIL 350A. Model Theory
- PHIL 351A. Recursion Theory
- PHIL 354. Topics in Logic
- PHIL 355. Logic and Social Choice
- PHIL 358. Rational Agency and Intelligent Interaction (CS 222)
- PHIL 366. Evolution and Communication
- PHIL 387. Practical Rationality
- PHIL 391. Research Seminar in Logic and the Foundations of Mathematics (MATH 391)
- POLISCI 120A. American Political Sociology and Public Opinion: Who We Are and What We Believe
- POLISCI 123. Politics and Public Policy (PUBLPOL 101, PUBLPOL 201)
- POLISCI 152/352. Introduction to Game Theoretic Methods in Political Science
- POLISCI 344U. Political Culture
- POLISCI 351A. Foundations of Political Economy
- PSYCH 1. Introduction to Psychology
- PSYCH 7Q. Language Understanding by Children and Adults
- PSYCH 23N. Aping: Imitation, Control, and the Development of the Human Mind
- PSYCH 30. Introduction to Perception
- PSYCH 45. Introduction to Learning and Memory
- PSYCH 50. Introduction to Cognitive Neuroscience
- PSYCH 55. Introduction to Cognition and the Brain
- PSYCH 60. Introduction to Developmental Psychology
- PSYCH 70. Introduction to Social Psychology
- PSYCH 75. Introduction to Cultural Psychology
- PSYCH 80. Introduction to Personality and Affective Science
- PSYCH 104. Uniquely Human
- PSYCH 110. Research Methods and Experimental Design
- PSYCH 120. Cellular Neuroscience: Cell Signaling and Behavior (BIO 153)
- PSYCH 121/228. Ion Transport and Intracellular Messengers
- PSYCH 122S. Introduction to Cognitive and Comparative Neuroscience
- PSYCH 131/262. Language and Thought
- PSYCH 133. Human Cognitive Abilities (EDUC 369)
- PSYCH 134. Seminar on Language and Deception
- PSYCH 137/239A. Birds to Words: Cognition, Communication, and Language (HUMBIO 145)
- PSYCH 141. Cognitive Development
- PSYCH 143. Developmental Anomalies
- PSYCH 152. Mediation for Dispute Resolution (EDUC 131)
- PSYCH 154. Judgment and Decision-Making
- PSYCH 158/259. Emotions: History, Theories, and Research
- PSYCH 166. Seminar on Personal and Social Change
- PSYCH 167. Seminar on Aggression
- PSYCH 168/268. Emotion Regulation
- PSYCH 179/270. The Psychology of Everyday Morality
- PSYCH 202. Cognitive Neuroscience
- PSYCH 204. Computation and cognition: the probabilistic approach
- PSYCH 204A. Human Neuroimaging Methods
- PSYCH 204B. Computational Neuroimaging: Analysis Methods
- PSYCH 205. Foundations of Cognition
- PSYCH 209A. The Neural Basis of Cognition: A Parallel Distributed Processing Approach
- PSYCH 209B. Applications of Parallel Distributed Processing Models to Cognition and Cognitive Neuroscience
- PSYCH 210. Foundations of Memory
- PSYCH 212. Social Psychology
- PSYCH 215. Mind, Culture, and Society
- PSYCH 221. Applied Vision and Image Systems
- PSYCH 223. Social Norms (OB 630)
- PSYCH 226. Models and Mechanisms of Memory
- PSYCH 227. Seminar in Psycholinguistics: Information-Theoretic Models of Language and Cognition (LINGUIST 247)
- PSYCH 232. Brain and Decision Making
- PSYCH 239. Formal and Computational Approaches in Psychology and Cognitive Science
- PSYCH 245. Social Psychological Perspectives on Stereotyping and Prejudice
- PSYCH 250. High-Level Vision: Object Representation (CS 431)
- PSYCH 251. Affective Neuroscience
- PSYCH 252. Statistical Methods for Behavioral and Social Sciences
- PSYCH 253. Statistical Theory, Models, and Methodology
- PSYCH 272. Special Topics in Psycholinguistics
- PSYCH 279. Topics in Cognitive Control
- PSYCH 296. Methods in Personality and Social Psychology
- PUBLPOL 102/202. Organizations and Public Policy
- PUBLPOL 195. Business and Public Policy
- PUBLPOL 302B. Economic Analysis of Law
- SOC 110/210. Politics and Society
- SOC 114/214. Economic Sociology
- SOC 115/315. Topics in Economic Sociology
- SOC 120/220. Interpersonal Relations
- SOC 121. The Individual in Social Structure: Foundations in Sociological Social Psychology
- SOC 122/222. Sociology of Culture
- SOC 126/226. Introduction to Social Networks
- SOC 127/227. Bargaining, Power, and Influence in Social Interaction
- SOC 160/260. Formal Organizations
- STATS 110. Statistical Methods in Engineering and the Physical Sciences

- STATS 116. Theory of Probability
- STATS 141. Biostatistics (BIO 141)
- STATS 191. Introduction to Applied Statistics
- STATS 200. Introduction to Statistical Inference
- STATS 211. Meta-research: Appraising Research Findings, Bias, and Meta-analysis (HRP 206, MED 206)
- STATS 217. Introduction to Stochastic Processes
- STATS 218. Introduction to Stochastic Processes
- STATS 227. Statistical Computing
- STATS 310A. Theory of Probability (MATH 230A)
- STATS 310B. Theory of Probability (MATH 230B)
- STATS 310C. Theory of Probability (MATH 230C)
- STATS 315A. Modern Applied Statistics: Learning
- STATS 315B. Modern Applied Statistics: Data Mining
- STS 101/201. Science, Technology, and Contemporary Society (ENGR 130)
- STS 110. Ethics and Public Policy (MS&E 197, PUBLPOL 103B)

## MINOR IN SYMBOLIC SYSTEMS

Students may minor in Symbolic Systems by completing either item 1 or item 2 below.

1. One course in each of the following core areas (please note that several of these courses have prerequisites):
  - a. *Cognition*: SYMSYS 100\* or PSYCH 55
  - b. *Logic and Computation*: PHIL 150 or 151, or CS 103 or 154
  - c. *Computer Programming*: CS 106B, 106X, or 107
  - d. *Philosophical Foundations*: SYMSYS 100\* or PHIL 80
  - e. *Formal Linguistics*: LINGUIST 120, 130A, or 180
  - f. *Artificial Intelligence*: CS 121 or 221
2. SYMSYS 100, plus an interdisciplinary SSP concentration listed on the SSP web site at <http://symsys.stanford.edu>. To qualify, the selection of courses used for the minor must be interdisciplinary; it must either include courses from at least three departments, or include more than one course from each of two departments.

\* SYMSYS 100 may not be counted for both areas 'a' and 'd'.

## COTERMINAL BACHELOR'S AND MASTER'S DEGREES IN SYMBOLIC SYSTEMS

Many SSP majors also complete coterminal M.S. or M.A. degrees in affiliated departments. In addition to the Symbolic Systems M.S. program (see below), the Department of Philosophy offers a Special Program in Symbolic Systems track for interdisciplinary graduate level work leading to the Master of Arts in Philosophy.

University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees" section of this bulletin. For University coterminal degree program rules and University application forms, see <http://studentaffairs.stanford.edu/registrar/publications#Coterm>.

## MASTER OF SCIENCE IN SYMBOLIC SYSTEMS

The University's basic requirements for the M.S. degree is discussed in the "Graduate Degrees" section of this bulletin.

The M.S. degree in Symbolic Systems is designed to be completed in the equivalent of one academic year by coterminal students or returning students who already have a B.S. degree in Symbolic Systems, and in two years or less by other students depending upon level of preparation. Admission is competitive, providing a limited number of students with the opportunity to pursue course and project work in consultation with a faculty adviser who is affiliated with the Symbolic Systems Program. The

faculty adviser may impose requirements beyond those described here.

Admission to the program as a coterminal student is subject to the policies and deadlines described in the "Undergraduate Degrees and Programs" section of this bulletin (see "Coterminal Bachelor's and Master's Degrees"). Applicants to the M.S. program are reviewed each Winter Quarter. Information on deadlines, procedures for applying, and degree requirements are available from the program's student services coordinator in the Linguistics Department office (460-127E) and at <http://symsys.stanford.edu/viewing/htmldocument/13623>.

## REQUIREMENTS

A candidate for the M.S. degree in Symbolic Systems must complete a program of 45 units. At least 36 of these must be graded units, passed with an average grade of 3.0 (B) or better. Any course taken as part of the 45-unit program must be taken for a letter grade unless the course is offered 'S/NC' only. Furthermore, none of the 45 units to be counted toward the M.S. degree may include units counted toward an undergraduate degree at Stanford or elsewhere. Course requirements are waived only if evidence is provided that similar or more advanced courses have been taken, either at Stanford or another institution. Courses that are waived rather than taken may not be counted toward the M.S. degree.

Each candidate for the M.S. degree must fulfill the following requirements:

1. Submission to the Symbolic Systems Program office and approval of the following pre-project research documents:
  - a. Project Area Statement, endorsed with a commitment from a student's prospective project advisor no later than May 1 of the academic year prior to the expected graduation year; and
  - b. Qualifying Research Paper due no later than the end of the Summer Quarter prior to the expected graduation year.
2. Completion of a coherent plan of study, to be approved by the Graduate Studies Director in consultation with the student's advisor and designed to support a student's project. An initial plan of study should be delineated on the Program Proposal Form prior to the end of the student's first quarter of study, to be modified at the time of the Project Area Statement with the approval of a student's advisor and the Graduate Studies Director. The plan of study must include courses more advanced than the Symbolic Systems undergraduate core in four main skill areas: formal, empirical, computational, and philosophical; and in at least three of the following departments: Computer Science, Linguistics, Philosophy, and Psychology. More advanced courses in each of the skill areas are defined as follows:
  - a. *Formal*: a course in logic and computational theory beyond the level of PHIL 151
  - b. *Empirical*: a course drawing on experimental or observational data or methods, beyond the level of PSYCH 55, LINGUIST 120, or LINGUIST 130A
  - c. *Computational*: a course involving programming beyond the level of CS 107
  - d. *Philosophical*: a course in the area of Philosophy of Mind/Language/Science/Epistemology or Metaphysics at the 200 level or above, certified by the instructor as worthy of graduate credit
3. Completion of three quarters of the Symbolic Systems Program M.S. Seminar (SYMSYS 291).

## COGNATE COURSES

The following is a list of cognate courses that may be applied to the M.S. in Symbolic Systems. See respective department listings for course descriptions and the University policy on graduate unit requirements.

- BIO 153. Cellular Neuroscience: Cell Signaling and Behavior (PSYCH 120)
- BIO 154. Molecular and Cellular Neurobiology

- BIO 222. Exploring Neural Circuits
- BIO 250. Human Behavioral Biology
- BIO 258. Developmental Neurobiology
- BIO 263. Neural Systems and Behavior
- BIOE 341. Computational Neural Networks
- BIOMEDIN 251. Outcomes Analysis (HRP 252)
- CME 100. Vector Calculus for Engineers (ENGR 154)
- CME 100A. Vector Calculus for Engineers, ACE
- CME 106. Introduction to Probability and Statistics for Engineers (ENGR 155C)
- CME 108. Introduction to Scientific Computing
- COMM 206. Communication Research Methods
- COMM 220. Digital Media in Society
- COMM 268. Experimental Research in Advanced User Interfaces (ME 468)
- COMM 269. Computers and Interfaces
- COMM 272. Media Psychology
- CS 103. Mathematical Foundations of Computing
- CS 106A. Programming Methodology
- CS 106B. Programming Abstractions
- CS 106X. Programming Abstractions (Accelerated)
- CS 107. Computer Organization and Systems
- CS 108. Object-Oriented Systems Design
- CS 109. Introduction to Probability for Computer Scientists
- CS 121. Introduction to Artificial Intelligence
- CS 142. Web Applications
- CS 147. Introduction to Human-Computer Interaction Design
- CS 148. Introduction to Computer Graphics and Imaging
- CS 154. Introduction to Automata and Complexity Theory
- CS 157. Logic and Automated Reasoning
- CS 161. Design and Analysis of Algorithms
- CS 170. Stanford Laptop Orchestra: Composition, Coding, and Performance (MUSIC 128)
- CS 181. Computers, Ethics, and Public Policy
- CS 193D. Professional Software Development with C++
- CS 204. Computational Law
- CS 205A. Mathematical Methods for Robotics, Vision, and Graphics
- CS 207. The Economics of Software
- CS 221. Artificial Intelligence: Principles and Techniques
- CS 222. Rational Agency and Intelligent Interaction (PHIL 358)
- CS 223A. Introduction to Robotics (ME 320)
- CS 224M. Multi-Agent Systems
- CS 224N. Natural Language Processing (LINGUIST 284)
- CS 224S. Speech Recognition and Synthesis (LINGUIST 285)
- CS 224U. Natural Language Understanding (LINGUIST 288)
- CS 225A. Experimental Robotics
- CS 225B. Robot Programming Laboratory
- CS 226. Statistical Techniques in Robotics
- CS 227. Knowledge Representation and Reasoning
- CS 227B. General Game Playing
- CS 228. Probabilistic Graphical Models: Principles and Techniques
- CS 228T. Probabilistic Graphical Models: Advanced Methods
- CS 229. Machine Learning
- CS 247. Human-Computer Interaction Design Studio
- CS 261. Optimization and Algorithmic Paradigms
- CS 270. Modeling Biomedical Systems: Ontology, Terminology, Problem Solving (BIOMEDIN 210)
- CS 271. Smart Health through Effective Design (BIOMEDIN 211)
- CS 274. Representations and Algorithms for Computational Molecular Biology (BIOE 214, BIOMEDIN 214, GENE 214)
- CS 276. Information Retrieval and Web Search (LINGUIST 286)
- CS 278. Systems Biology (BIOE 310, CSB 278)
- CS 294H. Research Project in Human-Computer Interaction
- CS 303. Designing Computer Science Experiments
- CS 326A. Motion Planning
- CS 364A. Algorithmic Game Theory
- CS 376. Research Topics in Human-Computer Interaction
- CS 377. Topics in Human-Computer Interaction
- CS 377L. Learning in a Networked World (EDUC 298)
- CS 378. Phenomenological Foundations of Cognition, Language, and Computation
- CS 447. Software Design Experiences
- CS 448B. Data Visualization
- ECON 102B. Introduction to Econometrics
- ECON 102C. Advanced Topics in Econometrics
- ECON 135. Finance for Non-MBAs (MS&E 245G)
- ECON 136. Market Design
- ECON 137. Information and Incentives
- ECON 138. Risk and Insurance
- ECON 141. Public Finance and Fiscal Policy (PUBLPOL 107)
- ECON 153. Economics of the Internet
- ECON 155. Environmental Economics and Policy
- ECON 160. Game Theory and Economic Applications
- ECON 179. Experimental Economics
- ECON 190. Introduction to Financial Accounting
- ECON 281. Normative Decision Theory and Social Choice
- ECON 286. Game Theory and Economic Application
- ECON 288. Computational Economics
- ECON 289. Advanced Topics in Game Theory and Information Economics
- ECON 290. Multiperson Decision Theory
- EDUC 124. Collaborative Design and Research of Technology-integrated Curriculum
- EDUC 218. Topics in Cognition and Learning: Visualization
- EDUC 247. Moral Education
- EDUC 298. Learning in a Networked World (CS 377L)
- EDUC 303X. Designing Learning Spaces
- EDUC 333A. Understanding Learning Environments
- EDUC 342. Child Development and New Technologies
- EDUC 366X. Learning in Formal and Informal Environments
- EDUC 369. Human Cognitive Abilities
- EDUC 375A. Seminar on Organizational Theory (MS&E 389, SOC 363A)
- EDUC 391X. Web-Based Technologies in Teaching and Learning
- EE 263. Introduction to Linear Dynamical Systems (CME 263)
- EE 364A. Convex Optimization I (CME 364A)
- EE 364B. Convex Optimization II (CME 364B)
- EE 373B. Adaptive Neural Networks
- EE 376A. Information Theory (STATS 376A)
- EE 376B. Information Theory (STATS 376B)
- EE 278A. Probabilistic Systems Analysis
- ENGR 155C. Introduction to Probability and Statistics for Engineers (CME 106)
- ENGR 205. Introduction to Control Design Techniques
- ENGR 209A. Analysis and Control of Nonlinear Systems
- ETHICSOC 108. Ethics and the Professions
- LINGUIST 106. Introduction to Speech Perception
- LINGUIST 110. Introduction to Phonetics and Phonology
- LINGUIST 116. Morphology
- LINGUIST 120. Introduction to Syntax
- LINGUIST 130B. Introduction to Lexical Semantics
- LINGUIST 205A. Phonetics
- LINGUIST 205B. Advanced Phonetics
- LINGUIST 210A. Phonology
- LINGUIST 210B. Advanced Phonology
- LINGUIST 221A. Foundations of English Grammar

- LINGUIST 221B. Studies in Universal Grammar
- LINGUIST 222A. Foundations of Syntactic Theory I
- LINGUIST 224. Introduction to Lexical Function Grammar
- LINGUIST 224B. Advanced Topics in Lexical Functional Grammar
- LINGUIST 230A. Introduction to Semantics and Pragmatics
- LINGUIST 230B. Advanced Semantics and Pragmatics
- LINGUIST 232A. Lexical Semantics
- LINGUIST 240. Language Acquisition I
- LINGUIST 241. Language Acquisition II
- LINGUIST 247. Seminar in Psycholinguistics: Information-Theoretic Models of Language and Cognition (PSYCH 227)
- LINGUIST 280. From Languages to Information
- LINGUIST 281. Grammar Engineering
- LINGUIST 282. Computational Theories of Syntax
- LINGUIST 284. Natural Language Processing (CS 224N)
- LINGUIST 285. Speech Recognition and Synthesis (CS 224S)
- LINGUIST 286. Information Retrieval and Web Search (CS 276)
- LINGUIST 288. Natural Language Understanding (CS 224U)
- MATH 103. Matrix Theory and Its Applications
- MATH 113. Linear Algebra and Matrix Theory
- MATH 151. Introduction to Probability Theory
- MATH 161. Set Theory
- MATH 292A. Set Theory (PHIL 352A)
- ME 115A. Introduction to Human Values in Design
- ME 115B. Product Design Methods
- MS&E 111. Introduction to Optimization
- MS&E 120. Probabilistic Analysis
- MS&E 121. Introduction to Stochastic Modeling
- MS&E 134/234. Organization Change and Information Systems
- MS&E 180. Organizations: Theory and Management
- MS&E 197. Ethics and Public Policy (PUBLPOL 103B, STS 110)
- MS&E 201. Dynamic Systems
- MS&E 236. Game Theory with Engineering Applications
- MS&E 236H. Game Theory with Engineering Applications
- MS&E 248. Economics of Natural Resources
- MS&E 250A. Engineering Risk Analysis (PUBLPOL 355)
- MS&E 250B. Project Course in Engineering Risk Analysis
- MS&E 251. Stochastic Decision Models
- MS&E 252. Decision Analysis I: Foundations of Decision Analysis
- MS&E 254. The Ethical Analyst
- MS&E 299. Voluntary Social Systems
- MS&E 339. Approximate Dynamic Programming
- MS&E 352. Decision Analysis II: Professional Decision Analysis
- MS&E 355. Influence Diagrams and Probabilistic Networks
- MUSIC 128. Stanford Laptop Orchestra: Composition, Coding, and Performance (CS 170)
- MUSIC 220A. Fundamentals of Computer-Generated Sound
- MUSIC 220B. Compositional Algorithms, Psychoacoustics, and Computational Music
- MUSIC 220C. Research Seminar in Computer-Generated Music
- MUSIC 250A. HCI Theory and Practice
- MUSIC 251. Psychophysics and Music Cognition
- MUSIC 253. Music Notation and Representation Software
- MUSIC 254. Symbolic Music Analysis and Retrieval
- NBIO 206. The Nervous System
- NBIO 218. Neural Basis of Behavior
- NBIO 220. Central Mechanisms in Vision-based Cognition
- NENS 220. Computational Neuroscience
- PHIL 102. Modern Philosophy, Descartes to Kant
- PHIL 184B. Philosophy of the Body
- PHIL 184P. Probability and Epistemology
- PHIL 185. Memory
- PHIL 194C. Time and Free Will
- PHIL 194R. Epistemic Paradoxes
- PHIL 243. Quine
- PHIL 250. Basic Concepts in Mathematical Logic
- PHIL 251. First-Order Logic
- PHIL 252. Computability and Logic
- PHIL 254. Modal Logic
- PHIL 255. Concepts of Freedom
- PHIL 257. Topics in Philosophy of Logic
- PHIL 262. Philosophy of Mathematics
- PHIL 264. Central Topics in the Philosophy of Science: Theory and Evidence
- PHIL 265. Philosophy of Physics
- PHIL 266. Probability: Ten Great Ideas About Chance (STATS 267)
- PHIL 267B. Philosophy, Biology, and Behavior
- PHIL 269. Evolution of the Social Contract
- PHIL 270. Ethical Theory
- PHIL 279. Collectivities (POLISCI 336J)
- PHIL 280. Metaphysics
- PHIL 280A. Realism, Anti-Realism, Irrealism, Quasi-Realism
- PHIL 281. Philosophy of Language
- PHIL 282. Truth
- PHIL 284. Theory of Knowledge
- PHIL 284F. Feminist Theories of Knowledge
- PHIL 286. Philosophy of Mind
- PHIL 287. Philosophy of Action
- PHIL 288. Personal Identity
- PHIL 289. Examples of Free Will
- PHIL 350A. Model Theory
- PHIL 351A. Recursion Theory
- PHIL 354. Topics in Logic
- PHIL 355. Logic and Social Choice
- PHIL 358. Rational Agency and Intelligent Interaction (CS 222)
- PHIL 366. Evolution and Communication
- PHIL 387. Practical Rationality
- PHIL 391. Research Seminar in Logic and the Foundations of Mathematics (MATH 391)
- POLISCI 120A. American Political Sociology and Public Opinion: Who We Are and What We Believe
- POLISCI 344U. Political Culture
- POLISCI 351A. Foundations of Political Economy
- POLISCI 352. Introduction to Game Theoretic Methods in Political Science
- PSYCH 104. Uniquely Human
- PSYCH 110. Research Methods and Experimental Design
- PSYCH 120. Cellular Neuroscience: Cell Signaling and Behavior (BIO 153)
- PSYCH 122S. Introduction to Cognitive and Comparative Neuroscience
- PSYCH 134. Seminar on Language and Deception
- PSYCH 141. Cognitive Development
- PSYCH 143. Developmental Anomalies
- PSYCH 152. Mediation for Dispute Resolution (EDUC 131)
- PSYCH 154. Judgment and Decision-Making
- PSYCH 166. Seminar on Personal and Social Change
- PSYCH 167. Seminar on Aggression
- PSYCH 202. Cognitive Neuroscience
- PSYCH 204. Computation and cognition: the probabilistic approach
- PSYCH 204A. Human Neuroimaging Methods

- PSYCH 204B. Computational Neuroimaging: Analysis Methods
- PSYCH 205. Foundations of Cognition
- PSYCH 209A. The Neural Basis of Cognition: A Parallel Distributed Processing Approach
- PSYCH 209B. Applications of Parallel Distributed Processing Models to Cognition and Cognitive Neuroscience
- PSYCH 210. Foundations of Memory
- PSYCH 212. Social Psychology
- PSYCH 215. Mind, Culture, and Society
- PSYCH 221. Applied Vision and Image Systems
- PSYCH 223. Social Norms (OB 630)
- PSYCH 226. Models and Mechanisms of Memory
- PSYCH 227. Seminar in Psycholinguistics: Information-Theoretic Models of Language and Cognition (LINGUIST 247)
- PSYCH 228. Ion Transport and Intracellular Messengers
- PSYCH 232. Brain and Decision Making
- PSYCH 239. Formal and Computational Approaches in Psychology and Cognitive Science
- PSYCH 239A. Birds to Words: Cognition, Communication, and Language
- PSYCH 245. Social Psychological Perspectives on Stereotyping and Prejudice
- PSYCH 250. High-Level Vision: Object Representation (CS 431)
- PSYCH 251. Affective Neuroscience
- PSYCH 252. Statistical Methods for Behavioral and Social Sciences
- PSYCH 253. Statistical Theory, Models, and Methodology
- PSYCH 259. Emotions: History, Theories, and Research
- PSYCH 262. Language and Thought
- PSYCH 268. Emotion Regulation
- PSYCH 270. The Psychology of Everyday Morality
- PSYCH 272. Special Topics in Psycholinguistics
- PSYCH 279. Topics in Cognitive Control
- PSYCH 296. Methods in Personality and Social Psychology
- PUBLPOL 195. Business and Public Policy
- PUBLPOL 201. Politics and Public Policy
- PUBLPOL 202. Organizations and Public Policy
- PUBLPOL 204. Economic Policy Analysis
- PUBLPOL 302B. Economic Analysis of Law
- SOC 121. The Individual in Social Structure: Foundations in Sociological Social Psychology
- SOC 210. Politics and Society
- SOC 214. Economic Sociology
- SOC 220. Interpersonal Relations
- SOC 222. Sociology of Culture
- SOC 226. Introduction to Social Networks
- SOC 227. Bargaining, Power, and Influence in Social Interaction
- SOC 260. Formal Organizations
- SOC 315. Topics in Economic Sociology
- STATS 110. Statistical Methods in Engineering and the Physical Sciences
- STATS 116. Theory of Probability
- STATS 141. Biostatistics (BIO 141)
- STATS 191. Introduction to Applied Statistics
- STATS 200. Introduction to Statistical Inference
- STATS 211. Meta-research: Appraising Research Findings, Bias, and Meta-analysis (HRP 206, MED 206)
- STATS 217. Introduction to Stochastic Processes
- STATS 218. Introduction to Stochastic Processes
- STATS 227. Statistical Computing
- STATS 310A. Theory of Probability (MATH 230A)
- STATS 310B. Theory of Probability (MATH 230B)

- STATS 310C. Theory of Probability (MATH 230C)
- STATS 315A. Modern Applied Statistics: Learning
- STATS 315B. Modern Applied Statistics: Data Mining
- STS 110. Ethics and Public Policy (MS&E 197, PUBLPOL 103B)
- STS 201. Science, Technology, and Contemporary Society

## URBAN STUDIES

*Director:* Doug McAdam (Sociology)

*Associate Director:* Michael Kahan (Lecturer, Urban Studies)

*Executive Committee:* Albert Camarillo (History), Prudence Carter (Education), Zephyr Frank (History), Michael Rosenfeld (Sociology), Walter Scheidel (Classics), Jeff Wachtel (President's Office)

*Affiliated Faculty:* Arnetha Ball (Education), Eric Bettinger (Education), Scott Bukatman (Art and Art History), Albert Camarillo (History), Prudence Carter (Education), Samuel Chiu (Management Science and Engineering), Karen Cook (Sociology), Paulla Ebron (Anthropology), Paula Findlen (History), James Fishkin (Communication), Shelley Fisher Fishkin (English), Charlotte Fonrobert (Religious Studies), Richard Ford (Law), Zephyr Frank (History), Leah Gordon (Education), Gary Griggs (Civil and Environmental Engineering), David Grusky (Sociology), Thomas Hansen (Anthropology), Ian Hodder (Anthropology), Miyako Inoue (Anthropology), Sarah Jain (Anthropology), Tomás Jiménez (Sociology), David Labaree (Education), Raymond Levitt (Civil and Environmental Engineering), Carolyn Lougee Chappell (History), Raymond McDermott (Education), Daniel McFarland (Education), Milbrey McLaughlin (Education), William McLennan (Office of Religious Life), Ian Morris (Classics), Josiah Ober (Classics, Political Science), Susan Olzak (Sociology), Leonard Ortolano (Civil and Environmental Engineering), Sean Reardon (Education), Rob Reich (Political Science), Ian Robertson (Anthropology), Michael Rosenfeld (Sociology), (Sociology), Walter Scheidel (Classics), Gary Segura (Political Science), Michael Shanks (Classics), Jennifer Trimble (Classics), Nancy Brandon Tuma (Sociology, Hoover Institution), Fred Turner (Communication), Paul Turner (Art and Art History), Guadalupe Valdes (Education), Barbara Voss (Anthropology)

*Lecturers:* Rohit Aggarwala, Hilary Schafer Boudet, Melanie Edwards, Dehan Glanz, Michael Kahan, Patricia Karlin-Neumann, Michael Kieschnick, Lawrence Litvak, Joanne Sanders, Laura Scher, Frederic Stout

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Courses offered by the Urban Studies Program are listed under the subject code URBANST on the *Stanford Bulletin's* ExploreCourses web site.

The Urban Studies program treats urbanism as an interdisciplinary field; it brings together students, faculty, and outside specialists concerned with cities, and the impacts of cities on society and people's lives. The Urban Studies major encourages students to inquire deeply into the nature of cities and the techniques used to modify urban environments. It prepares students to address urbanization, and gives students a knowledge base and theoretical, analytical, and practical skills to understand urban social systems and effect social change.

## MISSION OF THE UNDERGRADUATE PROGRAM IN URBAN STUDIES

The mission of the undergraduate program in Urban Studies is to develop students' understanding of the nature of cities and their impacts on both the individual and society at large. The program is interdisciplinary in nature drawing from fields in the social sciences, history, and education. Courses in the program focus on issues in contemporary urban society, and on the tools and concepts that can bring about change to improve urban life. Courses also address how cities have changed over time and how they continue to change today in societies around the world. Through a comprehensive program that includes course work, an internship, and independent research, a major in Urban Studies prepares students for careers and advanced academic pursuits in fields including architecture, community service, education, environmental planning, real estate development, urban design, and urban planning; many alumni have obtained graduate degrees in architecture, business, law, public policy, urban design, and urban planning from major universities across the country. Information on careers and graduate programs pursued by Urban Studies alumni is available from the Urban Studies program office.

### LEARNING OUTCOMES

The program expects its undergraduate majors to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the Program in Urban Studies. Students are expected to demonstrate ability:

1. to formulate a research question and assess its significance in relation to one or more relevant scholarly literatures and, where relevant, to theoretical writings.
2. to collect data to answer proposed research question.
3. to analyze a problem and draw correct inferences using qualitative and/or quantitative analysis.
4. to write clearly and persuasively.

### BACHELOR OF ARTS IN URBAN STUDIES

The Urban Studies major requires students to complete four types of courses totaling at least 73 units: 19 units in the core; at least 12 units of skills courses (for those declaring after August 1, 2011; 8 units for those who declared earlier); at least 25 units in an area of concentration; and 13 units in the capstone sequence. If units in these categories total less than 73, the remaining units may be fulfilled by courses in other concentrations or in Urban Studies courses numbered 100 or higher (except URBANST 198 and 199). Majors must also complete one prerequisite: ECON 1A, Introductory Economics A; this prerequisite course may be taken S/NC, as the units for this course do not count toward the 73 units required for the major. URBANST 198, URBANST 199, and prerequisites for required courses and for electives also do not count towards the 73-unit minimum.

Urban Studies students interested in graduate school in business or urban planning are advised to obtain basic quantitative skills by completing MATH 19, 20, and 21, or MATH 41 and 42, preferably before the junior year, and to complete ECON 1B. A course in statistical methods, such as STATS 60, ECON 102A, POLISCI 150A or 151B, or SOC 181B, is recommended for students interested in business or urban planning.

Urban Studies students carry out an internship in an urban organization in the public or non-profit sector, typically by enrolling in URBANST 201B during Spring Quarter of the junior year. This internship, or an appropriate substitution where necessary, should be arranged no later than Winter Quarter of the junior year, in consultation with the Urban Studies internship coordinator. Urban Studies majors who wish to receive academic credit for additional internship work may enroll in URBANST 194. Students may not count more than 7 units of internship, including URBANST 194 and 201A/B, toward their major. Students can consult the Haas Center for Public Service for other courses with internship placements at community organizations.

Urban Studies students are encouraged to spend at least one quarter studying overseas to learn how cities vary across societies. Some Urban Studies concentration courses, as well as electives, can be satisfied at Stanford overseas campuses. Courses offered overseas vary from year to year, and students should check in advance with Overseas Studies and Urban Studies concerning which courses meet Urban Studies requirements. Students may arrange to fulfill the internship requirement through a placement at one of Stanford's overseas locations.

Courses counted toward the 73-unit graduation requirement for the major must be taken for a letter grade, and a minimum grade of 'C' is required. The only exceptions are Urban Studies courses numbered 100 and higher that are offered only on an S/NC basis, such as URBANST 201A and 201B. Students may count up to three non-Stanford courses, for a maximum of 15 units, toward the major. These units must first be approved by the Office of Transfer Credit in the Registrar's Office and subsequently approved by the Urban Studies program. Transfer credit is not awarded for internship. Students may not count more than 5 units of URBANST 197, Directed Reading, toward the major without permission of the Director. Qualified students may write a senior honors thesis and graduate with honors; see details in "Honors Program" below. Students interested in declaring Urban Studies as a major are required to meet first with the student services administrator and one of the program's advisers; they then declare the Urban Studies major on Axess.

### URBAN STUDIES CORE

Urban Studies majors should complete URBANST 110, Introduction to Urban Studies, before Spring Quarter of the junior year. The following courses, totaling 19 units, are required: URBANST 110. Introduction to Urban Studies  
URBANST 112. The Urban Underclass  
URBANST 113. Introduction to Urban Design  
URBANST 114. Cities in Comparative Perspective

### SKILLS

A minimum of 12 units are required (for those who declare after August 1, 2011; 8 units for those who declared before), and should be taken before the end of the junior year. The following two courses are recommended for most Urban Studies majors. The third skills course will vary, depending on a student's needs and interests. Courses that fulfill the skills requirement are listed on the Urban Studies website; consult with an adviser to determine the best choice.

ANTHRO 130D. Spatial Approaches to Social Science  
SOC 180A. Foundations of Social Research

### CONCENTRATIONS

Students must complete at least 25 units in one of the following concentrations. Courses may not be double counted. Students should consult an adviser to develop a program that meets their intellectual goals; relevant courses not listed here, including research methods courses taken in preparation for the capstone project, may be counted toward the concentration with the prior consent of an adviser.

These concentrations are declared to the department; they are not declared on Axess, and they do not appear on the transcript or the diploma.

### CITIES IN COMPARATIVE AND HISTORICAL PERSPECTIVE

Focus is on how cities have evolved over time, and how they are continuing to change today in societies around the world, drawing on disciplinary approaches including anthropology, archaeology, art history, geography, and history. By placing urban issues in perspective, students improve their comprehension of the present as well as the past.



Students in this concentration are encouraged to study off campus, and preferably overseas, for at least one quarter. Many courses offered through the Overseas Studies Program can be counted toward the concentration. Similarly, internships offered at many of Stanford's overseas locations can be used to fulfill the Urban Studies internship requirement. One of the following courses is required for the cities in comparative and historical perspective concentration:

ANTHRO 103. The Archaeology of Modern Urbanism  
CLASSART 112. Ancient Urbanism

The following courses may be counted toward the Cities in Comparative and Historical Perspective concentration:

AMELANG 177. Middle Eastern Cities in Literature and Film  
ANTHRO 104. Urban Life and Cultural Imagination in South Asia  
ANTHRO 105. Ancient Cities in the New World  
ANTHRO 127. City and Sounds  
ARTHIST 3. Introduction to the History of Architecture  
ARTHIST 107A. St. Petersburg, A Cultural Biography: Architecture, Urban Planning, the Arts  
ARTHIST 143A. History of American Architecture  
ARTHIST 188A. The History of Modern and Contemporary Japanese and Chinese Architecture and Urbanism  
CEE 32Q. Place: Making Space Now  
CLASSART 112. Ancient Urbanism  
CLASSART 131. Roman Archaeology and Heritage: The Case of Tarragona (Spain) in the European Context  
CLASSGEN 119. Gender and Power in Ancient Rome  
CLASSHIS 60. The Romans  
CLASSHIS 101. The Greeks  
ENGLISH 186. Tales of Three Cities: New York, Chicago, Los Angeles  
FILMSTUD 150. Cinema and the City  
HISTORY 31. Science, Technology, and Art: The Worlds of Leonardo da Vinci  
HISTORY 106A. Global Human Geography: Asia and Africa  
HISTORY 106B. Global Human Geography: Europe and Americas  
HISTORY 110C. Introduction to Modern Europe  
HISTORY 150C. The United States in the 20th Century  
HISTORY 166. Introduction to African American History: The Modern African American Freedom Struggle  
HISTORY 232D. Rome: The City and the World  
HISTORY 260. California's Minority-Majority Cities  
HISTORY 276. Modern Brazil  
HISTORY 287D. Tel-Aviv: Site, Symbol, City  
HISTORY 291B. The City in Imperial China  
ME 120. History and Philosophy of Design  
OSPBELJ 10. Beijing: Past and Present  
OSPBELJ 32. Site, Memory, History: Beijing as Place  
OSPBELJ 13. Jewish and Muslim Berlin  
OSPBELJ 30. Berlin vor Ort: A Field Trip Module  
OSPBELJ 60. Cityscape as History: Architecture and Urban Design in Berlin  
OSPBELJ 100. Berlin Heute  
OSPCPTWN 11. Education and Schooling in Post-Apartheid South Africa  
OSPCPTWN 16. South Africa Sites of Memory  
OSPCPTWN 17. Western Cape Sites of Memory  
OSPCPTWN 20. Supervised Service Learning  
OSPCPTWN 22. Preparation for Community-Based Research in Community Health and Development  
OSPCPTWN 24A & B. Targeted Research: Project in Community Health and Development  
OSPCPTWN 40. Education in the Post-Apartheid City  
OSPCPTWN 42. Race, Class, and Status: Cape Town in Comparative Perspective  
OSPCPTWN 43. Public and Community Health in Sub-Saharan Africa

OSPCPTWN 44. Negotiating Home, Citizenship, and the South African City  
OSPCPTWN 65. Western Cape Sites of Memory  
OSPCPTWN 68. Cities in the 21st Century: Urbanization, Globalization, Security  
OSPFLOR 58. Space as History: Urban Change and Social Vision: Florence 1059-2008  
OSPFLOR 75. Florence in the Renaissance  
OSPFLOR 115Y. The Duomo and the Piazza della Signoria: Symbols of a Civilization  
OSPMADRD 21. Built Environmental History of Spain  
OSPMADRD 60. Integration into Spanish Society: Service Learning and Professional Opportunities  
OSPOXFRD 66. Oxford: The Culture of the City  
OSPOXFRD 70. History of London  
OSPPARIS 92. Building Paris: Its History, Architecture, and Urban Design  
OSPSANTG 71. Santiago: Urban Planning, Public Policy, and the Built Environment  
POLISCI 110C. America and the World Economy  
RELIGST 237. Jewish and Christian Rome in the 1st to 6th Centuries  
URBANST 115. Urban Sustainability: Long-Term Archaeological Perspectives  
URBANST 161. American Urban History since 1920

## URBAN EDUCATION

The purpose of this concentration is to prepare students for a career in educational policy and practice in diverse settings. This concentration is a useful basis for graduate study in educational policy, law, or business, and for students who have been admitted by the School of Education to pursue a coterminal master's degree in the Stanford Teacher Education Program (STEP) or the Policy, Organization, and Leadership Studies Program (POLS). Students planning to pursue a coterminal master's should take one of the three practica: EDUC 103A, B, and C (for the STEP elementary coterm); EDUC 101X (for the STEP secondary coterm); or EDUC 270A (for the POLS coterm). Application and admission to a coterminal degree in these programs occurs during the Autumn Quarter of the junior year and is handled by the School of Education.

Opportunities to obtain teaching and advising experience are available in nearby schools through Stanford College Prep and other programs administered by the Haas Center for Public Service and through courses offered by the School of Education. Students who choose this concentration may be eligible for the undergraduate honors program of the School of Education, in which case they should enroll in EDUC 199A, B, or C during their senior year.

The following course is required for the urban education concentration:

EDUC 112X. Urban Education

The following courses may be counted toward the urban education concentration:

AFRICAST 111. Education for All? The Global and Local in Public Policy Making in Africa  
EDUC 101. Introduction to Teaching and Learning  
EDUC 103A. Tutoring: Seeing a Child through Literacy (Same as SOC 103A)  
EDUC 103B. Race, Ethnicity, and Linguistic Diversity in Classrooms: Sociocultural Theory and Practices  
EDUC 103C. Educational Policy, Diversity, and English Learners  
EDUC 104X. Conduct of Research with and in Communities  
EDUC 100. Sociology of Education: The Social Organization of Schools  
EDUC 115Q. Identities, Race, and Culture in Urban Schools  
EDUC 116X. Service Learning as an Approach to Teaching  
EDUC 123X. Contexts that Promote Youth Development: Understandings of Effective Interventions  
EDUC 137. Social Justice in Education

EDUC 144. Child Development in and Beyond Schools  
 EDUC 148X. Critical Perspectives on Teaching and Tutoring English Language Learners  
 EDUC 149. Theory and Issues in the Study of Bilingualism  
 EDUC 177. Education of Immigrant Students: Psychological Perspectives  
 EDUC 178X. Latino Families, Languages, and Schools  
 EDUC 179. Urban Youth and Their Institutions: Research and Practice  
 EDUC 201. History of Education in the United States  
 EDUC 202. Introduction to Comparative and International Education  
 EDUC 203. The Anthropology of Education  
 EDUC 204. Introduction to the Philosophy of Education  
 EDUC 207X. School: What Is It Good For?  
 EDUC 216X. Education, Race, and Inequality in African American History, 1880-1990  
 EDUC 220A. Introduction to the Economics of Education  
 EDUC 220B. Introduction to the Politics of Education  
 EDUC 220C. Education and Society  
 EDUC 220D. History of School Reform: Origins, Policies, Outcomes, and Explanations  
 EDUC 221A. Policy Analysis in Education  
 EDUC 223. Good Schools: Research, Policy and Practice  
 EDUC 233A, B. Adolescent Development and Mentoring in the Urban Context  
 HUMBIO 142. Adolescent Development  
 or PSYCH 60. Introduction to Developmental Psychology  
 OSPCPTWN 11. Education and Schooling in Post-Apartheid South Africa  
 OSPCPTWN 32. Learning, Development and Social Change: Service Learning in the Contemporary South African Context  
 SOC 132. Sociology of Education: The Social Organization of Schools

### URBAN SOCIETY AND SOCIAL CHANGE

Focus is on issues in contemporary urban society and the tools and concepts that planners, policy makers, and citizens use to address those issues. Topics include environmental challenges, racial and class inequality, and the provision of adequate urban infrastructure. Students learn how community action, urban planning and design, and organizations in nonprofit, for-profit, and government sectors address urban social and environmental problems. This concentration prepares students to enter graduate programs concerned with urban affairs, community service, and public policy, and to work with local governmental agencies and for-profit and nonprofit organizations engaged in community service and development.

The following course is required for the urban society and social change concentration:

POLISCI 133. Ethics and Politics of Public Service

The following courses may be counted toward the urban society and social change concentration:

ANTHRO 32. Theories in Race and Ethnicity  
 ASNAMST 146S. Asian American Culture and Community  
 CEE 64. Air Pollution: From Urban Smog to Global Change  
 CEE 100. Managing Sustainable Building Projects  
 CEE 115. Goals and Methods of Sustainable Building Projects  
 CEE 124. Sustainable Development Studio  
 CEE 129. Engineering and Policy Responses to Climate Change Impacts on Seaports  
 CEE 131. Architectural Design Process  
 CEE 141A. Infrastructure Project Development  
 CEE 142A. Creating Sustainable Development  
 CEE 171. Environmental Planning Methods  
 CEE 172. Air Quality Management  
 COMM 120. Digital Media in Society  
 EARTHSYS 124. Environmental Justice: Local, National, and International Dimensions  
 EARTHSYS 133. California Climate Change Law and Policy

EARTHSYS 181. Concepts of Urban Agriculture  
 ECON 150. Economic Policy Analysis  
 ECON 155. Environmental Economics and Policy  
 EDUC 270A. Learning to Lead in Public Service Organizations  
 ENGR 150. Social Innovation and Entrepreneurship  
 HISTORY 105. Gandhi, King and Non-Violence  
 HISTORY 255. Martin Luther King, Jr.: The Social Gospel and the Struggle for Justice  
 HISTORY 259A,B. Poverty and Homelessness in America  
 HISTORY 260. California's Minority-Majority Cities  
 HUMBIO 122S. Social Class, Race, Ethnicity, Health  
 HUMBIO 127A,B. Community Health: Assessment and Planning  
 HUMBIO 128. Community Health Psychology  
 MS&E 296. Sustainable Mobility: Improving Energy Efficiency and Reducing CO<sub>2</sub> Emissions for Transportation  
 OSPCPTWN 20. Supervised Service Learning  
 OSPCPTWN 22. Preparation for Community-Based Research in Community Health and Development  
 OSPCPTWN 24. Targeted Research: Project in Community Health and Development  
 OSPCPTWN 32. Learning Development and Social Change  
 OSPCPTWN 42. Race, Class, and Status: Cape Town in Comparative Perspective  
 OSPMOSC 57. Social Inequality in Socialist and Post-Socialist Societies  
 POLISCI 132S. Theories of Civil Society, Philanthropy, and the Nonprofit Sector  
 POLISCI 221F. Race and American Politics  
 PUBLPOL 135. Regional Politics and Decision Making in Silicon Valley  
 PUBLPOL 183. Philanthropy and Social Innovation  
 SOC 118. Social Movements and Collective Action  
 SOC 119. Understanding Large-Scale Societal Change: The Case of the 1960's  
 SOC 135. Poverty, Inequality, and Social Policy in the United States  
 SOC 137. Inequality and Access to Justice  
 SOC 140. Introduction to Social Stratification  
 SOC 141. Controversies About Inequality  
 SOC 145. Race and Ethnic Relations  
 SOC 160. Formal Organizations  
 or MS&E 180. Organizations: Theory and Management  
 SOC 161. The Social Science of Entrepreneurship  
 SOC 164. Immigration and the Changing United States  
 SOC 166. Mexicans, Mexican Americans, and Chicanos in American Society  
 URBANST 111. Urban Politics  
 URBANST 115. Urban Sustainability: Long-Term Archaeological Perspectives  
 URBANST 123. Approaching Research and the Community  
 URBANST 126. Spirituality and Nonviolent Urban and Social Transformation  
 URBANST 131. Social Innovation and the Social Entrepreneur  
 URBANST 132. Concepts and Analytic Skills for the Social Sector  
 URBANST 133. Social Entrepreneurship Collaboratory  
 URBANST 137. Innovations in Microcredit and Development Finance  
 URBANST 162. Managing Local Governments  
 URBANST 163. Land Use Control  
 URBANST 165. Sustainable Urban and Regional Transportation Planning  
 URBANST 171. Urban Design Studio

### SELF-DESIGNED

Students who wish to concentrate in an area of urban studies other than one of the above concentrations must complete the Urban Studies core, skills, and capstone requirement, and design additional units to bring the total to at least 73 units. The self-designed portion of the major should concentrate on a particular area of urban study, such as urban health care or urban

environmental management. Additional units must be approved by both the Director of Urban Studies and an academic adviser who is a member of the Academic Council and has expertise in the particular area of interest to the student. A proposal for a self-designed concentration should include a list of courses and a description of how each course meets the student's educational objectives. A proposal for a self-designed concentration must be accompanied by a letter to the Director of Urban Studies indicating that the academic adviser has examined and approved the student's plan.

Students pursuing a self-designed concentration must submit proposals for approval by the Director of Urban Studies by the beginning of the third quarter of the student's sophomore year. Applications received after that deadline are not considered. Students interested in designing their own concentration are strongly encouraged to meet with the Director of Urban Studies before the end of their sophomore year.

## CAPSTONE

All majors are required to complete an internship and a sequence of two seminars, totaling 13 units, in which students participate in the work of an urban organization related to their area of interest, design a senior project, and write the results of their project. The capstone seminars can be used to satisfy the Writing in the Major requirement and to complete some work on an honors thesis. URBANST 201A or B, and 202, should be taken in the junior year, and URBANST 203 in the senior year. Students who plan to be away during Winter Quarter of their junior year are advised to take URBANST 202 in the Winter Quarter of their sophomore year.

URBANST 201A. Capstone Internship in Urban Studies  
or URBANST 201B. Capstone Internship Seminar  
URBANST 202. Preparation for Senior Research  
URBANST 203. Senior Seminar (WIM)

## HONORS PROGRAM

The honors program offers qualified students an opportunity to conduct independent research and to write a thesis summarizing the results. Before being accepted to the honors program in Urban Studies, a student must

1. declare a major in Urban Studies and complete at least 30 of the 73 required units including all prerequisites and core classes
2. complete URBANST 202 (offered Winter Quarter) (for those graduating in 2012, URBANST 201 also fulfills this requirement)
3. have an overall GPA of 3.3 and a GPA of at least 3.5 in Urban Studies
4. submit an application, including a one-page abstract and the signatures of an adviser and, if applicable, a second reader. If the adviser is not a member of Stanford's Academic Council, the student must have a second reader who is an Academic Council member. The application must be submitted to the program office no later than April 30 of the junior year, and it must then be approved by the Director of the Urban Studies honors program.

Honors students are expected to complete a portion of their honors work in URBANST 203, Senior Seminar, in Autumn Quarter. Additionally, they must register for 5-10 units total in URBANST 199, Senior Honors Thesis, over the course of their senior year. The units of URBANST 199 are in addition to the 73-units required for the major. Honors students are required to present their theses at the Senior Colloquium in Spring Quarter of senior year.

To graduate with honors, students must receive a grade of at least 'A-' in the honors work and have a GPA of at least 3.5 in courses for the Urban Studies major at the time of graduation.

## MINOR IN URBAN STUDIES

The minor in Urban Studies is designed to introduce students to several disciplinary approaches to the study of cities, and provides the opportunity to explore one of three specialized options:

- Cities in comparative and historical perspective
- Urban education
- Urban society and social change

The minor in Urban Studies requires completion of seven courses for a letter grade, including the four core courses, the required course in the student's chosen concentration area, and two additional courses in that option as listed in the "Bachelor of Arts in Urban Studies" section of this bulletin.

## COTERMINAL PROGRAMS IN URBAN STUDIES

Undergraduates in Urban Studies may enter coterminal master's degree programs in a number of departments and schools in the University. In recent years, Urban Studies majors have developed coterminal programs with the departments of Civil and Environmental Engineering, Communication, and Sociology, and with the School of Education. Information and applications for coterminal degree programs are available at Undergraduate Advising and Research. Students should discuss the coterminal program with a program director during their junior year.

For University coterminal degree program rules and University application forms, see <http://registrar.stanford.edu/shared/publications.htm#Coterm>.

## OVERSEAS STUDIES COURSES IN URBAN STUDIES

For course descriptions and additional offerings, see the listings in the *Stanford Bulletin's* ExploreCourses web site (<http://explorecourses.stanford.edu>) or the Bing Overseas Studies web site (<http://bosp.stanford.edu>). Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

### AUTUMN QUARTER

#### BERLIN

- OSPBER 60. Cityscape as History: Architecture and Urban Design in Berlin. 5 units, Matthias Pabsch, GER:DB:Hum

#### FLORENCE

- OSPFLOR 115Y. The Duomo and Palazzo della Signoria: Symbols of a Civilization. 4 units, Timothy Verdon, GER:DB:Hum

#### MADRID

- OSPMADRD 60. Integration into Spanish Society: Service Learning and Professional Opportunities. 5 units, Sheila Klaiber

### WINTER QUARTER

#### CAPETOWN

- OSPCPTWN 24A. Targeted Research Project in Community Health and Development. 3 units, Timothy Stanton

#### MADRID

- OSPMADRD 60. Integration into Spanish Society: Service Learning and Professional Opportunities. 5 units, Sheila Klaiber

### SPRING QUARTER

#### BERLIN

- OSPBER 11. The Vanishing City: Lost Architecture and the Art of Commemoration in Berlin. 4-5 units, Knut Ebeling, GER:DB:Hum

**CAPETOWN**

- OSPCPTWN 22. Preparation for Community-Based Research in Community Health and Development. 3 units, Timothy Stanton
- OSPCPTWN 24B. Targeted Research Project in Community Health and Development. 5 units, Timothy Stanton
- OSPCPTWN 40. Education in the Post-Apartheid City. 4 units, Aslam Fataar
- OSPCPTWN 44. Negotiating Home, Citizenship and the South African City. 4 units, Sophie Oldfield

**FLORENCE**

- OSPFLOR 58. Space as History: Urban Change and Social Vision: Florence 1059-2008. 4 units, Filippo Rossi, Timothy Verdon, GER:DB:Hum

**MADRID**

- OSPMADRD 60. Integration into Spanish Society: Service Learning and Professional Opportunities. 5 units, Sheila Klaiber

**PARIS**

- OSPPARIS 92. Building Paris: Its History, Architecture, and Urban Design. 4 units, Estelle Halevi, GER:DB:Hum

**STANFORD IN WASHINGTON**

*Director:* Adrienne Jamieson

The Bing Stanford in Washington program provides highly-qualified undergraduates with an opportunity to work and study in the nation's capital. In addition to providing students with an understanding of public policy making, the program offers an opportunity to take advantage of the city's unique cultural resources.

Central in the student's educational experience is a full-time internship. Students serve as interns at such institutions and agencies as the Senate, the House of Representatives, the Office of Management and Budget, the White House, the National Institutes of Health, the Smithsonian Institution, CNN, World Bank, the departments of State, Justice, Treasury, Education, and Health and Human Services.

In addition to the internship, students also complete an academic course of study consisting of small courses taught by policy experts, and weekly seminars taught by Stanford faculty members. Seminars are generally 3-5 units. Past topics have included congressional oversight and the press; economic growth and development patterns, policies, and prospects; critical health issues in the U.S. and abroad; policy making in the Washington community; and criminal justice policy. Speakers from the Washington policy community frequently join students and faculty for discussions. Students often write a major paper related to their internship for 3-5 units of credit. Course and seminar topics vary according to student and faculty interest.

The Bing Stanford in Washington program offers stretch quarters in the Autumn and Spring (early September to mid-December, and late March to the end of June) and a regular quarter in Winter, which focuses on environmental and health policy. The program is designed for students in their junior year or during the first or second quarter of their senior year. Applications must be completed two quarters in advance, and three quarters in advance if a student is overseas or otherwise not on campus during the qualifying quarter.

Students interested in the program should contact the campus office of the Bing Stanford in Washington program in Room 105 of the SIEPR Gunn Building; see <http://bsiw.stanford.edu>; or email [bsiwinfo\\_ca@stanford.edu](mailto:bsiwinfo_ca@stanford.edu).

**SCHOOL OF LAW**

*Emeriti: (Professors)* Barbara Allen Babcock, Wayne G. Barnett, Paul Brest, Gerhard Casper, William Cohen, Lance E. Dickson, Marc A. Franklin, Jack H. Friedenthal, Robert A. Girard, William B. Gould IV, Thomas C. Grey, Thomas C. Heller, Miguel A. Méndez, John Henry Merryman, Margaret Jane Radin, David Rosenhan, Kenneth E. Scott, Byron D. Sher, William H. Simon, Michael S. Wald

*Dean:* Larry D. Kramer

*Vice Dean:* Mark G. Kelman

*Associate Dean for Curriculum:* Jane Schacter

*Associate Dean for Executive Education and Special Programs:* F. Daniel Siciliano

*Associate Dean for Graduate Studies:* Deborah R. Hensler

*Associate Dean for Public Interest and Clinical Education:* Lawrence C. Marshall

*Senior Associate Dean and Chief Financial Officer:* Frank Brucato

*Associate Deans:* Diane Chin, Faye Deal, Julia Erwin-Weiner, Catherine Glaze, Sabrina Johnson, Susan Robinson

*Professors:* Janet Cooper Alexander, Joseph Bankman, R. Richard Banks, Joshua Cohen, G. Marcus Cole, Richard Craswell, Mariano-Florentino (Tino) Cuéllar, Robert M. Daines, Michele Landis Dauber, John J. Donohue III, George Fisher, Richard T. Ford, Barbara H. Fried, Lawrence M. Friedman, Ronald J. Gilson (on leave autumn), Paul Goldstein, Robert W. Gordon, Henry T. Greeley, Joseph A. Grundfest, Deborah R. Hensler, Daniel E. Ho (on leave), Pamela S. Karlan (on leave autumn), Mark G. Kelman, Amalia D. Kessler (on leave autumn), Daniel P. Kessler, Michael Klausner, Larry D. Kramer, Mark A. Lemley, Lawrence C. Marshall, Jenny S. Martinez, Michael W. McConnell, Alison D. Morantz, Joan Petersilia, A. Mitchell Polinsky, Robert L. Rabin (on leave), Deborah L. Rhode, Jane Schacter, Norman W. Spaulding, James F. Strnad II, Kathleen M. Sullivan (on leave), Alan O. Sykes, Barton H. Thompson, Jr., George Triantis, Robert Weisberg

*Associate Professor:* Barbara van Schewick

*Assistant Professors:* David Freeman Engstrom, Nora Freeman Engstrom, Michael W. Wara

*Professors (Teaching):* Juliet M. Brodie, James Cavallaro, William S. Koski, Deborah A. Sivas, Jayashri Srikantiah

*Associate Professors (Teaching):* Jeffrey L. Fisher, Jay A. Mitchell  
*Professors of the Practice of Law:* David W. Mills, Dan Reicher, F. Daniel Siciliano

*Senior Lecturers:* Margaret R. Caldwell, Janet Martinez, Allen S. Weiner

*Professors (by courtesy):* Michael Genesereth, David Larcker, Clifford Nass, Paul C. Pfleiderer, Madhav Rajan, Jack Rakove, Frank Wolack

*Visiting Professors:* Michael Asimow, David Ball, Nita Farahany, Siegfried Fina, Edward Larson, Robert MacCoun, Avishai Margalit, Peter Menell, Rogelio Perez-Perdomo, William Simon, David Sklansky, J.W. Verret, Jonathan Zittrain

*Legal Research and Writing Instructors:* Albertina Antognini, Beth Colgan, Andrew Gilden, Kaipo Matsumura, Jeanne Merino, Briana Rosenbaum

*Lecturers:* Simao Avila, Daniel L. Barton, Marilyn Bautista, Jeanine Becker, Karen Biestman, Byron Bland, Ryan Calo, Viola Canales, Nathan Chapman, Diane Chin, Laurent Cohen-Tanugi, Daniel Cooperman, Betsy de la Vega, Susan Diamond, Michael E. Dickstein, Lisa Douglass, Jared Ellias, Bonnie Eskanazi, Jordan Eth, Anthony Falzone, Randee G. Fenner, Bertram Fields, David Forst, Laurence Franklin, Mei Gchlik, Tracy Genesen, Thomas C. Goldstein, Jennifer Granick, Jonathan Greenberg, Lucas Guttentag, Timothy H. Hallahan, Brad Handler, Keith Hennessey, Brooke Heymach, David Hornik, Ivan Humphreys, Erik Jensen, David Johnson, Danielle Jones, Tami Kricheli-Katz, Julie Matlof Kennedy, Suzanne

McKechnie Klahr, Jeffery W. Kobrick, Charles Koob, Galit Lipa, Paul Lomio, Brian Love, Andrew McLaughlin, Beth McLellan, Jeanne Merino, Roberta J. Morris, Linda Netsch, Thomas J. Nolan, Jessica Notini, B. Howard Pearson, Lisa M. Pearson, Pamela Phan, Sergio Puig de la Parra, Jenik Radon, Stephan Ray, Edward Reines, John Rodkin, Andrew Roper, Kevin Russell, Richard Salgado, Ticien Sassoubre, Jeff Schox, Rachele Silverberg, Stephanie Smith, Stephan Sonnenberg, Larry Sonsini, Elizabeth Stark, Sergio Stone, Kimberly Summe, Stuart Taylor, Dan Torres, Roland Vogl, Bruce Wagman, Vaughn Walker, Erika V. Wayne, Dana Weintraub, Katherine C. Wright, James Yoon

*Affiliated Faculty:* Kate Bundorf (Health Research and Policy), Tamar Herzog (History), Joy Ishii (GSB), Jose Maldonado (Psychiatry and Behavioral Sciences), Maria Ogneva (GSB), Stefan Reichelstein (GSB), Scott Sagan (Political Science), Helen Stacy (FSI)

Courses offered by the School of Law are listed on the *Stanford Bulletin's* ExploreCourses web site under the subject codes LAW and LAWGEN.

The School of Law, established in 1893, provides a legal education for students who are fitted by their maturity and academic training to pursue professional study under University methods of instruction. The curriculum leading to the first professional degree in law, the Doctor of Jurisprudence (J.D.), constitutes an adequate preparation for the practice of law in any English-speaking jurisdiction. Graduate work leading to the degrees of Master of Laws (L.L.M.), Master of the Science of Law (J.S.M.), and Doctor of the Science of Law (J.S.D.), and a non-professional degree, Master of Legal Studies (M.L.S.), is also offered. For the full curriculum, see <http://lawreg.stanford.edu/stanford>. Stanford Law School offers joint or dual degree options in combination with other Stanford graduate departments and universities across the country; see the "Joint and Dual Degrees in Law" section of this bulletin.

The school is on a three-term academic calendar. For a complete list of academic dates see the Academic Calendar on the Law School web site at <http://www.law.stanford.edu/calendar>.

For further information about admission, programs, curriculum, and faculty, see <http://www.law.stanford.edu>.

## JOINT AND DUAL DEGREES IN LAW

Formal admission to both the Law School and to the other cooperating school or department in accordance with the established admission standards of each school or department is required. In addition to the formal joint degree programs offered, the school considers requests for a dual program on an individually designed basis. For additional information on Law School joint or dual degree programs, see <http://www.law.stanford.edu/program/degrees>. See relevant web sites or department sections of this bulletin for degree requirements.

Formal joint degree programs at Stanford:

*School of Business*—See <http://www.gsb.stanford.edu/mba>.

J.D./M.B.A. Master of Business Administration

*School of Earth Sciences*—

J.D./M.S. Emmett Interdisciplinary Program in Environment and Resources (E-IPER)

J.D./Ph.D. Emmett Interdisciplinary Program in Environment and Resources (E-IPER)

*School of Education*—

J.D./M.A. Education

*School of Engineering*—

J.D./M.S. Bioengineering

J.D./Ph.D. Bioengineering

J.D./M.S. Computer Science

J.D./M.S. Electrical Engineering

J.D./M.S. Management Science and Engineering (MS&E)

J.D./Ph.D. Management Science and Engineering (MS&E)

*School of Humanities and Sciences*—

J.D./M.A. Economics

J.D./Ph.D. Economics

J.D./M.A. History

J.D./Ph.D. History

J.D./M.A. in degree granting programs in the Division of International Comparative and Area Studies (ICA): African Studies, East Asian Studies, International Policy Studies, Latin American Studies, and Russian, East European and Eurasian Studies

J.D./Ph.D. Philosophy

J.D./Ph.D. Political Science

J.D./Ph.D. Psychology

J.D./M.P.P. Public Policy

J.D./Ph.D. Sociology

*School of Medicine*—

J.D./M.S. Health Research and Policy (HRP)

*Formal joint degree programs with other universities*—

J.D./M.P.A. with the Woodrow Wilson School of Public and International Affairs at Princeton University

J.D./M.A. with the Paul H. Nitze School of Advanced International Studies at Johns Hopkins University

## COURSES IN LAW

Detailed course descriptions are posted on the Stanford Law School, Office of the Registrar web site at <http://lawreg.stanford.edu/stanford>. Some law courses have special enrollment instructions and restrictions, but many law courses are open to qualified graduate students in other departments of Stanford University with instructor consent. Non-law students may not enroll in courses that are part of the required first-year JD curriculum. Stanford non-Law students intending to enroll in any course with a LAW subject code must consult the Office of the Law School Registrar in the Stanford Law School Administration Building, room 100, or see <http://www.law.stanford.edu/school/offices/registrar>.

# SCHOOL OF MEDICINE

*Dean:* Philip Pizzo

*Senior Associate Dean for Graduate Education and Postdoctoral Affairs:* Daniel Herschlag

*Senior Associate Dean for Medical Education:* Charles Prober

The School of Medicine offers courses of study leading to the M.S., Ph.D., and M.D. degrees.

## UNDERGRADUATE PROGRAMS IN THE SCHOOL OF MEDICINE

Many courses in the School of Medicine are open to any registered Stanford student who has fulfilled the prerequisites, subject to the usual limits of course enrollment and faculty approval. The school also offers courses specifically for undergraduates, as well as graduate-level courses where advanced undergraduates with backgrounds in the life sciences are welcome. Among the undergraduate offerings are numerous Stanford Introductory Seminars for freshmen and sophomores (see the "Stanford Introductory Studies" section of this Bulletin), the Emergency Medical Technician program, Stanford Immersion in Medicine Physician Shadowing, Pre-Vet Advisory, and courses in Community Health, including participation in the Stanford Free Clinics. The school also offers several undergraduate courses through the Department of Biology and the Interdisciplinary Program in Human Biology in the School of Humanities and Sciences.

## M.S. AND PH.D. PROGRAMS IN THE SCHOOL OF MEDICINE

The School of Medicine is home to graduate programs covering a broad range of disciplines within biomedicine leading to Ph.D. or M.S. degrees. These programs focus on interdisciplinary training with in-depth investigation of an original problem of fundamental importance to the biosciences. Each degree program sets its own curriculum, but many courses are taught by groups of faculty from multiple programs and departments. Flexibility is a priority to ensure that all students obtain the best possible training for pursuing careers in their areas of interest. The school is dedicated to training students from diverse backgrounds, and to the promotion of diversity in graduate education. Admission is through one of about 15 home programs. These home programs enable students to carry out dissertation research and training with School of Medicine faculty, as well as investigators in the departments of Biology and Biophysics in the School of Humanities and Sciences. Detailed information on School of Medicine M.S. and Ph.D. programs, curricula, and research can be found at <http://med.stanford.edu/ms> and <http://med.stanford.edu/phd>. Application information can be found at <http://gradadmissions.stanford.edu>.

## M.D. PROGRAM IN THE SCHOOL OF MEDICINE

The School of Medicine seeks to attract students who are passionate about scholarship and wish to improve the health of the world's people through research, innovation, and leadership. The Stanford M.D. curriculum provides education in biomedical and clinical sciences along with study and independent research

through scholarly concentrations. Emphasis is placed on interdisciplinary learning, with streamlined content and melding of basic science and clinical instruction across the curriculum. Blocks of unscheduled time allow for individual or group study, participation in elective courses, research, and reflection. Alternative pathways through the curriculum include an option of a fifth or sixth year of study as well as opportunities for pursuing a second degree, such as an M.P.H., M.B.A., Master's of Science in Epidemiology or Health Services Research, or a Ph.D.

Broad clinical science education occurs throughout the curriculum with exposure to patient care and the practice of medicine beginning on the first day of medical school. Students may begin clinical clerkships as early as May of the second year. A population health course combines classroom and experiential learning to provide understanding of the socioeconomic determinants of the health of patients and communities.

Scholarly concentrations offer opportunities for developing skills that enhance basic science and clinical training in areas such as bioengineering, biomedical ethics and medical humanities, biomedical informatics, clinical research, community health, health services and policy research, and the molecular basis of medicine. Through the scholarly concentration program, these skills may be applied in clinical areas housed within centers at Stanford such as the Comprehensive Cancer Center, the Cardiovascular Institute, the Neuroscience Institute, the Institute of Immunology, Transplantation, and Infection, and Women's Health at Stanford. Study in a scholarly concentration typically includes course work and research activities. Research for scholarly concentrations is supported through the Medical Scholars program, which funds student research projects at Stanford and overseas.

Students with interests in medical research as a career are encouraged to investigate opportunities available through the Medical Scientist Training Program (MSTP). Stanford also collaborates with the University of California, Berkeley, to offer students opportunities for M.D./M.P.H. training. Details about these programs may be found at [http://med.stanford.edu/combined\\_degree](http://med.stanford.edu/combined_degree).

Stanford is committed to representing the diversity of the U.S. and California populations by seeking a diverse body of students who are interested in the intellectual substance of medicine and committed to advancing the field of health care, broadly defined. Provided an applicant to the school has completed basic courses in physics, chemistry, and biology, the choice of an undergraduate major may reflect other interests, including the arts and humanities. Course work in advanced biology such as biochemistry, molecular biology, or genetics and the behavioral sciences is recommended because of their importance in understanding health care. Breadth of interests and depth of experiences play an important role in the selection of students from among those applicants having superior academic records.

The M.D. degree requires 13 quarters of registration at full Med-MD tuition; the joint M.D./Ph.D. degree requires 16 quarters. Completion of the M.D. degree must be achieved within six years, unless a petition is granted to extend this time frame. For further details on the M.D. degree, including admission requirements, see <http://med.stanford.edu/md>.

## MULTIPLE-DEGREE PROGRAMS IN THE SCHOOL OF MEDICINE

### MEDICAL SCIENTIST TRAINING PROGRAM

The Medical Science Training Program (MSTP) provides medical students with an opportunity to pursue an individualized program of research and course work leading to both the M.D. and Ph.D. degrees. It is designed to equip students for careers in academic investigative medicine, and emphasizes flexibility of

curricular and research programs for each trainee. Training for a combined M.D.-Ph.D. includes the same content encountered by students who pursue each degree separately, but the total training time is less than the sum of the time normally required for each degree. The flexible curriculum at Stanford's School of Medicine allows each student, in consultation with a preceptor and other advisers, to pursue a plan of study that satisfies the requirements for the M.D. and allows performance of doctoral-level research leading to the Ph.D. Students interested in joining the MSTP are considered for admission at the time of their application to the School of Medicine M.D. program and are asked to provide supplemental information relevant to their research background. Current Stanford M.D. students may also apply for admission to the MSTP. Further information regarding the program and the admissions process may be obtained from the MSTP administrator; details about the MSTP may be found at <http://mstp.stanford.edu>.

## MASTER OF SCIENCE IN MEDICINE PROGRAM

The Master of Science in Medicine program admits current Stanford Ph.D. students who have a commitment to translational research, but are not interested in becoming clinicians. The goal of the program is to train researchers in human biology and disease to be better equipped to translate new scientific discoveries into useful medical advances. Students offered admission into any Ph.D. program at Stanford may apply for admission to the master's program. During their first five quarters, students take basic biomedical science courses with Stanford M.D. students. The School of Medicine M.D. curriculum is presented in a succinct format that allows time for students to concurrently complete their Ph.D. course requirements and lab rotations. By early in their second year, students choose a lab for their Ph.D. thesis research and complete their medical course work. They also elect a clinical co-mentor to discuss translational research needs and help to arrange a short clinical experience. Upon completion of the Program., participating students receive an M.S. in Medicine. Details about the program can be found at <http://msm.stanford.edu>.

## BIOCHEMISTRY

*Emeriti: (Professors)* Robert L. Baldwin, Paul Berg, Douglas L. Brutlag, David S. Hogness, A. Dale Kaiser, I. Robert Lehman  
*Chair:* Mark A. Krasnow

*Professors:* Philip Beachy, Patrick O. Brown, Gilbert Chu, Ronald W. Davis, James E. Ferrell, Jr., Daniel Herschlag, Mark A. Krasnow, Suzanne R. Pfeffer, James A. Spudich

*Associate Professors:* Pehr A. B. Harbury, Julie A. Theriot

*Assistant Professors:* Rhiju Das, Aaron F. Straight

*Courtesy Professors:* Kerwyn C. Huang, Chaitan S. Khosla, Sharon Long, Rajat Rohatgi

*Department Offices:* Beckman Center, B400

*Mail Code:* 94305-5307

*Phone:* (650) 723-6161

*Web Site:* <http://biochem.stanford.edu/>

Courses offered by the Department of Biochemistry are listed under the subject code BIOC on the *Stanford Bulletin's* ExploreCourses web site.

Biochemistry is a department within the School of Medicine, with offices and labs located in the Beckman Center for Molecular and Genetic Medicine at the Stanford Medical Center. Courses offered by the department may be taken by undergraduates as well as graduate and medical school students.

Advanced courses offered in more specialized areas emphasize recent developments in biochemistry, cell biology, and molecular biology. These courses include the physical and chemical principles of biochemistry, enzyme reaction mechanisms, membrane trafficking and biochemistry, molecular motors and the cytoskeleton, mechanisms and regulation of nucleic acid

replication and recombination, the biochemistry of bacterial and animal viruses, the molecular basis of morphogenesis, the molecular and cell biology of yeast, and the structure and function of both eukaryotic and prokaryotic chromosomes.

Opportunities exist for directed reading and research in biochemistry and molecular biology, using the most advanced research facilities, including those for light and electron microscopy, chromatography and electrophoresis, protein and nucleic acid purification, rapid kinetic analysis, synthesis and analysis, single molecule analyses using laser light traps, microarray generation and analysis, and computer graphic workstation facilities for protein and nucleic acid structural analysis. Ongoing research uses a variety of organisms from bacteria to animal cells.

## DOCTOR OF PHILOSOPHY IN BIOCHEMISTRY

Requirements for the M.S. and Ph.D. degrees are described in the "Graduate Degrees" section of this bulletin. The department does not offer undergraduate degrees.

The Department of Biochemistry offers a Ph.D. program which begins in the Autumn Quarter of each year. The program of study is designed to prepare students for productive careers in biochemistry; its emphasis is training in research, and each student works closely with members of the faculty. In addition to the requirement for a Ph.D. dissertation based on original research, students are required to complete six advanced courses in biochemistry and related areas among the 135 total units required for the Ph.D. Selection of these courses is tailored to fit the background and interests of each student. A second requirement involves the submission of two research proposals which are presented by the student to a small committee of departmental faculty members who are also responsible for monitoring the progress of student curricular and research programs, and a journal club presentation. All Ph.D. students are expected to participate actively in the department's seminar program, and students are encouraged to attend and to present papers at regional and national meetings in cellular biochemistry and molecular biology. Teaching experience is an integral part of the Ph.D. curriculum and is required for the degree.

The Department of Biochemistry offers an M.S. degree only to students already enrolled in the Ph.D. program. Students should contact the Graduate Studies adviser for more details.

Those applying for graduate study should have at least a baccalaureate degree and should have completed work in cell and developmental biology, basic biochemistry and molecular biology, and genetics. Also required are: at least one year of university physics; differential and integral calculus; and organic, inorganic, and physical chemistry. The department is especially interested in those applicants who have research experience in biology or chemistry. Students must submit an application, including transcripts and letters of recommendation, by December (see web site) for admission in the following Autumn Quarter.

Applications should be submitted at <http://gradadmissions.stanford.edu>. Applicants are notified by March 31 of decisions on their applications. Stanford University requires scores from the Graduate Record Examination (GRE) (verbal, quantitative, and analytical), and applicants are encouraged to submit scores from the GRE Subject Test in biochemistry, biology, or chemistry. Applicants should take the October GRE exam.

All applicants are urged to compete for non-Stanford fellowships or scholarships, and U.S. citizens should complete an application for a National Science Foundation Predoctoral Traineeship. Students are provided with financial support to cover normal living expenses; Stanford tuition costs are paid. Applicants for admission to the department are considered without regard to race, color, creed, religion, sex, age, national origin, or marital status.

Postdoctoral research training is available to graduates who hold a Ph.D. or an M.D. degree. Qualified individuals may write to individual faculty members for further information.

At present, the primary research interests of the department are the structure and function of proteins and nucleic acids, the biochemistry and control of development processes, molecular motors and the cytoskeleton, the trafficking of proteins between membrane-bound organelles, the control and regulation of gene expression, bioinformatics/protein structure design, and the application of microarrays to problems in human health and disease.

## CENTER FOR BIOMEDICAL ETHICS

*Director:* David C. Magnus

*Director Emeritus:* Thomas A. Raffin

*Associate Director:* Mildred K. Cho

*Participating Faculty and Staff:* Clarence H. Braddock, Julie A. Collier, LaVera M. Crawley, Maren Grainger-Monsen, Henry Greely, Katrina A. Karkazis, Sandra S. Lee, Jose R. Maldonado, Kelly E. Ormond, Laura W. Roberts, Christopher T. Scott, Audrey Shafer, Abraham C. Verghese, Lawrence I. Zaroff

*Center Offices:* 1215 Welch Road, Modular A

*Mail Code:* 94305-5417

*Phone:* (650) 723-5760

*Web Site:* <http://bioethics.stanford.edu>

The Stanford University Center for Biomedical Ethics (SCBE) is dedicated to interdisciplinary research and education, and provides clinical and research ethics consultation. SCBE serves as a scholarly resource on emerging ethical issues raised by medicine and biomedical research.

SCBE offers a scholarly concentration in Biomedical Ethics and Medical Humanities (BEMH) to medical students. This program allows medical students to study in depth the moral, social, and humanistic dimensions of medicine and biomedical science. Using cross-disciplinary methods such as those from philosophy, social science, film, literature, art, and law, students examine the meaning and implications of medicine and medical research.

*Requirements*—Students who pursue Biomedical Ethics and Medical Humanities in conjunction with an application area, such as Immunology, are required to complete 6 units including:

INDE 212. The Human Condition: Medicine, Arts, and Humanities (2 units)

MED 250A. Medical Ethics I (2 units)

Students may select the other two core BEMH units from a wide variety of University, Medical School, and Law School courses. Students interested in completing all 12 units in the BEMH scholarly area may do the same. Students are encouraged to go through the various offerings and devise a course plan to present to the director, David Magnus, and Audrey Shafer. Additional information on requirements for the scholarly concentration, is available at <http://bioethics.stanford.edu/education/bemh>.

## BIOMEDICAL INFORMATICS

*Committee:* Russ B. Altman (*Chair and Program Director*); Lawrence M. Fagan, Mark A. Musen (*Co-Directors*); Atul Butte, Amar K. Das, Teri Klein, David Paik, Daniel L. Rubin, Nigam Shah

### PARTICIPATING FACULTY AND STAFF BY DEPARTMENT\*

*Biochemistry:* Douglas L. Brutlag (Professor, emeritus), Rhiju Das (Assistant Professor), Ronald Davis (Professor), James Ferrell

(Professor), Hunter Fraser (Assistant Professor), Julie Theriot (Associate Professor)

*Bioengineering:* Russ B. Altman (Professor), Kwabena Boahen (Associate Professor), Markus Covert (Assistant Professor), Hunter Fraser (Assistant Professor), Ingmar Riedel-Kruse (Assistant Professor)

*Biology:* Markus Feldman (Professor), Dmitri Petrov (Associate Professor)

*Chemistry:* Vijay Pande (Associate Professor)

*Chemical and Systems Biology:* Joshua Elias (Assistant Professor), James Ferrell (Professor)

*Computer Science:* Serafim Batzoglou (Associate Professor), Gill Bejerano (Assistant Professor), David Dill (Professor), Leo Guibas (Professor), Daphne Koller (Professor), Chris Manning (Associate Professor), Teresa Meng (Professor), Terry Winograd (Professor)

*Developmental Biology:* Gill Bejerano (Assistant Professor), Harley McAdams (Professor, Research)

*Electrical Engineering:* Teresa Meng (Professor)

*Genetics:* Russ B. Altman (Professor), Carlos Bustamante (Professor), Mike Cherry (Associate Professor, Research), Stanley N. Cohen (Professor), Ronald Davis (Professor), Teri E. Klein (Senior Research Scientist), Jin Billy Li (Assistant Professor), Gavin Sherlock (Associate Professor), Arend Sidow (Associate Professor), Michael P. Snyder (Professor), Hua Tang (Associate Professor)

*Health Research and Policy:* Mark A. Hlatky (Professor), Richard A. Olshen (Professor), Robert Tibshirani (Professor)

*Management Science and Engineering:* Margaret Brandeau (Professor), Ross D. Shachter (Associate Professor)

*Medicine:* Russ B. Altman (Professor), Euan Ashley (Assistant Professor), Jayanta Bhattacharya (Associate Professor), Atul Butte (Associate Professor), Robert W. Carlson (Professor), Amar K. Das (Assistant Professor), Lawrence M. Fagan (Co-Director), Mary Goldstein (Professor), Peter D. Karp (Consulting Assistant Professor), Henry Lowe (Associate Professor, Research; Senior Associate Dean for Information Resources and Technology), Mark A. Musen (Professor), Douglas K. Owens (Associate Professor), Robert W. Shafer (Assistant Professor, Research), Nigam Shah (Assistant Professor), Samson Tu (Senior Research Scientist), P.J. Utz (Associate Professor), Michael G. Walker ((Consulting Associate Professor)

*Microbiology and Immunology:* Karla Kirkegaard (Professor), Garry Nolan (Professor), Julie Theriot (Associate Professor)

*Pediatrics:* Atul Butte (Associate Professor), Chris Longhurst (Clinical Assistant Professor), Henry Lowe (Associate Professor, Research; Senior Associate Dean for Information Resources and Technology)

*Psychiatry and Behavioral Sciences:* Amar K. Das (Assistant Professor), Vinod Menon (Associate Professor)

*Radiation Oncology:* Lei Xing (Professor)

*Radiology:* Sam Gambhir (Professor), Sandy A. Napel (Professor), David Paik (Assistant Professor), Sylvia Plevritis (Associate Professor), Daniel L. Rubin (Assistant Professor)

*Structural Biology:* Michael Levitt (Professor), Vijay Pande (Associate Professor)

*Statistics:* Trevor J. Hastie (Professor), Susan Holmes (Professor), Art Owen (Professor), Robert Tibshirani (Professor), Michael G. Walker (Consulting Associate Professor), Nancy Zhang (Assistant Professor)

*Surgery:* Thomas Krummel (Professor)

\* Research opportunities are not limited to faculty and departments listed.

*Program Offices:* Medical School Office Building (MSOB), room X- 215, 1265 Welch Road

*Mail Code:* 94305-5479

*Phone:* (650) 723-1398

*Fax:* (650) 725-7944

*Web Site:* <http://bmi.stanford.edu>



Courses offered by the Program in Biomedical Informatics are listed under the subject code BIOMEDIN on the *Stanford Bulletin's* ExploreCourses web site.

The program in Biomedical Informatics emphasizes research to develop novel computational methods that can advance biomedicine. Students receive training in the investigation of new approaches to conceptual modeling and to development of new algorithms that address challenging problems in the biological sciences and clinical medicine. Students with a primary interest in developing new informatics methods and knowledge are best suited for this program. Students with a primary interest in the biological or medical application of existing informatics techniques may be better suited for training in the application areas themselves.

## GRADUATE PROGRAMS IN BIOMEDICAL INFORMATICS

The Biomedical Informatics Program is interdepartmental and offers instruction and research opportunities leading to M.S. and Ph.D. degrees in Biomedical Informatics. All students are required to complete the core curriculum requirements, and also to elect additional courses to complement both their technical interests and their goals in applying informatics methods to clinical settings, biology, or imaging.

The core curriculum is common to all degrees offered by the program but is adapted or augmented depending on the interests and experience of the student. Deviations from the core curriculum must be justified in writing and approved by the student's Biomedical Informatics academic adviser and the chair of the Biomedical Informatics Executive Committee. It should be noted, however, that the program is intended to provide flexibility and to complement other opportunities in applied medical research that exist at Stanford. Although most students are expected to comply with the basic program of study outlined here, special arrangements can be made for those with unusual needs or those simultaneously enrolled in other degree programs within the University. Similarly, students with prior relevant training may have the curriculum adjusted to eliminate requirements met as part of prior training.

## CORE CURRICULUM AND PROGRAM REQUIREMENTS IN BIOMEDICAL INFORMATICS

### CORE CURRICULUM IN BIOMEDICAL INFORMATICS

Students are expected to participate regularly in the Biomedical Informatics Student Seminar (BIOMEDIN 201) and a research Colloquium, such as BIOMEDIN 200 or BIOMEDIN 205. In addition, all students are expected to fulfill requirements in the following five categories:

1. *Core Biomedical Informatics* (17 units): Students are expected to complete the core offerings in biomedical informatics, including BIOMEDIN 212 and 4 of the following: BIOMEDIN 210, 211, 214, 215, 217 and 260. Any remaining units must be graduate level courses listed under BIOMEDIN.
2. *Computer Science, Statistics, Mathematics & Engineering* (18 units): Students are expected to create a program of study with a mixture of graduate-level courses in computer science, statistics or other technical informatics-related disciplines that allows them to achieve in-depth mastery of these areas. The programs of study may focus on aspects of these disciplines including (but not limited to): machine learning, artificial intelligence, data mining, image analysis, human-computer interaction, systems engineering, scientific and numerical computing or graphics. In general, this course of study should include no more than 9 units in courses 100-199, and the rest should be 200 or above (unless specifically approved by adviser). CS courses 106, 107 and 108 cannot be counted for this requirement, and all courses should be formal classroom-based courses, unless approved by the executive committee.

Up to 6 units of this portion of the core curriculum may be taken on a pass/fail basis, but at least half of the units in this portion of the curriculum must be taken for a grade. BIOMEDIN units about 17 may also be counted for the requirements in this category. Students may petition for quantitative courses in the medical school or Humanities and Sciences to be counted in this section of the curriculum.

3. *Social and Ethical Issues* (4 units): Students are expected to be familiar with issues regarding ethical, legal, social, organizational and behavioral aspects of the impact of biomedical informatics technologies on society in general. They should select broadly from University offerings to explore one or more of these aspects more deeply. In addition, students are required to take MED 255, The Responsible Conduct of Research, or the equivalent.
4. *Unrestricted Electives* (6 units): Students may fulfill this requirement with any Stanford course, including courses taken to satisfy core curriculum prerequisites.
5. *For PhD Students only: Domain Biology/Medicine, Pedagogy, Electives* (9 units): In order to reach a total of 54 units of core curriculum, PhD students should take an additional 9 units; this should include 6 units of biology or medicine classes relevant to their research interests, 2 units of BIOMEDIN 290, and one additional unit of unrestricted elective.

The core curriculum generally entails a minimum of 45 units of course work for master's students and 54 units of course work for Ph.D. students, but can require substantially more or less depending upon the courses chosen and the previous training of the student. BIOMEDIN 200, 201, 299, 801, 802 and MED 255 may be taken for satisfactory/no credit (S/NC). The varying backgrounds of students are well recognized and no one is required to take courses in an area in which he or she has already been adequately trained; under such circumstances, students are permitted to skip courses or substitute more advanced work using a formal annual process administered by the BMI executive committee, in which students demonstrate satisfaction of core curriculum prerequisites, and request permission to receive core curriculum credit for classes taken previously in areas of the core curriculum. Students design appropriate programs for their interests with the assistance and approval of their Biomedical Informatics academic adviser. At least 27 units of formal course work are expected for the core curriculum.

## PROGRAM REQUIREMENTS FOR THE ACADEMIC M.S., PROFESSIONAL M.S., AND COTERMINAL M.S. DEGREES

Students enrolled in any of the M.S. degrees must complete the program requirements in order to graduate. Programs of at least 45 units that meet the following guidelines are normally approved:

1. Completion of the core curriculum with overall GPA of 3.0.
2. Students are expected to participate regularly in the Biomedical Informatics Student Seminar (BIOMEDIN 201) and a research colloquium, such as BIOMEDIN 200 or BIOMEDIN 205. HCP professional masters candidates who are able to attend classes on campus should also participate regularly.
3. Electives: additional courses to bring the total to 45 or more units as necessary.
4. Masters candidates should sign up for BIOMEDIN 801 for their project units.

The University requirements for the M.S. degree are described in the "Graduate Degrees" section of this bulletin.

## MASTER OF SCIENCE IN BIOMEDICAL INFORMATICS (ACADEMIC)

This degree is designed for individuals who wish to undertake in-depth study of biomedical informatics with research on a full-time basis. Normally, a student spends two years in the program and implements and documents a substantial project during the second year. The first year involves acquiring the fundamental

concepts and tools through course work and research project involvement. All first- and second-year students are expected to devote 50 percent or more of their time participating in research projects. Research rotations are not required, but can be done with approval of the academic adviser or training program director. Graduates of this program are prepared to contribute creatively to basic or applied projects in biomedical informatics. This degree requires a written research paper to be approved by two faculty members.

## **MASTER OF SCIENCE IN BIOMEDICAL INFORMATICS (PROFESSIONAL/HONORS COOPERATIVE PROGRAM)**

This degree is designed primarily for the working professional who already has advanced training in one discipline and wishes to acquire interdisciplinary skills. All classes necessary for the degree are available online. The professional M.S. is offered in conjunction with Stanford Center for Professional Development (SCPD), which establishes the rates of tuition and fees. The program uses the honors cooperative model (HCP), which assumes that the student is working in a corporate setting and is enrolled in the M.S. on a part-time basis. The student has up to five years to complete the program. Research projects are optional and the student must make arrangements with program faculty. Graduates of this program are prepared to contribute creatively to basic or applied projects in biomedical informatics.

## **MASTER OF SCIENCE IN BIOMEDICAL INFORMATICS (COTERMINAL)**

The coterminal degree program allows Stanford University undergraduates to study for a master's degree while completing their bachelor's degree(s) in the same or a different department. Please refer to the "Coterminal Bachelor's and Master's Degrees" section under "Undergraduate Degrees and Programs" in this bulletin for additional information.

The coterminal Master of Science program follows the same program requirements as the Master of Science (Professional), except for the requirement to be employed in a corporate setting. The coterminal degree is available only to current Stanford undergraduates. Coterminal students are enrolled full-time and courses are taken on campus. Research projects are optional and the student must make arrangements with program faculty. Graduates of this program are prepared to contribute creatively to basic or applied projects in biomedical informatics.

For University coterminal degree program rules and University application forms, see <http://registrar.stanford.edu/pdf/CotermAppRules.pdf>

## **DOCTOR OF PHILOSOPHY IN BIOMEDICAL INFORMATICS**

The University's basic requirements for the doctorate (residence, dissertation, examination, and so on) are discussed in the "Graduate Degrees" section of this bulletin.

Individuals wishing to prepare themselves for careers as independent researchers in biomedical informatics, with applications experience in bioinformatics, clinical informatics, or imaging informatics, should apply for admission to the doctoral program. The following are additional requirements imposed by the Biomedical Informatics Executive Committee:

1. A student plans and completes a coherent program of study including the core curriculum and additional requirements as for the master's program. In the first year, two or three research rotations are encouraged. The master's requirements should be completed by the end of the second year in the program (six quarters of study, excluding summers).
2. Doctoral students are generally advanced to Ph.D. candidacy after passing the qualifying exam, which takes place during the

end of the second year of training. A student's academic adviser has primary responsibility for the adequacy of the program, which is regularly reviewed by the Biomedical Informatics Executive Committee.

3. To remain in the Ph.D. program, each student must attain a grade point average (GPA) of 3.0 for the core curriculum. The student must fulfill these requirements and apply for admission to candidacy for the Ph.D. by the end of six quarters of study (excluding summers). In addition, reasonable progress in the student's research activities is expected of all doctoral candidates.
4. During the third year of training, generally in Winter Quarter, each doctoral student is required to give a preproposal seminar that describes evolving research plans.
5. By the end of nine quarters (excluding summers), each student must orally present a written thesis proposal for the written dissertation and must orally defend the proposal before a dissertation committee that generally includes at least one member of the Biomedical Informatics Executive Committee. The committee determines whether the student's general knowledge of the field and the details of the planned thesis are sufficient to justify proceeding with the dissertation.
6. After application for Terminal Graduate Registration (TGR) status, the Ph.D. candidate should register each quarter for BIOMEDIN 802 so their research effort may be counted toward the degree.
7. As part of the training for the Ph.D., each student is required to be a teaching assistant for two courses approved by the Biomedical Informatics Executive Committee; one should be completed in the first two years of study.
8. The most important requirement for the Ph.D. degree is the dissertation. Prior to the oral dissertation proposal and defense, each student must secure the agreement of a member of the program faculty to act as dissertation adviser. The principal adviser should be approved by the Biomedical Informatics Executive Committee, and all dissertation committees should include at least one participating BMI faculty member.
9. At the completion of training, while still matriculated and shortly prior to deposit of the dissertation, the student gives a final talk describing his or her results. No official additional oral examination is required upon completion of the written dissertation. The oral defense of the dissertation proposal satisfies the University oral examination requirement.
10. The student is expected to demonstrate an ability to present scholarly material and research in a lecture at a formal seminar.
11. The student is expected to demonstrate an ability to present scholarly material in concise written form. Each student is required to write a paper suitable for publication, usually discussing his or her doctoral research project. This paper must be approved by the student's academic adviser as suitable for submission to a refereed journal before the doctoral degree is conferred.
12. The dissertation must be accepted by a reading committee composed of the principal dissertation adviser, a member of the program faculty, and a third faculty member chosen from anywhere within the University. A fourth reader may be added at the discretion of the student and their adviser.

## **PH.D. MINOR IN BIOMEDICAL INFORMATICS**

For a Ph.D. minor in Biomedical Informatics (BMI), a candidate must complete a minimum of 20 unduplicated units of biomedical informatics course work, including 12 units in BMI core courses from BIOMEDIN 210, 211, 212, 214, 215, 217 and 260.

The candidate must complete the one-unit MED 255, Responsible Conduct of Research, or an approved substitute.

The remaining units must be courses that would count towards the BMI master's degree, taken from any of these three areas:

- Computer Science
  - Probability, Statistics, Machine Learning, and Experimental Design
  - Biomedicine
- Courses used for the BMI Ph.D. minor may not be double-counted to meet the requirements of a master's or Ph.D. degree.
- All courses used for the BMI Ph.D. minor, except MED 255, must be taken for a letter grade and passed with an overall GPA of 3.0 or better.

This degree offering became effective in Autumn Quarter 2010-11. Courses taken prior to that date may be counted towards the BMI Ph.D. minor degree.

## CANCER BIOLOGY

**Program Director:** Amato Giaccia (Radiation Oncology)  
**Committee on Cancer Biology:** Nicholas Denko (Radiation Oncology), Howard Chang (Dermatology), Jeffrey Axelrod (Pathology), Katrin Chua (Medicine, Endocrinology), Julien Sage (Pediatrics), Alexandro Sweet-Cordero (Pediatrics), Timothy Stearns (Biology, Genetics), Jonathan Pollack (Pathology)

**Participating Departments and Faculty:**

**Biochemistry:** Patrick O. Brown (Professor)  
**Bioengineering:** Jennifer Cochran (Assistant Professor)  
**Biology (School of Humanities and Sciences):** William Burkholder (Assistant Professor), Martha Cyert (Professor), Guowei Fang (Assistant Professor), Judith Frydman (Associate Professor), Or Gozani (Assistant Professor), Ashby Morrison (Assistant Professor), W. James Nelson (Professor), Virginia Walbot (Professor), Tim Stearns (Professor)  
**Chemical And Systems Biology:** James K. Chen (Assistant Professor), Karlene Cimprich (Associate Professor), James E. Ferrell (Professor), Mary Teruel (Assistant Professor)  
**Dermatology:** Howard Y. Chang (Associate Professor), Paul A. Khavari (Professor), M. Peter Marinkovich (Associate Professor), Anthony Oro (Associate Professor)  
**Developmental Biology:** Roeland Nusse (Professor), Matthew Scott (Professor)  
**Genetics:** Anne Brunet (Assistant Professor), Michele Calos (Professor), Stanley Cohen (Professor), Monte M. Winslow (Assistant Professor)  
**Medicine/Cardiovascular Medicine:** Ching-pin Chang (Assistant Professor)  
**Medicine/Endocrinology/Geronotology/Metabolism:** Katrin Chua (Assistant Professor), Andrew R. Hoffman (Professor)  
**Medicine/Gastroenterology and Hepatology:** Christine Cartwright (Professor), Anson Lowe (Assistant Professor)  
**Medicine/Hematology:** Steven Artandi (Associate Professor), Calvin Kuo (Associate Professor), Ravindra Majeti (Assistant Professor)  
**Medicine/Oncology:** Gilbert Chu (Professor), Dean Felsher (Associate Professor), James Ford (Associate Professor), Ronald Levy (Professor), Beverly S. Mitchell (Professor; Director, Stanford Cancer Institute)  
**Medicine/Pulmonary and Critical Care Medicine:** Glenn Rosen (Associate Professor)  
**Microbiology and Immunology:** Helen M. Blau (Professor)  
**Neurology and Neurological Sciences:** Thomas Rando (Professor)  
**Neurology and Neurosurgery:** Yoon-Jae Cho (Assistant Professor)  
**Neurosurgery:** Albert J. Wong (Professor)  
**Obstetrics and Gynecology:** Renee A. Reijo Pera (Professor)  
**Otolaryngology:** John Sunwoo (Assistant Professor)  
**Pathology:** Jeff Axelrod (Associate Professor), Matthew Bogoy (Associate Professor), Michael Cleary (Professor), Gerald Crabtree (Professor), Edgar Engleman (Professor), Andrew Fire (Professor), Isabella Graef (Assistant Professor), Joseph Lipsick (Professor), Bingwei Lu (Assistant Professor), Jonathan Pollack (Associate Professor), Irving Weissman (Professor; Virginia &

D.K. Ludwig Professor for Clinical Investigation in Cancer Research, Professor of Developmental Biology), Marius Wernig (Assistant Professor)  
**Pediatrics/Cancer Biology:** Julien Sage (Assistant Professor), Alejandro Sweet-Cordero (Assistant Professor)  
**Pediatrics/Cardiology:** Marlene Rabinovitch (Professor)  
**Pediatrics/Endocrinology:** Brian Feldman (Assistant Professor)  
**Radiation Oncology/Radiation Biology:** Laura Attardi (Associate Professor), J. Martin Brown (Professor), Nicholas Denko (Assistant Professor), Amato Giaccia (Professor; Director, Stanford University Cancer Biology Program)  
**Radiation Oncology/Radiation Physics:** Edward Graves (Assistant Professor)  
**Radiation Oncology/Radiation Therapy:** Susan Knox (Associate Professor), Albert Koong (Assistant Professor), Quynh-Thu Le (Professor), Max Diehn (Assistant Professor)  
**Radiology/Diagnostic Radiology:** Samira Guccione (Assistant Professor, Research), Jianghong Rao (Assistant Professor)  
**Structural Biology:** William Weis (Professor)  
**Urology:** Donna Peehl (Professor, Research), Zijie Sun (Associate Professor)  
**Program Office:** 265 Campus Drive, Suite G2103  
**Mail Code:** 94305-5456  
**Phone:** (650) 723-6198  
**Email:** gracebk@stanford.edu  
**Web Site:** <http://stanford.edu/group/cancerbio>

Courses offered by the Cancer Biology Program are listed under the subject code CBIO on the *Stanford Bulletin's* ExploreCourses web site.

The Cancer Biology Program at Stanford University is an interdisciplinary program leading to the Ph.D. degree. During the past three decades, understanding of cancer has increased with the discovery of oncogenes, tumor suppressor genes, pathways of DNA damage and repair, chromatin remodeling, cell cycle regulation, angiogenesis and responses to hypoxia, and recent glimpses into the molecular basis of metastasis and cancer stem cell biology. In addition, methods of parallel analysis including gene expression arrays, protein arrays, and tissue arrays have begun to refine and redefine the taxonomy of cancer diagnosis. This explosion of basic and clinical science has resulted in the first successful cancer chemotherapies and immunotherapies based on the knowledge of specific molecular targets. Stanford presents a unique environment to pursue interdisciplinary cancer research because the schools of Medicine, Humanities and Sciences, and Engineering are located on a single campus

The goal of the Cancer Biology Ph.D. program is to provide students with education and training that enables them to make significant contributions to this field. Course work during the first year is designed to provide a broad understanding of the molecular, genetic, cell biological, and pathobiological aspects of cancer. Students also learn about the current state of the epidemiology, clinical diagnosis, treatment, and prevention of human cancers. Equally important during the first year is a series of three rotations in research laboratories chosen by each student. By the beginning of the second year, each student chooses a research adviser and begins work on the dissertation project. A qualifying examination must be completed by the end of the second year. An annual Cancer Biology conference at Asilomar in Pacific Grove California provides students with an opportunity to present their research to one another and to faculty. The expected time to degree is four to five years.

Students are not limited to a single department in choosing their research adviser. The Cancer Biology Ph.D. program currently has approximately 67 graduate students located in basic science and clinical departments throughout the School of Medicine and the School of Humanities and Sciences.

## GRADUATE PROGRAMS IN CANCER BIOLOGY

The program offers a Ph.D. in Cancer Biology.

## DOCTOR OF PHILOSOPHY IN CANCER BIOLOGY

University requirements for the Ph.D. are described under the "Graduate Degrees" section of this bulletin.

A small number of applicants are admitted to the program each year. Applicants should have completed an undergraduate major in the biological sciences; applicants with undergraduate majors in physics, chemistry, or mathematics may be admitted if they complete background training in biology during the first two years of study. During the first year, each student is required to complete a minimum of three, one quarter laboratory rotations. Students must choose a dissertation adviser prior to the end of Summer Quarter, first year, but not before the end of Spring Quarter, first year.

The requirements for the Ph.D. degree are as follows:

1. Training in biology equivalent to that of an undergraduate biology major at Stanford.
2. Completion of the following courses:
  - a. C BIO 241. Molecular, Cellular, and Genetic Basis of Cancer
  - b. GENE 203. Advanced Genetics
  - c. BIO 214. Cell Biology of Physiological Processes
  - d. CSB 210. Signal Transduction Pathways and Networks. Students can take GENE 211, Genomics, or SBIO 214, Biological Macromolecules, in lieu of CSB 210.
  - e. C BIO 280. Cancer Biology Journal Club; required for first- and second-year graduate students in Autumn, Winter, and Spring quarters.
  - f. MED 255. Responsible Conduct in Research; with consent, may be audited.
3. At least 6 units of additional cancer biology-related, graduate-level courses. Course work taken is determined in consultation with the student's adviser and/or the Program Director.
4. Presentation of research results at the annual Cancer Biology Conference on at least three occasions, at least one being an oral presentation.
5. Completion of a qualifying examination in Cancer Biology is required for admission to Ph.D. candidacy. The exam consists of an NIH-style written grant proposal not to exceed ten pages (excluding references), and an oral examination. The examining committee consists of three faculty members from the Cancer Biology Program and does not include the student's dissertation adviser. The composition of this committee is chosen by the student and dissertation adviser and must be submitted to and approved by the program director prior to the end of Autumn Quarter, second year. The qualifying examination must be taken prior to the end of Spring Quarter, second year. If necessary, one retake is permitted prior to the end of Summer Quarter, second year. After the qualifying examination has been completed, the student is required to form a dissertation reading committee that includes the student's adviser and three other members of the Academic Council with appropriate expertise. Each student is required to arrange annual meetings (more frequently, if necessary) of the dissertation reading committee, at which time oral presentations of progress during the past year and a plan of study for the coming year are presented and discussed. Completion of each annual committee meeting must be communicated in writing to the program director by the adviser by the end of Spring Quarter each year.

The major accomplishment of each successful Ph.D. student is the presentation of a written dissertation resulting from independent investigation that contributes to knowledge in the area of cancer biology. An oral examination is also required for the Ph.D. degree. In the Cancer Biology Program, a public seminar (one hour) is presented by the Ph.D. candidate, followed by a closed-door oral examination. The oral examination committee consists of at least four examiners (the members of the doctoral dissertation reading committee) and a chair. The oral examination chair may not have a full or joint appointment in the adviser's or

student's home department. However, a courtesy appointment does not affect eligibility. The oral examination chair may be from the same department as any other member(s) of the examination committee. All members of the oral examination committee are normally members of the Academic Council, as the oral examination chair must be. With the prior approval of the program director or school dean, one of the examiners may be a person who is not a member of the Academic Council if that individual contributes expertise not otherwise available. Official responsibility for selecting the oral examination chair rests with the program. Cancer Biology delegates this to the student and dissertation adviser.

## CHEMICAL AND SYSTEMS BIOLOGY

*Emeriti: (Professors)* Robert H. Dreisbach, Avram Goldstein, Dora B. Goldstein, Tag E. Mansour, Oleg Jardetzky, Richard A. Roth, James P. Whitlock

*Chair:* James E. Ferrell, Jr.

*Professors:* James E. Ferrell, Jr., Tobias Meyer, Daria Mochly-Rosen

*Associate Professors:* James K. Chen, Karlene A. Cimprich, Thomas J. Wandless

*Assistant Professors:* Joshua Elias, Joanna K. Wysocka

*Courtesy Professors:* Stuart Kim, Beverly S. Mitchell, Paul A. Wender

*Courtesy Associate Professors:* Calvin J. Kuo, Matthew Bogoy

*Courtesy Assistant Professors:* Ajay Chawla, Markus Willard Covert, Jan M. Skotheim

*Web Site:* <http://casb.stanford.edu>

Courses offered by the Department of Chemical and Systems Biology are listed under the subject code CSB on the *Stanford Bulletin's* ExploreCourses web site.

The department emphasizes individualized training at the interface of physical science and biomedical science. The program encourages students to draw upon a variety of modern scientific techniques, ranging from recent advances in molecular biology and protein biochemistry to synthetic organic chemistry and single cell imaging. Graduate students in the department take courses in signal transduction networks, chemical biology, and other areas of importance to their research goals.

## MASTER OF SCIENCE IN CHEMICAL AND SYSTEMS BIOLOGY

Students in the Ph.D. program may apply for an M.S. degree after having satisfactorily completed the course and laboratory requirements of the first two years. The degree also requires a written thesis based on literature or laboratory research. Postdoctoral research training is available to graduates having the Ph.D. or M.D. degree.

## DOCTOR OF PHILOSOPHY IN CHEMICAL AND SYSTEMS BIOLOGY

University requirements for the Ph.D. are described in the "Graduate Degrees" section of this bulletin.

The Department of Chemical and Systems Biology offers interdisciplinary training to prepare students for independent careers in biomedical science. The main focus of the program is cell signaling, chemical biology, and systems biology.

The program leading to the Ph.D. degree includes formal and informal study in chemical biology, systems biology, drug discovery, biochemistry, and other areas of relevance to the interests of particular students. First-year students spend one quarter in each of three different laboratories, working closely with other graduate students, a professor, and postdoctoral fellows on

various research projects. During the fourth quarter, the student chooses a faculty mentor with whom to undertake thesis research, based on available positions and the student's interest. During or before the eighth quarter of study, students must pass a qualifying exam which consists of an oral exam on general knowledge and a defense of a research proposal. Course requirements are fulfilled during the first two years of study; the later years of the four- to six-year program are devoted to full-time dissertation research. Close tutorial contact between students and faculty is stressed throughout the program.

Research opportunities also exist for medical students and undergraduates. The limited size of the labs in the department allows for close tutorial contact between students, postdoctoral fellows, and faculty.

The department participates in the four quarter Health and Human Disease and Practice of Medicine sequence which provides medical students with a comprehensive, systems-based education in physiology, pathology, microbiology, and pharmacology.

## COMPARATIVE MEDICINE

*Chair:* Sherril Green

*Professors:* Donna M. Bouley, Linda C. Cork, Sherril Green

*Associate Professors:* Paul Buckmaster, Corinna Darian-Smith, Joseph Garner, Shaul Hestrin

*Assistant Professors:* Megan Albertelli, Stephen Felt, Jennifer Johns, Claude Nagamine

*Department Offices:* Edwards Building, Room R321

*Mail Code:* 94305-5342

*Phone:* (650) 498-5080

*Web Site:* <http://med.stanford.edu/compmed>

Courses offered by the Department of Comparative Medicine are listed under the subject code COMPMED on the *Stanford Bulletin's* ExploreCourses web site.

The Department of Comparative Medicine is a clinical department that offers residency training in laboratory animal medicine for veterinarians. Its faculty offer courses at the undergraduate and graduate levels. Clinical faculty and basic science faculty in the Department of Comparative Medicine accept students to participate in research projects.

The discipline of Comparative Medicine studies the differences and similarities among species to elucidate biological and disease mechanisms. The research interests of faculty include neuroscience, infectious diseases, neuropathology, cancer, molecular genetics, and laboratory animal science.

## DEVELOPMENTAL BIOLOGY

*Emeriti (Professors):* David S. Hogness, A. Dale Kaiser

*Chair:* Roeland Nusse

*Associate Chair:* William Talbot

*Professors:* Ben Barres, Philip Beachy, Gerald Crabtree, Margaret Fuller, Seung Kim, Stuart Kim, David Kingsley, Roeland Nusse, Matthew Scott, Lucy Shapiro, William Talbot, Anne Villeneuve, Irving Weissman

*Assistant Professors:* Gill Bejerano, Joanna Wysocka

*Professor (Teaching):* Ellen Porzig

*Professor (Research):* Harley McAdams

Courses offered by the Department of Development Biology are listed under the subject code DBIO on the *Stanford Bulletin's* ExploreCourses web site.

A fundamental problem in biology is how the complex set of multicellular structures that characterize an adult animal is generated from the fertilized egg. Recent advances at the molecular level, particularly with respect to the genetic control of development, have been explosive. These advances represent the beginning of a major movement in the biological sciences toward

the understanding of the molecular mechanisms underlying developmental decisions and the resulting morphogenetic processes. This new thrust in developmental biology derives from the extraordinary methodological advances of the past decade in molecular genetics, immunology, and biochemistry. However, it also derives from groundwork laid by the classical developmental studies, the rapid advances in cell biology and animal virology, and from models borrowed from prokaryotic systems. Increasingly, the work is directly related to human diseases, including oncogene function and inherited genetic disease.

The Department of Developmental Biology includes a critical mass of scientists who are leading the thrust in developmental biology and who can train new leaders in the attack on the fundamental problems of development. Department labs work on a wide variety of organisms from microbes to worms, flies, and mice. The dramatic evolutionary conservation of genes that regulate development makes the comparative approach of the research particularly effective. Scientists in the department labs have a very high level of interaction and collaboration. The discipline of developmental biology draws on biochemistry, cell biology, genetics, molecular biology, and genomics. People in the department have a major interest in regenerative medicine and stem cell biology.

The department is located in the Beckman Center for Molecular and Genetic Medicine within the Stanford University Medical Center.

### MASTER OF SCIENCE IN DEVELOPMENTAL BIOLOGY

University requirements for the M.S. are described in the "Graduate Degrees" section of this bulletin.

Students in the Ph.D. program in Developmental Biology may apply for an M.S. degree, assuming completion of their course requirements and preparation of a written proposal. The master's degree awarded by the Department of Developmental Biology does not include the possibility of minors for graduate students enrolled in other departments or programs.

Students are required to take, and satisfactorily complete, at least three lecture courses offered by the department, including 210, Developmental Biology. In addition, students are required to take three courses outside the department. Students are also expected to attend Developmental Biology seminars and journal clubs. In addition, the candidate must complete a research paper proposing a specific experimental approach and background in an area of science relative to developmental biology.

### DOCTOR OF PHILOSOPHY IN DEVELOPMENTAL BIOLOGY

University requirements for the Ph.D. are described in the "Graduate Degrees" section of this bulletin.

The graduate program in Developmental Biology leads to the Ph.D. degree. The department also participates in the Medical Scientists Training Program (MSTP) in which individuals are candidates for both the M.D. and Ph.D. degrees.

Students are required to complete at least six courses, including Developmental Biology (210); Advanced Genetics (203); Frontiers in Biological Sciences (215); and an advanced molecular biology, biochemistry, or biophysics course. Students are expected to attend Developmental Biology seminars and journal clubs.

Completion of a qualifying examination is required for admission to Ph.D. candidacy. The examination consists of two parts. One proposal is on a subject different from the dissertation research and the other proposal is on the planned subject of the thesis. The final requirements of the program include presentation of a Ph.D. dissertation as the result of independent investigation and constituting a contribution to knowledge in the area of developmental biology. The student must pass the University oral examination, taken only after the student has substantially completed research. The examination is preceded by a public

seminar in which the research is presented by the candidate. The oral examination is conducted by a dissertation reading committee.

## GENETICS

*Emeritus: (Professor)* Leonard Herzenberg, Uta Francke

*Chair:* Michael Snyder

*Professors:* Russ Altman, Gregory Barsh, Carlos Bustamante, Michele Calos, Stanley Cohen, Ronald Davis, Andrew Fire, Margaret Fuller, Mark Kay, Stuart Kim, Joseph Lipsick, John Pringle, Matthew Scott, Tim Stearns, Anne Villeneuve

*Associate Professors:* Laura Attardi, Julie Baker, Anne Brunet, James Ford, Gavin Sherlock, Arend Sidow, Julien Sage, Zijie Sun, Hua Tang, Douglas Vollrath

*Assistant Professors:* William Greenleaf, Jin Billy Li, Stephen Montgomery, Monte Winslow

*Professor (Research):* Leonore Herzenberg

*Associate Professor (Research):* J. Michael Cherry

*Associate Professor (Teaching):* Kelly Ormond

*Courtesy Professor:* Hank Greely, Alexander Urban

*Lecturer:* Andrea Kwan

*Mail Code:* 94305-5120

*Phone:* (650) 723-3335

*Email:* genetics-info@genome.stanford.edu

*Web Site:* <http://genetics.stanford.edu>

Courses offered by the Department of Genetics are listed under the subject code GENE on the *Stanford Bulletin's* ExploreCourses web site.

## MASTER OF SCIENCE IN HUMAN GENETICS AND GENETIC COUNSELING

The University requirements for the M.S. are described in the "Graduate Degrees" section of this bulletin.

The Department of Genetics offers an M.S. in Human Genetics and Genetic Counseling, which is accredited by the American Board of Genetic Counseling. This program prepares students to practice in the healthcare profession of genetic counseling. The program is a full time two-year program, and accepts students to begin the program only in Autumn Quarter. Students must be admitted directly into this program, and cannot automatically transfer from the Ph.D. programs within the department, or vice versa. While courses are oriented primarily towards genetic counseling students, they may also be taken by medical students, other graduate students, residents or post-doctoral fellows, and (with permission) undergraduates.

The degree requires the completion of clinical rotations and an approved research project. Students must also complete required course work (GENE 271-286), several additional required courses (bioethics, research ethics and developmental biology), and are encouraged to take 2-4 elective courses of their choice, including a research methods elective. Faculty members include members of the Stanford faculty from Genetics, Pediatrics, Obstetrics, Pathology, Developmental Biology, Biomedical Ethics, Law, and Psychology, and practicing genetic counselors and clinical geneticists in various medical centers across the Bay Area.

Applications are due in December (see web site) for admission in the following Autumn Quarter. Applicants should demonstrate a combination of academic preparation, exposure to genetic counseling, and counseling and/or laboratory experiences. Exposure to persons with disabilities or chronic illness is also helpful. Additional information about the program is available at <http://www.med.stanford.edu/genetic-counseling>.

## DOCTOR OF PHILOSOPHY IN GENETICS

University requirements for the Ph.D. degree are described in the "Graduate Degrees" section of this bulletin.

The Ph.D. program in the Department of Genetics offers graduate students the opportunity to pursue a discipline that

encompasses both a set of tools and a coherent way of thinking about biology and medicine. All major areas of genetics are represented in the department, including human genetics (molecular identification of Mendelian traits and the pathophysiology of genetic disease, gene therapy, genetic epidemiology, analysis of complex traits, and human evolution), and application of model organisms such as bacteria, yeast, flies, worms, or mice to basic questions in biomedical research. The department is especially strong in genomic and bioinformatic approaches to genome biology and evolution, and includes several genome-scale databases such as the *Saccharomyces* Genome Database (SGD), the Stanford Microarray Database (SMD), and the Pharmacogenetics and Pharmacogenomics Knowledge Base (PharmGKB) and, administered through the Department of Biochemistry, the Stanford Genome Technology Center (SGTC).

Exposure to the intellectual scope of the department is provided by laboratory rotations, dissertation research, advanced courses in genetics and other areas of biomedical science, seminar series, journal clubs, and an annual three-day retreat of faculty, students, postdoctoral fellows, and staff scientists. Emphasis is placed on interactions and collaborations among students, postdoctoral students, and faculty within the department and throughout the campus.

During their first year, graduate students in the department take graduate courses and sample areas of research by doing rotations in three or four laboratories. At the end of the first three quarters, students may select a laboratory in which to do their dissertation research. While the dissertation research is generally performed in one laboratory, collaborative projects with more than one faculty member are encouraged. In addition to interacting with their faculty preceptor, graduate students receive advice regularly from other faculty members who serve as members of their dissertation committee. Study for the Ph.D. generally requires between four and five years of graduate work, most of which is focused on dissertation research.

Students are generally enrolled in the program to receive the Ph.D. degree, although a limited number of M.D. candidates can combine research training in genetics with their medical studies. Ph.D. candidates who have passed the qualifying exam in the second year can opt to receive the M.S. as a terminal degree.

There are opportunities for graduate students to teach in graduate-level and professional-school courses. In addition, students have the opportunity to participate in educational outreach activities coordinated by the department, which include opportunities to interact with secondary school students and teachers, lay groups, and local science museums.

Students who have recently received a bachelor's, master's, M.D., or Ph.D. degree in related fields may apply for graduate study. Prospective students must have a background in biology, mathematics, physics, and chemistry. Decisions for admission are based on comparison of the relative merits of all the candidates' academic abilities and potential for research and the department's interest in promoting a diverse learning environment. Interviews take place in late February or early March and successful applicants are offered admission by early spring. Students who wish to pursue a combined M.D./Ph.D. degree are considered for admission into the graduate program in the department after they have been admitted to the M.D. program in the School of Medicine.

Students begin graduate studies in Autumn Quarter. Prospective students are encouraged to start the application process early to ensure that they are able to submit a complete application by the December deadline. All students accepted into the Ph.D. program in the Department of Genetics are provided with full tuition and a stipend. Two training grants from the National Institutes of Health provide major support for the graduate training program in the department. Other student support is provided by departmental funds and from research grants, both federal and private, of the faculty. In addition, a number of graduate students are funded by fellowships, including those from the National Science Foundation and the Stanford Graduate Fellows program.

# HEALTH RESEARCH AND POLICY

*Emeriti: (Professors)* Dan Bloch, John Farquhar, Victor R. Fuchs  
*Chair:* Phil Lavori

*Co-Chair:* Robert Tibshirani

*Professors:* Laurence Baker, Bradley Efron, Trevor Hastie, Victor W. Henderson, Mark Hlatky, John Ioannidis, Iain M. Johnstone, Abby C. King, Philip W. Lavori, Ying Lu, Yvonne Maldonado, Richard A. Olshen, Julie Parsonnet, Robert Tibshirani, Alice S. Whittemore, Dee W. West, Wing Wong

*Associate Professor:* M. Kate Bundorf, Lorene M. Nelson, Chiara Sabatti

*Assistant Professors:* Marc Coram, Allison Kurian, Mei-Chiung Shih, Weiva Sieh, Lu Tian

*Assistant Professors (Clinical):* Rita Papat, Kristin Sainani

*Courtesy Professors:* Mary Goldstein, Paul Heidenreich, Daniel Kessler, Alex Macario, Douglas Owens, Paul Wise

*Courtesy Associate Professors:* Jay Bhattacharya, David R. Rogosa

*Courtesy Assistant Professors:* Grant Miller

*Senior Lecturer:* Irene Corso

*Lecturers:* Raymond Balise, Scarlett Gomez, Laurel Habel, De Kun Li, David Lilienfeld, Cynthia O'Malley, Caroline Tanner, Stephen Van Den Eeden

*Consulting Professors:* Gary Friedman, Elizabeth Holly, Marion Lee, George Lundberg, Peggy Reynolds

*Consulting Associate Professors:* Paul Barnett, Sally Glaser, Pamela Horn-Ross, Esther John, Ciaran Phibbs

*Consulting Assistant Professors:* Ellen Chang, Christina Clarke-Dur, Theresa Keegan, Bang Nguyen, Ingrid Oakley-Girvan, Rudy Rull, Todd Wagner

*Mail Code:* 94305-5405

*Phone:* (650) 723-5456

*Web Site:* <http://hrp.stanford.edu>

Courses offered by the Department of Health Research and Policy are listed under the subject code HRP on the *Stanford Bulletin's* ExploreCourses web site.

The Department of Health Research and Policy has three principal areas of scholarly interest:

1. Biostatistics deals with scientific methodology in the medical sciences, emphasizing the use of statistical techniques.
2. Epidemiology is the study of the distribution and determinants of illness and impairment in human populations. Epidemiology training provides analytic tools for clinical and translational research, including studies of disease etiology, prevention, and therapy.
3. Health Services Research is concerned with many aspects of health policy analysis in the public and private sectors

## GRADUATE PROGRAMS IN HEALTH RESEARCH POLICY

The Program in Epidemiology and the Program in Health Services Research are housed in the Department of Health Research and Policy. These programs offer M.S. degrees in Epidemiology and in Health Services Research. Students with an interest in pursuing advanced degrees with an emphasis on biostatistics can do so through programs offered by the Department of Statistics. Division of Biostatistics faculty participate in these programs.

For additional information, address inquiries to the Educational Coordinator, Department of Health Research and Policy, Stanford University School of Medicine, HRP Redwood Building, Room T-152F, Stanford, California 94305-5405.

## HEALTH SERVICES RESEARCH

*Director:* Mark Hlatky (Professor, Health Research and Policy, and Medicine)

*Executive Committee:* Laurence Baker (Professor, Health Research and Policy), M. Kate Bundorf (Associate Professor, Health Research and Policy), Mary Goldstein (Professor, Medicine), Mark Hlatky (Professor, Health Research and Policy, and Medicine), Douglas Owens (Professor, Medicine)

### **Participating Faculty and Staff by Department:**

*Anesthesia:* Alex Macario (Professor)

*Business:* Alain Enthoven (Professor, emeritus)

*Health Research and Policy:* Laurence Baker (Professor), Paul Barnett (Consulting Associate Professor), M. Kate Bundorf (Associate Professor), Victor Fuchs (Professor, emeritus), Trevor Hastie (Professor), Mark Hlatky (Professor), Philip Lavori (Professor), Richard Olshen (Professor), Ciaran Phibbs (Consulting Associate Professor), Joseph Selby (Consulting Professor), Robert Tibshirani (Professor)

*Law:* Henry Greeley (Professor), Daniel Kessler (Professor)

*Management Science and Engineering:* Margaret Brandeau (Professor)

*Medicine:* Jay Bhattacharya (Associate Professor), Jeremy Goldhaber-Fiebert (Assistant Professor), Mary Goldstein (Professor), Michael Gould (Associate Professor), Paul Heidenreich (Associate Professor), Mark Hlatky (Professor), Grant Miller (Assistant Professor), Douglas Owens (Professor), Wolfgang Winkelmayr (Associate Professor)

*Pediatrics:* Paul Wise (Professor)

*Psychiatry:* Rudolph Moos (Professor, emeritus)

*Sociology:* Richard Scott (Professor, emeritus)

*Program Offices:* HRP Redwood Building, Room T152F

*Mail Code:* 94305-5405

*Phone:* (650) 723-5456

*Email:* [hsr-program@med.stanford.edu](mailto:hsr-program@med.stanford.edu)

*Web Site:* <http://med.stanford.edu/hsr>

## MASTER OF SCIENCE IN HEALTH SERVICES RESEARCH

The master's degree program in Health Services Research seeks to train students in the quantitative analysis of issues in health and medical care. The program emphasizes an individually designed program of course work and completion of a master's project under the mentorship of a faculty member. The typical student in the program is either a physician who has completed residency training and is preparing for a research career, or a student with a strong background in policy analysis who wishes to focus on problems in health or medical care. Faculty interests include outcomes research, health economics, health care organization, health care access, quality of care, decision analysis, clinical guidelines, and assessment of patient preferences and quality of life.

To receive the degree, students are expected to demonstrate knowledge of issues in health services research and the quantitative skills necessary for research in this area. Students must take at least 45 units of course work and write a University thesis. The course work requirements are:

1. At least 8 units from the following group of Health Research and Policy (HRP) core courses: HRP 256, Economics of Health and Medical Care; HRP 391, Health Care Regulation; HRP 392, Analysis of Costs, Risks, and Benefits in Health Care.
2. At least 6 units of graduate-level statistics courses. The sequence of HRP 261, Intermediate Biostatistics: Analysis of Discrete Data; and HRP 262, Intermediate Biostatistics: Regression, Prediction, Survival Analysis, is strongly recommended.
3. At least 3 units of HRP 283, Health Services Research Core Seminar.
4. At least 15 units of HRP research credit from HRP 299, Directed Reading, or HRP 399, Research.
5. An additional set of approved elective courses to complete the program total of at least 45 units.

For additional information, address inquiries to the Educational Coordinator, Department of Health Research and Policy, Stanford University School of Medicine, HRP Redwood Building, Room T138C, Stanford, California 94305-5405.

## EPIDEMIOLOGY

*Director:* Victor W. Henderson (Professor, Health Research and Policy, and Neurology and Neurological Sciences)

*Core Faculty and Academic Teaching Staff:* Raymond R. Balise (Lecturer, Health Research and Policy), Gary D. Friedman (Consulting Professor, Health Research and Policy), Victor W. Henderson (Professor, Health Research and Policy, and Neurology and Neurological Sciences), Abby C. King (Professor, Health Research and Policy, and Medicine), Allison Kurian (Assistant Professor, Medicine, and Health Research and Policy), Philip Lavori (Professor, Health Research and Policy), Yvonne A. Maldonado (Professor, Pediatrics), Lorene M. Nelson (Associate Professor, Health Research and Policy), Julie Parsonnet (Professor, Medicine, and Health Research and Policy), Rita A. Popat (Clinical Assistant Professor, Health Research and Policy), Kristin L. Sainani (Clinical Assistant Professor, Health Research and Policy), Weiva Sieh (Assistant Professor, Health Research and Policy), Dee W. West (Professor, Health Research and Policy), Alice S. Whittemore (Professor, Health Research and Policy)

*Program Offices:* HRP Redwood Building, Room T152F

*Mail Code:* 94305-5405

*Phone:* (650) 723-5456

*Email:* [epiprogram@med.stanford.edu](mailto:epiprogram@med.stanford.edu)

*Web Site:* <http://www.stanford.edu/dept/HRP/epidemiology>

## MASTER OF SCIENCE IN EPIDEMIOLOGY

The Graduate Program in Epidemiology offers instruction and interdisciplinary research opportunities leading to the M.S. degree in Epidemiology. Epidemiology is the study of the distribution and determinants of illness and impairment in human populations. It is important in its own right, and epidemiologic methods are used by clinical investigators and by other scientists who conduct observational and experimental research on the identification, prevention, and treatment of human disorders.

Core and affiliated faculty come from the Department of Health Research and Policy; other Stanford University departments, and notable Bay Area research facilities. The Program has particular strengths in cancer epidemiology, cardiovascular disease epidemiology, infectious disease epidemiology, musculoskeletal disease epidemiology, neuroepidemiology, and aspects of epidemiologic methods, genetic epidemiology, and reproductive epidemiology and women's health.

The mission of the Stanford University School of Medicine is to be a premier research-intensive medical school that improves health through leadership and collaborative discoveries and innovation in patient care, education and research. With support from a NIH Clinical and Translational Science Award, the graduate program in Epidemiology fosters this mission through the training of physician investigators in techniques of clinical research. The department also considers students from other disciplines who would benefit from formal training in epidemiologic methods.

A typical student has the M.D. degree and is in the fellowship stage of his or her postgraduate training, or in an early stage of faculty development. Other students may not have prior clinical training. These may include behavioral, social, and life scientists; law students; and students with the baccalaureate degree. They may wish to bring an epidemiologic orientation to their research or practice, or they may be considering careers in epidemiology or a related discipline.

To receive the M.S. degree, students are expected to obtain a grounding in epidemiologic methods and applied biostatistics and to demonstrate research skills through the completion of a thesis. Students must complete at least 45 units of course work:

1. Epidemiologic methods: HRP 225, Design and Conduct of Clinical and Epidemiologic Studies; HRP 226, Advanced Epidemiologic and Clinical Research Methods; HRP 251, Design and Conduct of Clinical Trials.
2. Biostatistics: HRP 259, Introduction to Probability and Statistics for Epidemiology; HRP 261, Intermediate Biostatistics: Analysis of Discrete Data; HRP 262, Intermediate Biostatistics: Regression, Prediction, Survival Analysis.
3. Research seminars: HRP 236, Epidemiology Research Seminar (at least 3 units).
4. Research: HRP 399, Master thesis (at least 12 units).
5. Research conduct: Students must complete MED 255, Responsible Conduct of Research, and attend a Human Subjects Institutional Review Board meeting.
6. Additional approved selective and elective courses to complete the program total of at least 45 units.

Students are assigned a methodology mentor from the Department of Health Research and Policy, and they also select a research mentor, who may be from another department. For physicians, the research mentor is often an affiliated faculty member from the department of the student's clinical specialty.

University requirements for the M.S. degree are described in the "Graduate Degrees" section of this bulletin. Other programmatic requirements are in *Graduate Program in Epidemiology, Information and Guidelines*, available from the educational coordinator in the Department of Health Research and Policy.

## IMMUNOLOGY

*Chair, Executive Committee for the Immunology Program:* Patricia Jones (Professor, Biology)

*Director for Immunology Program:* Olivia Martinez (Professor, Research, Surgery, Transplantation)

### **Participating Departments and Faculty:**

*Biology:* Patricia P. Jones (Professor)

*Genetics:* Leonard A. Herzenberg (Professor, emeritus), Leonore A. Herzenberg (Professor, Research),

*Medicine/Blood and Bone Marrow Transplantation Program:* Robert Negrin (Professor), David Miklos (Assistant Professor), Judith Shizuru (Associate Professor)

*Medicine/Cardiovascular Medicine:* Joseph Wu (Assistant Professor, and Radiology and Institute for Stem Cell and Regenerative Medicine)

*Medicine/Gastroenterology and Hepatology:* Aida Habtezion (Assistant Professor)

*Medicine/Hematology:* Calvin Kuo (Associate Professor, and Chemical Systems Biology), Peter Lee (Associate Professor), Ravi Majeti (Assistant Professor, and Institute for Stem Cell and Regenerative Medicine)

*Medicine/Immunology and Rheumatology:* C. Garrison Fathman (Professor), Jorg Goronzy (Professor), William Robinson (Associate Professor), Samuel Strober (Professor), Paul J. Utz (Associate Professor), Cornelia Weyand (Professor)

*Medicine/Infectious Diseases:* Robert Shafer (Associate Professor, Research, and Pathology)

*Medicine/Oncology:* Ash Alizadeh (Assistant Professor), Gilbert Chu (Professor, and Biochemistry), Dean Felsher (Associate Professor, and Pathology), Ronald Levy (Professor), Shoshana Levy (Professor, Research)

*Medicine/Pulmonary and Critical Care Medicine:* Mark Nicolls (Associate Professor)

*Microbiology and Immunology:* John Boothroyd (Professor), Chang-Zheng Chen (Assistant Professor), Yueh-Hsiu Chien (Professor), Mark M. Davis (Professor, and Director, Institute for Immunity, Transplantation and Infection), Hugh McDavitt (Professor,emeritus), Garry P. Nolan (Professor), David Schneider (Associate Professor)



*Molecular and Cellular Physiology:* K. Christopher Garcia (Professor, and Structural Biology), Richard S. Lewis (Professor)

*Neurology and Neurological Sciences:* May Han (Assistant Professor), Lawrence Steinman (Professor, and Pediatrics), Tony Wyss-Coray (Associate Professor, Research)

*Neurosurgery:* Theo Palmer (Associate Professor)

*Otolaryngology/Head and Neck Surgery (ENT):* John B. Sunwoo (Assistant Professor)

*Pathology:* Eugene C. Butcher (Professor), Michael Cleary (Professor), Gerald R. Crabtree (Professor, and Developmental Biology), Edgar G. Engleman (Professor, and Medicine/Immunology and Rheumatology), Magali Fontaine (Assistant Professor), Stephen Galli (Professor and Chair), Sara Michie (Professor), Raymond A. Sobel (Professor), Irving Weissman (Professor, and Director, Stem Cell Institute)

*Pediatrics:* Ann Arvin (Professor, and Microbiology and Immunology), Atul Butte (Associate Professor, Immunology and Rheumatology, and Computer Science), Manish Butte (Assistant Professor), Christopher Contag (Professor, Research, and Microbiology and Immunology, and Radiology), David B. Lewis (Professor), Elizabeth Mellins (Associate Professor), Kari Nadeau (Assistant Professor), Minnie Sarwal (Professor)

*Psychiatry and Behavioral Sciences:* Firdaus Dhabhar (Associate Professor), Emmanuel Mignot (Professor)

*Structural Biology:* Peter Parham (Professor, and Microbiology and Immunology)

*Surgery/Multi-Organ Transplantation:* Sheri Krams (Associate Professor, Research), Olivia Martinez (Professor, Research)

*Urology:* Michael Hsieh (Assistant Professor)

\* Recalled to active duty

Mail Code: 94305-5422

Phone: (650) 725-5076

Email: mopan@stanford.edu

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

Courses offered by the Immunology Program are listed under the subject code IMMUNOL on the *Stanford Bulletin's* ExploreCourses web site.

## MASTER OF SCIENCE IN IMMUNOLOGY

Students in the Ph.D. program in Immunology may apply for an M.S. degree in Immunology only under special circumstances, assuming completion of appropriate requirements. Students must complete:

- At least 45 units of academic work, all of which must be in courses at or above the 100 level, 36 units of which must be at or above the 200 level.
- 2-3 quarters of graduate research (IMMUNOL 399), consisting of rotations in the labs of three faculty members.
- Course work in Immunology as follows:
  - Basic Immunology. For graduate students, BIO 230A, Molecular and Cellular Immunology Literature Review; for medical students, IMMUNOL 205, Immunology in Human Health and Disease or equivalent
  - Advanced Immunology such as IMMUNOL 201, 202, and 203
  - IMMUNOL 215. Principles of Biological Technologies, or another techniques course by permission
  - In addition, the student may take one elective course. Some possible electives are:
    - MPHA 210. Signal Transduction Pathways and Networks
    - SBIO 241. Biological Macromolecules
    - CBIO 241. Molecular, Cellular, and Genetic Basis of Cancer
    - DBIO 210. Developmental Biology.
- Students have the option to select from two of the following three courses in the first year:
  - GENE 203. Advanced Genetics
  - BIO 214. Advanced Cell Biology

- MI 210. Advanced Pathogenesis of Bacteria, Viruses, and Eukaryotic Parasites

- Graduate-level biochemistry and molecular biology (BIOC 220).
- Course work in IMMUNOL 311, Seminar in Immunology, and IMMUNOL 311A, Seminar Discussion in Immunology.
- Participation in the Immunology journal club (IMMUNOL 305), and attendance at the Immunology seminar series and at the annual Stanford Immunology Scientific Conference.
- First Year Rotations Presentations, mid-July. Students present on one out of three lab rotations.
- Students must submit a master's thesis paper on one of their rotations. This requirement may be waived under special circumstances.

## DOCTOR OF PHILOSOPHY IN IMMUNOLOGY

University requirements for the Ph.D. are described in the "Graduate Degrees" section of this bulletin.

The Immunology Program offers instruction and research opportunities leading to a Ph.D. in Immunology. The goal of the program is to develop investigators who have a solid foundation in Immunology and related sciences to carry out innovative research. The program features a flexible choice of courses and seminars combined with extensive research training in the laboratories of participating Immunology faculty.

Students applying to the program typically have an undergraduate major in biological sciences, but majors in other areas are acceptable if the applicants have had sufficient course work in biology and chemistry. Formal application should be made by December 1st. Applications are evaluated by the Immunology predoctoral committee based upon: GRE scores; grades; evidence of research experience; letters of recommendation, including letters from research sponsor(s); and commitment to a career in biomedical research. Subject tests are not required. Interested Stanford medical students are welcome to apply to the program and should submit a formal application by December 1.

Students admitted to the program are offered financial support covering tuition, a living stipend, insurance coverage, and an allowance for books/travel. Applicants are urged to apply for independent fellowships such as from the National Science Foundation. Fellowship applications are due in November of the year prior to matriculation in the graduate program, but Immunology graduate students may continue to apply for outside fellowships after matriculation. The PhD Program has a limited number of department-funded slots for trainees such that students who have been awarded an outside fellowship are also encouraged to apply. On matriculation, each student is assisted by a first-year advising committee in selecting courses and lab rotations in the first year and in choosing a lab for the dissertation research. Once a dissertation adviser has been selected, a dissertation committee including the dissertation adviser and two additional Immunology faculty, is constituted to guide the student during the dissertation research. The student must meet with the dissertation committee at least once a year.

Candidates for Ph.D. degrees at Stanford must satisfactorily complete a program of study that includes 135 units of graduate course work and research. At least 3 units must be taken with each of four different Stanford faculty members. All core course requirements must be completed by the end of the second year.

*Requirements for the Ph.D. degree in Immunology include—*

- Training in biology and cognate disciplines equivalent to that provided by the undergraduate Biology major at Stanford.
- Completion of the following courses (or their equivalents from undergraduate work):
  - Basic Immunology (BIO 230A, Molecular and Cellular Immunology Literature Review)
  - Advanced Immunology (IMMUNOL 201, 202, 203)
  - Two of the following three courses: Gen 203. Advanced Genetics, Bio 214. Advanced Cell biology, MI 210.

- Advanced Pathogenesis of Bacteria, Viruses, and Eukaryotic Parasites
- d. Chemistry of Biological Processes (BIOC 220)
  - e. Biostatistics (BIO 141 or STATS 141)
  - f. Principles of Biological Technologies (IMMUNOL 215) or another techniques course by permission
  - g. One elective course; suggested courses include: MPHA 210. Signal Transduction Pathways and Networks, SBIO 241. Biological Macromolecules, CBIO 241. Cancer Biology, DBIO 210. Developmental Biology
  - h. MED 255. Responsible Conduct in Science
  - i. IMMUNOL 305. Immunology Journal Club
3. Prior to enrolling for Autumn Quarter, first-year students are required to read Janeway's *Immunobiology*, 8th edition, in preparation for their graduate studies. First-year students are required to take both the IMMUNOL 311, Seminar in Immunology, and the companion course, IMMUNOL 311A, Seminar Discussion in Immunology, and participate in IMMUNOL 305, Immunology Journal Club.
  4. Students in their second year and above must participate in the IMMUNOL 311, Seminars in Immunology (4:00 pm, Tuesdays) and may opt to take the companion course, IMMUNOL 311A, in which students read the papers of visiting seminar speakers and meet to discuss the material. Students who have not yet achieved TGR status must register for 1 unit for IMMUNOL 311.
  5. Participation (through regular attendance and oral presentation) in the Immunology journal clubs for the first three years (IMMUNOL 305).
  6. Elective courses as agreed upon by the student, adviser, and advisory committee. Electives may be chosen from graduate courses and seminars in any of the biomedical science departments and programs.
  7. Students must complete three one quarter rotations in the first year. Medical students who are accepted into the Ph.D. program must also complete three rotations. First year students, including MSTP and MD/PhD students, present one out of their three lab rotations (First Year Rotation Presentation, mid-July). The faculty advising and feedback portion of the First Year Rotation Presentation also is an important opportunity for the Predoctoral Committee to give critical advice and comments to students in choosing mentors and relevant courses.
  8. The students complete their Qualifying Examination before December 17th, the Autumn Quarter of the Second Year. Students must submit to a general oral examination of broad fields in immunology and defend a research proposal on their dissertation research.
  9. Students may apply for Ph.D. candidacy upon successful completion of the First Year Rotation Presentations and the Qualifying Examination -- General Oral examination and the Research Proposal. Administration and evaluation of these requirements leading to Ph.D. candidacy is the responsibility of the Predoctoral Committee; the student's dissertation committee is responsible for advising the student through the research and other elective courses as needed towards the completion of the Ph.D. dissertation.
  10. Teaching assistantships in two Immunology courses (IMMUNOL 290, Teaching in Immunology). Before fulfilling their teaching assistantships, Immunology graduate students are required to attend a teaching assistantship orientation offered at the beginning of every quarter by the Center for Teaching and Learning. MSTP students may submit one of their medical school TAs as partial fulfillment of the TA requirement for the Ph.D. in Immunology.
  11. Students are required to attend the annual Stanford Immunology Scientific Conference. Students are required to give one poster and one scientific presentation at these annual Stanford Immunology scientific conferences. Fourth-year and above students present their current research to fellow students and faculty in a monthly forum, The Next Generation.

12. Students must pass the University oral examination on the dissertation research, which is to be taken only after the student has substantially completed the research. The examination is preceded by a public seminar in which the candidate presents his/her research.
13. A Ph.D. dissertation, resulting from independent investigation that constitutes a contribution to knowledge in the area of immunology but be submitted to and approved by the Thesis Committee.

## MICROBIOLOGY AND IMMUNOLOGY

*Emeriti: (Professors)* Stanley Falkow, Hugh O. McDevitt, Edward S. Mocarski, Sidney Raffel, Leon T. Rosenberg

*Chair:* Peter Sarnow

*Associate Chair:* Stanley Falkow

*Professors:* Ann Arvin, Helen Blau, John C. Boothroyd, Yueh-Hsiu Chien, Mark M. Davis, Stephen J. Galli, Harry B. Greenberg, Karla Kirkegaard, A. C. Matin, Garry Nolan, Peter Parham, Phillip Pizzo, Charles Prober, David Relman, Peter Sarnow, Gary K. Schoolnik, Lucy S. Tompkins

*Associate Professors:* Matthew Bogyo, Christopher Contag, David Schneider, Julie Theriot

*Assistant Professors:* Manuel Amieva, Chang-Zheng Chen, Denise Monack, Upinder Singh, Justin Sonnenburg

*Acting Assistant Professor:* Jan Carette

*Associate Professor (Teaching):* Robert D. Siegel

Institute for Immunity, Transplantation and Infection

Director, Human Immune Monitoring Center and Senior Research Scientist: Holden Maecker

*Department Offices:* D300 Fairchild Building, 299 Campus Drive

*Mail Code:* 94305-5124

*Phone:* (650) 725-8541

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*Web Site:* <http://microimmuno.stanford.edu>

Courses offered by the Department of Microbiology and Immunology are listed under the subject code MI on the *Stanford Bulletin's* ExploreCourses web site.

## GRADUATE PROGRAMS IN MICROBIOLOGY AND IMMUNOLOGY

The Department of Microbiology and Immunology offers a program of training leading to the Ph.D. degree, as well as research training, courses, and seminars for medical students and postdoctoral fellows. Research interests focus on two broad areas: host/parasite interactions, and the function of the immune system. Laboratories investigate mechanisms of pathogenesis and the physiology of viruses, bacteria, and protozoan parasites, as well as the lymphocyte function in antigen recognition, immune response, and autoimmunity.

## MASTER OF SCIENCE

A regular M.S. program is not offered, although this degree is awarded under special circumstances. Candidates for master's degrees are expected to have completed the preliminary requirements for the B.S. degree, or the equivalent. In addition, the candidate is expected to complete 45 quarter units of work related to microbiology; at least 25 of these units should concern research devoted to a thesis. The thesis must be approved by at least two members of the department faculty.

## DOCTOR OF PHILOSOPHY IN MICROBIOLOGY AND IMMUNOLOGY

University requirements for the Ph.D. are described in the "Graduate Degrees" section of this bulletin.

*Application, Admission, and Financial Aid*—Prospective Ph.D. candidates should have completed a bachelor's degree in a discipline of biology or chemistry, including course work in biochemistry, chemistry, genetics, immunology, microbiology, and molecular biology. The deadline for receipt of applications with all supporting materials is December 1.

Applicants must file a report of scores on the general subject tests of the Graduate Record Examination (GRE). It is strongly recommended that the GRE be taken before October so that scores are available when applications are evaluated.

In the absence of independent fellowship support, entering predoctoral students are fully supported with a stipend and tuition award. Highly qualified applicants may be honored by a nomination for a Stanford Graduate Fellowship. Successful applicants have been competitive for predoctoral fellowships such as those from the National Science Foundation.

*Program for Graduate Study*—The Ph.D. degree requires course work and independent research demonstrating an individual's creative, scholastic, and intellectual abilities. On entering the department, students meet an advisory faculty member; together they design a timetable for completion of the degree requirements. Typically, this consists of first identifying gaps in the student's undergraduate education and determining courses that should be taken. Then, a tentative plan is made for two to four lab rotations (one rotation per quarter). During the first year of graduate study in the department, each student also takes six or seven upper-level (200-series) courses. Three of these courses are requirements of the department: MI 215, Principles of Biological Techniques; MI 230, Medical Microbiology and Infectious Diseases; and MI 210, Advanced Pathogenesis of Bacteria, Viruses, and Eukaryotic Parasites. Three courses are part of the core curriculum that is required of many graduate students in Stanford Biosciences: BIO 203 /DBIO 203 /GENE 203, Advanced Genetics; BIO 230, Molecular and Cellular Immunology; and BIO 214/BIOC 224, Advanced Cell Biology.

In Autumn Quarter of the second year, a research proposal based on the student's own thesis topic is defended to the thesis committee. In Spring Quarter of the second year, each student defends orally a formal research proposal on a topic outside the intended thesis project. This qualifying examination proposal is due to the graduate program steering committee by May 1. Based on successful performance on this proposal, the student is admitted to candidacy. Teaching experience and training are also part of the graduate curriculum. Graduate students are required to act as teaching assistants for two courses. In addition, first- and second-year graduate students are required to participate in a bi-weekly journal club.

## MOLECULAR AND CELLULAR PHYSIOLOGY

*Chair:* Brian K. Kobilka

*Professors:* Axel T. Brunger, K. Christopher Garcia, Brian K. Kobilka, Richard S. Lewis, W. James Nelson, Stephen J. Smith, Thomas C. Sudhof, William Weis

*Associate Professors:* John Huguenaud, V. Daniel Madison, Merritt C. Maduke, Miriam B. Goodman

*Assistant Professors:* Maxence V. Nachury

*Courtesy Associate Professors:* Stefan Heller, Anthony J. Ricci

*Courtesy Assistant Professor:* Richard J. Reimer

*Department Offices:* Beckman Center, B100

*Mail Code:* 94305-5345

*Phone:* (650) 725-7554

*Email:* schantae@stanford.edu

*Web Site:* <http://mcp.stanford.edu>

Courses offered by the Department of Molecular and Cellular Physiology are listed under the subject code MCP on the *Stanford Bulletin's* ExploreCourses web site.

The Department of Molecular and Cellular Physiology is located in the Beckman Center for Molecular and Genetic Medicine.

A central goal of physiology in the post-genomic era is to understand how thousands of encoded proteins serve to bring about the highly coordinated behavior of cells and tissues. Research in the department approaches this goal at many levels of organization, ranging from single molecules and individual cells to multicellular systems and the whole organism. The faculty share common interests in the molecular mechanisms of cell signaling and behavior, with a special focus on structure/function analysis of ion channels and G-protein coupled receptors, and their roles at the cellular, organ, and whole-organism levels; the molecular basis of sensory transduction, synaptic transmission, plasticity and memory; the role of ion channels and calcium in controlling gene expression in neural and immune cells; and the regulation of vesicle trafficking and targeting, cell polarity, and cell-cell interactions in the nervous system and in epithelia. Research programs employ a wide range of approaches, including molecular and cell biology, biochemistry, genetics, biophysics, x-ray crystallography and solution NMR, electrophysiology, and *in vitro* and *in vivo* imaging with confocal and multi-photon microscopy.

### GRADUATE PROGRAMS IN MOLECULAR AND CELLULAR PHYSIOLOGY

The department offers required and elective courses for students in the School of Medicine and is also open to other qualified students with the consent of the instructor. Training of medical, graduate, and postdoctoral students is available. The program offers a course of study leading to the Ph.D. degree. No B.S. is offered, and an M.S. is offered only in the unusual circumstance where a student completes the course work, rotation, and the written section of the qualifying exam, but is unable to complete the requirements for the Ph.D.

### DOCTOR OF PHILOSOPHY IN MOLECULAR AND CELLULAR PHYSIOLOGY

Students with undergraduate or master's degrees who have completed a year each of college chemistry (including lectures in organic and physical chemistry), physics, calculus, and biology are considered for admission to graduate study. Applicants submit a report of scores from the Graduate Record Examination (verbal, quantitative, analytical, and an advanced subject test in one of the sciences) as part of the application. Students who do not speak English as their native language must submit scores from TOEFL unless waived by Graduate Admissions.

Study toward the Ph.D. is expected to occupy five years, including summers. A minimum of six quarter-long courses is required. These include four graduate-level courses (200-300 series) and a choice of two out of these three courses: MCP 221, MCP 258, and MCP 256. Students are also required to take the Molecular and Cellular Physiology Seminar/Research In Progress series. Each student presents a talk on research in progress to the department at least every other year, starting their second year. Grades for course work must be a minimum of 'B-', and at least two grades equal to 'A-' or above are necessary but not sufficient for continuation in the program.

*Qualifying Examination*—At the end of the second year in residence as a graduate student, each Ph.D. candidate presents a written thesis proposal to be defended at an oral comprehensive examination. The examinations may be taken only after all course work has been completed by the required standard. Students undertake individual research studies as early as possible after consultation with their preceptor. Upon passing this exam, the student is advanced to candidacy for the Ph.D.

*Dissertation and University Oral Examination*—The results of independent, original work by the students are presented in a

dissertation. The oral examination is largely a defense of the dissertation.

**Advisers and Advisory Committees**—A graduate advisory committee, currently professors Kobilka, Lewis, Nachury and Madison, advises students during the period before the formation of their qualifying committees.

**Financial Aid**—Students may be funded by their advisers' research grants, by training grants, by department funds, or by extramural funds. Students are encouraged to obtain funding from outside sources such as NIH and NSF.

## NEUROBIOLOGY

**Emeritus:** Denis Baylor, Uel J. McMahan, Eric Shooter, Lubert Stryer

**Chair:** Ben Barres

**Professors:** Eric I. Knudsen, William T. Newsome

**Associate Professors:** Thomas Clandinin, Ricardo Dolmetsch, Tirin Moore, Jennifer Raymond

**Assistant Professor:** Stephen Baccus

**Department Offices:** Fairchild Building, Second Floor

**Mail Code:** 94305-5125

**Web Site:** <http://neurobiology.stanford.edu>

Courses offered by the Department of Neurobiology are listed under the subject code NBIO on the *Stanford Bulletin's* ExploreCourses web site.

## GRADUATE PROGRAM IN NEUROBIOLOGY

Graduate students in the Department of Neurobiology obtain the Ph.D. degree through the interdepartmental Neurosciences Ph.D. program. Accepted students receive funding for tuition and a living stipend. Applicants should familiarize themselves with the research interests of the faculty and, if possible, indicate their preference on the application form which is submitted directly to the Neurosciences Program.

Medical students also are encouraged to enroll in the Ph.D. program. The requirements of the Ph.D. program are fitted to the interests and time schedules of the student. Postdoctoral training is available to graduates holding Ph.D. or M.D. degrees, and further information is obtained directly from the faculty member concerned.

Research interests of the department include information processing in vertebrate retina; structure, function, and development of auditory and visual systems; development and regeneration in the central and peripheral nervous system; neural mechanisms mediating higher nervous system functions, including perception, learning, attention and decision making.

## NEUROSCIENCES

**Director:** John R. Huguenard (Professor, Neurology and Neurological Sciences)

**Committee:** Katrin Andreasson, Paul S. Buckmaster, Thomas Clandinin, Luis de Lecea, Craig Garner, John R. Huguenard, Fei-Fei Li, Merritt Maduke, Samuel McClure, Anthony Ricci, Carla Shatz

### Participating Faculty:

**Anesthesia:** Rona Giffard (Professor), M. Bruce MacIver (Professor, Research), Sean Mackey (Associate Professor), David Yeomans (Associate Professor)

**Applied Physics:** Mark Schnitzer (Associate Professor)

**Bioengineering:** Kwabena Boahen (Associate Professor), Jennifer Cochran (Assistant Professor), Karl Deisseroth (Associate Professor), Scott Delp (Professor), Michael Lin (Assistant Professor), Matthew Scott (Professor)

**Biology:** Marcus Feldman (Professor), Russell D. Fernald (Professor), William F. Gilly (Professor), H. Craig Heller

(Professor), Ron Kopito (Professor), Liquan Luo (Professor), Susan McConnell (Professor), Robert M. Sapolsky (Professor), Mark Schnitzer (Associate Professor), Carla Shatz (Professor), Kang Shen (Associate Professor), Stuart Thompson (Professor)

**Chemical and Systems Biology:** Tobias Meyer (Professor), Daria Mochly-Rosen (Professor)

**Comparative Medicine:** Paul S. Buckmaster (Associate Professor), Corinna Darian-Smith (Associate Professor), Shaul Hestrin (Associate Professor)

**Computer Science:** Fei-Fei Li (Assistant Professor)

**Developmental Biology:** Ben Barres (Professor), Seung Kim (Professor), David Kingsley (Professor), Matthew P. Scott (Professor)

**Electrical Engineering:** Krishna Shenoy (Associate Professor)

**Genetics:** Anne Brunet (Associate Professor), Matthew Scott (Professor)

**Microbiology and Immunology:** Helen Blau (Professor)

**Molecular and Cellular Physiology:** Axel Brunger (Professor), Miriam B. Goodman (Associate Professor), Brian Kobilka (Professor), Richard S. Lewis (Professor), Daniel V. Madison (Associate Professor), Merritt C. Maduke (Associate Professor), Stephen Smith (Professor), Thomas Sudhof (Professor), Richard Tsien (Professor)

**Neurobiology:** Stephen Baccus (Assistant Professor), Ben Barres (Professor), Tom Clandinin (Associate Professor), Ricardo Dolmetsch (Associate Professor), Eric I. Knudsen (Professor), U. J. McMahan (Professor), Tirin Moore (Assistant Professor), William T. Newsome (Professor), Jennifer Raymond (Associate Professor), Carla Shatz (Professor)

**Neurology and Neurological Sciences:** Katrin Andreasson (Associate Professor), Ben Barres (Professor), Helen Bronte-Stewart (Associate Professor), Paul Buckmaster (Associate Professor), Robert S. Fisher (Professor), Michael Greicius (Assistant Professor), May Han (Assistant Professor), Ting-Ting Huang (Associate Professor, Research), John A. Huguenard (Professor), Frank Longo (Professor), Josef Parvizi (Assistant Professor), Kathleen Poston (Assistant Professor), David A. Prince (Professor), Thomas A. Rando (Professor), Lawrence Recht (Professor), Richard Reimer (Associate Professor), Robert M. Sapolsky (Professor), Lawrence Steinman (Professor), Tony Wyss-Coray (Associate Professor, Research), Yanmin Yang (Associate Professor)

**Neurosurgery:** Marion Buckwalter (Assistant Professor), Pak H. Chan (Professor), Theo Palmer (Associate Professor), Giles Plant (Associate Professor), Gary K. Steinberg (Professor), Heng Zhao (Assistant Professor, Research)

**Ophthalmology:** Yaping Joyce Liao (Assistant Professor)

**Otolaryngology:** Stefan Heller (Professor), Mirna Mustapha (Assistant Professor), Anthony Ricci (Professor)

**Pathology:** Isabella Graef (Assistant Professor), Bingwei Lu (Associate Professor), Raymond Sobel (Professor), Marius Wernig (Assistant Professor)

**Pediatrics:** Heidi Feldman (Professor), Michael Lin (Assistant Professor), Anna Penn (Assistant Professor), Lawrence Steinman (Professor)

**Philosophy:** Patrick Suppes (Professor, emeritus)

**Psychiatry and Behavioral Sciences:** Lu Chen (Associate Professor), Amit Etkin (Assistant Professor), Karl Deisseroth (Associate Professor), Luis de Lecea (Associate Professor), Firdaus Dhabhar (Associate Professor), Craig Garner (Professor), Terrence A. Ketter (Professor), David Lyons (Associate Professor, Research), Robert C. Malenka (Professor), Vinod Menon (Professor, Research), Emmanuel Mignot (Professor), Karen Parker (Assistant Professor), Natalie Rasgon (Professor), Allan L. Reiss (Professor), Edith Sullivan (Professor, Research), Jamie Zeitzer (Assistant Professor)

**Psychology:** Lera Boroditsky (Assistant Professor), Ian Gotlib (Professor), Kalanit Grill-Spector (Associate Professor), James J. Gross (Professor), Brian Knutson (Associate Professor), James McClelland (Professor), Samuel McClure (Assistant Professor), Anthony Norcia (Professor), Anthony Wagner

(Associate Professor), Brian Wandell (Professor), Jeffrey J. Wine (Professor)

*Radiology:* Gary H. Glover (Professor)

*Structural Biology:* U. J. McMahan (Professor, emeritus)

*Program Offices:* 1215 Welch Road, Modular B, #46

*Mail Code:* 94305-5400

*Phone:* (650) 723-9855

*Web Site:* [http://neuroscience.stanford.edu/education/phd\\_program](http://neuroscience.stanford.edu/education/phd_program)

Courses offered by the Neurosciences Program are listed under the subject code NEPR on the *Stanford Bulletin's* ExploreCourses web site.

## DOCTOR OF PHILOSOPHY IN NEUROSCIENCES

University requirements for the Ph.D. are described in the "Graduate Degrees" section of this bulletin.

The interdepartmental Neurosciences Program offers instruction and research opportunities leading to a Ph.D. in Neurosciences. The requirements for a Ph.D. degree follow those of the University and in addition are tailored to fit the background and interests of the student. Accepted students receive an award covering tuition, a basic health plan, and a living stipend. Qualified applicants should, where possible, apply for the predoctoral fellowships in open competition, especially those from the National Science Foundation. December 2 is the deadline for receipt in the Neurosciences Program office of applications with all supporting material.

Applicants should familiarize themselves with the research interests of the faculty and indicate their preferences clearly on the application form.

Since students enter with differing backgrounds, and the labs in which they may elect to work cover several different disciplines, the specific program for each student is developed individually with an advisory committee. All students are required to complete the basic introduction to neurobiology (NBIO 206 or equivalent). All students must complete nine quarters of Professional Development and Integrity in Neuroscience (NBIO 300). Lastly, students must also take five courses within (and at least one course in each of) the following three areas:

1. Molecular, Cellular and Developmental Neuroscience
2. Systems, Computational, Cognitive and Behavioral Neuroscience
3. Translational Neuroscience

Courses from outside the neuroscience core can satisfy the elective requirement.

Students usually rotate through several labs during their first year, although they may choose to begin thesis research on entry. After the first rotation, students may rotate both within and outside the Neurosciences Program. Required course work should be completed by the end of the second year. Passing of a comprehensive oral preliminary examination given by the student's advisory committee is required for admission to Ph.D. candidacy. This examination is usually taken by the end of the second year. The student is required to present a Ph.D. dissertation, which is the result of independent investigation contributing to knowledge in an area of neuroscience, and to defend his or her dissertation in a University oral examination, which includes a public seminar.

Medical students may participate in this program provided they meet the prerequisites and satisfy all the requirements of the graduate program as listed above. The timing of the program may be adjusted to fit their special circumstances.

## OBSTETRICS AND GYNECOLOGY

*Chair:* Jonathan S. Berek

Courses offered by the Department of Obstetrics and Gynecology are listed under the subject code OBGYN on the *Stanford Bulletin's* ExploreCourses web site.

The Department of Obstetrics and Gynecology does not offer degrees; however, qualified medical, graduate, or undergraduate students with an interest in basic research in reproductive biology may apply to arrange individual projects under the supervision of the faculty. The focus for the Division of Reproductive Biology is the study of the molecular and cellular biology of male and female reproductive organs.

## PATHOLOGY

*Emeriti: (Professor)* Ronald Dorfman, Richard L. Kempson; *(Professor, Clinical)* Lawrence F. Eng, Luis Fajardo, Heinz Furthmayr, F. Carl Grumet, Jon Kosek; *(Associate Professor)* P. Joanne Cornbleet

*Chair:* Stephen J. Galli

*Professors:* Daniel Arber, Ellen Jo Baron, Gerald J. Berry, Eugene C. Butcher, Michael L. Cleary, Gerald R. Crabtree, Edgar G. Engleman, Andrew Fire, Steven Fount, Stephen J. Galli, Lawrence Tim Goodnough, Michael R. Hendrickson, Joseph S. Lipsick, Donald P. Regula, Robert V. Rouse, Richard K. Sibley, Raymond Sobel, Howard H. Sussman, Dolly Tyan, Matt van de Rijn, Hannes Vogel, Teresa S. F. Wang, Roger A. Warnke, Irving L. Weissman, James Zehnder

*Associate Professors:* Jeffrey D. Axelrod, Matt Bogyo, Athena M. Cherry, Andrew Connolly, Tina Cowan, James D. Faix, Dean Felsher, Susan A. Galel, Sharon M. Geaghan, John P. Higgins, Neeraja Kambham, Christina Kong, Teri A. Longacre, Sara A. Michie, Yasodha Natkunam, Bruce Patterson, Jonathan R. Pollack, Iris Schrijver, Arend Sidow

*Assistant Professors:* Niaz Banaei, Raffick Bowen, Magali Fontaine, Tracy George, Dita Gratzinger, F. Kim Hazard, Kristin Jensen, Bingwei Lu, Jesse McKenney, Erich Schwartz, Uma Sundram, Marius Wernig, Robert West

*Courtesy Professors:* Donna Bouley, Bertil Glader, Lucy Tompkins

*Courtesy Associate Professor:* Robert Shafer

*Clinician Educators:* Susan Atwater, David Bingham, Barbara Egbert, Christopher Gonzales, Terri Haddix, Jinah Kim, Amy McKenney, Melanie Manning, Reetesh Pai, Run Shi, Brent Tan, Maurene Viele

*Instructors:* Ching-Cheng Chen, Neng Chen, Franklin Mullins, Chris Park, Adrian Piliponsky

*Adjunct Clinical Faculty:* Robert Archibald, Jerome S. Burke, Glenn Cockerham, Stephen Shi-Hua Chen, Seth Haber, Maie K. Herrick, Paul W. Herrmann, Anthony Le, Steven Long, Charles Lombard, Judy Melinek, Gregory Moes, Joseph O'Hara, Girish Putcha, Mahendra Ranchod, Thomas W. Rogers, Joshua Sichel

*Department Offices:* Medical Center, Lane Building, L-235

*Mail Code:* 94305-5324

*Phone:* (650) 723-5255

*Web Site:* <http://pathology.stanford.edu>

Courses offered by the Department of Pathology are listed under the subject code PATH on the *Stanford Bulletin's* ExploreCourses web site.

## PROGRAMS OF STUDY IN PATHOLOGY

The Department of Pathology offers advanced courses in aspects of pathology. The department does not offer advanced degrees in pathology, but qualified graduate students who are admitted to department-based or interdepartmental graduate

programs may elect to pursue their thesis requirements in the department's research laboratories. The discipline of pathology has served as a bridge between the preclinical and clinical sciences and is concerned with the application of advances in the basic biological sciences, both to the diagnosis of human disease and the elucidation of the mechanisms of normal molecular, cellular, and organ structure and function that manifest themselves in clinical disease. Accordingly, the department's research interests extend from fundamental molecular biology to clinical-pathological correlations, with an emphasis on experimental oncology.

Investigation in the department includes basic studies in areas using molecular biological, biochemical, and genetic cell biological techniques: DNA replication in yeast and cultured eukaryotic cells, cell cycle control in animal cells and yeast, identification and pathogenetic role of chromosomal aberrations in human malignancies and mechanisms of activation of oncogenes in human and animal cells, lymphocyte and neutrophil-interactions with endothelial cells, cell type specification and signal transduction pathways leading to specific gene expression or modulation of cytoskeletal behavior; cytoskeletal architecture, cell-matrix interaction, developmental biology of hematopoietic stem cells and thymus, regulation of the immune system, mechanisms of immune and other responses in the central nervous system, and neuro-degenerative diseases. Various studies focus on the development of novel diagnostic and immunotherapeutic treatment modalities and techniques for solid tumors, lymphomas, HIV, and genetic diseases. Research training in all of these areas is available for qualified medical and graduate students by individual arrangement with the appropriate faculty member. A summary of the research interests of the department faculty is available at <http://pathology.stanford.edu>.

## RADIATION ONCOLOGY

*Emeriti:* Malcolm A. Bagshaw, Peter Fessenden, Don R. Goffinet, George M. Hahn, Kendrick Smith

*Chair:* Richard T. Hoppe

*Professors:* J. Martin Brown, Sarah S. Donaldson, Amato J. Giaccia, Steven L. Hancock, Richard T. Hoppe, Quynh-Thu Le, Daniel S. Kapp, Steven A. Liebel

*Associate Professors:* Iris C. Gibbs, Paul Keall, Christopher R. King, Susan J. Knox, Gary Luxton, Lei Xing

*Assistant Professors:* Laura Attardi, Daniel Chang, Nicholas Denko, Edward Graves, Albert C. Koong

*Consulting Professor:* Robert M. Sutherland

Courses offered by the Department of Radiation Oncology are listed under the subject code RADO on the *Stanford Bulletin's* ExploreCourses web site.

Radiation Oncology focuses on the use of radiation for cancer therapy and research. The department does not offer degrees; however, its faculty teach courses open to medical students, graduate students, and undergraduates. The department also accepts students in other curricula as advisees for study and research. Graduate students in Biophysics and Cancer Biology may perform their thesis research in the department. Undergraduates may arrange individual research projects under supervision of faculty.

At the present time, the major areas of basic research investigation in the department include: DNA repair in mammalian cells after ionizing irradiation; studies of the mechanism of tumor hypoxia in animal tumors; development of new anti-cancer drugs to exploit tumor hypoxia; cytogenetic and molecular methods of predicting the sensitivity of individual tumors to cancer therapy; radiolabeled monoclonal antibodies for cancer detection and treatment; studies of oxygen levels in human tumors using polarographic electrodes; clinical trials of a new hypoxic cytotoxic agent (tirapazamine); studies of the late effects of cancer therapy; and techniques of conformal and intensity modulated radiation therapy.

## RADIOLOGY

*Emeriti (Professors):* Herbert L. Abrams, Malcolm Bagshaw, Ronald Castellino, Barton Lane, Gerald Friedland, David A. Goodwin, Henry H. Jones, William Marshall, I. Ross McDougall, Robert E. Mindelzun, William H. Northway, Bruce R. Parker, Lewis Wexler, Leslie M. Zatz

*Chair:* Gary M. Glazer

*Professors:* Scott W. Atlas, Richard A. Barth, Christopher F. Beaulieu, Michale Federle, Sanjiv Sam Gambhir, Gary M. Glazer, Gary H. Glover, Michael L. Goris, Robert J. Herfkens, Dave Hovsepian, Debra M. Ikeda, R. Brooke Jeffrey, Ann Leung, Michael Marks, Michael Moseley, Sandy Napel, Matilde Nino-Murcia, Norbert J. Pelc, Allan Reiss, Geoffrey Rubin, Brian Rutt, George Segall, F. Graham Sommer, Daniel Spielman

*Professors (Research):* R. Kim Butts-Pauly

*Associate Professors:* Francis Blankenberg, Francis P. Chan, Bruce Daniel, Terry Desser, Huy M. Do, Nancy Fischbein, Dominik Fleischmann, Garry E. Gold, Lawrence Hofmann, Beverley Newman, Eric W. Olcott, Kathryn J. Stevens, Daniel Y. Sze

*Associate Professors (Research):* Roland Bammer, Rebecca Fahrig, Sylvia Plevritis

*Assistant Professors:* Sandip Biswal, Robert Dodd, Gloria Hwang, Aya Kamaya, Nishita Kothary, William Kuo, Jafi Lipson, Andrew Quon, Jianghong Rao, Daniel Rubin, Lewis Shin, Shreyas Vasanawala, Juergen Willmann, Joseph Wu, Kristen Yeom, Greg Zaharchuk

*Assistant Professors (Research):* Zhen Cheng, Brian Hargreaves, David Paik, Ramasamy Paulmurugan

*Web Site:* <http://www-radiology.stanford.edu>

Courses offered by the Department of Radiology are listed under the subject code RAD on the *Stanford Bulletin's* ExploreCourses web site.

The Department of Radiology does not offer degrees; however, its faculty teach courses open to medical students, graduate students, and undergraduates. The department also accepts students in other curricula as advisees for study and research. Undergraduates may also arrange individual research projects under the supervision of the department's faculty. This discipline focuses on the use of radiation, ultrasound, and magnetic resonance as diagnostic, therapeutic, and research tools. The fundamental and applied research within the department reflects this broad spectrum as it relates to anatomy, pathology, physiology, and interventional procedures. Original research and development of new clinical applications in medical imaging is supported within the Radiological Sciences Laboratory.

## STEM CELL BIOLOGY AND REGENERATIVE MEDICINE

*Director:* Renee A. Reijo Pera

*Co-directors:* Michael T. Longaker, Theo D. Palmer, Irving L. Weissman

*Participating Faculty:* Philip A. Beachy (Professor, Institute for Stem Cell Biology and Regenerative Medicine, Department of Developmental Biology and Biochemistry), Michael F. Clarke (Professor, Institute for Stem Cell Biology and Regenerative Medicine and Department of Medicine-Oncology), Maximilian Diehn (Assistant Professor, Institute for Stem Cell Biology and Regenerative Medicine, Stanford Cancer Center and Department of Radiation Oncology), Michael T. Longaker (Professor, Institute for Stem Cell Biology and Regenerative Medicine and Department of Surgery-Plastic/Reconstructive Surgery), Ravindra Majeti (Assistant Professor, Institute for

Stem Cell Biology and Regenerative Medicine, Stanford Cancer Center and Department of Medicine-Hematology), Roel Nusse (Professor, Institute for Stem Cell Biology and Regenerative Medicine and Department of Developmental Biology), Theo Palmer, Associate Professor, Institute for Stem Cell Biology and Regenerative Medicine and Department of Neurosurgery), Renee A. Reijo Pera (Professor, Institute for Stem Cell Biology and Regenerative Medicine and Department of Obstetrics & Gynecology), Irving L. Weissman (Professor, Institute for Stem Cell Biology and Regenerative Medicine, Department of Pathology, Developmental Biology and by courtesy, Biology), Marius Wernig (Assistant Professor, Institute for Stem Cell Biology and Regenerative Medicine and Department of Pathology), Joanna Wysocka (Assistant Professor, Institute for Stem Cell Biology and Regenerative Medicine and Department of Chemical and Systems Biology and Developmental Biology)

*Program Office:* 265 Campus Drive, Suite G3021, Stanford, CA 94305

*Mail Code:* 94305-5463

*Phone:* (650) 723-6716

*Web Site:* <http://stemcell.stanford.edu>

*Email:* [stemcellphd@stanford.edu](mailto:stemcellphd@stanford.edu)

Courses offered by the Program in Stem Cell Biology and Regenerative Medicine are listed under the subject code STEMREM on the Stanford Bulletin's Explore Courses web site.

## GRADUATE PROGRAM IN STEM CELL BIOLOGY AND REGENERATIVE MEDICINE

The Stanford Stem Cell Biology and Regenerative Medicine (SCBRM) program is dedicated to doctoral education that translates basic science to clinical applications, typically referred to as Translational Science, and of intense interest internationally in medical schools and universities. Stem Cell Biology and Regenerative Medicine is crossdisciplinary with advances linked to embryology, developmental and cell biology, neurosciences, cardiovascular biology, genetics, clinical medicine, bioengineering, engineering and computer sciences. The core curriculum is combined with unique research and clinical/professional immersion rotations to provide opportunities for doctoral students to specialize in the broad subject of translational medicine and yet focus specifically on fundamentals of SCBRM. The curriculum combines education in genetics and developmental biology with an introductory laboratory-based stem cell course, an advanced course in stem cell biology and regenerative medicine, and a clinical rotation with alternative opportunities in law, business and/or engineering.

The mission of the SCBRM graduate program is to produce future leaders in translational science through a combination of basic science and clinical/professional immersion. The program aims to be innovative and to change the landscape for graduate education in the biomedical sciences by having the immersion tailored to each student's translational goals. The program accommodates students who wish to focus primarily at the basic science level alongside those who wish to focus specifically on innovation such as a new device to solve a clinical problem. In the former case, the student might seek out a primary mentor affiliated with the basic sciences and take electives that reflect the more basic interest. In the latter case, the student might select an elective with an engineering focus and seek out primary mentorship with a more clinically or engineering focused mentor. In this way, graduates from our doctoral program receive exceptional didactic education and research experience and are well positioned to develop successful translational careers in SCBRM, in line with their passion to improve human health via applications of their knowledge to human health.

## DOCTOR OF PHILOSOPHY IN STEM CELL BIOLOGY AND REGENERATIVE MEDICINE

University requirements for the Ph.D. are discussed in the "Graduate Degrees" section of this bulletin.

The Stem Cell Biology and Regenerative Medicine curriculum, combined with the research and rotation opportunities, provides a flexible educational opportunity for doctoral students to specialize in the broad subject of translational medicine while being focused more specifically on the fundamentals of Stem Cell Biology and Regenerative Medicine while training in the laboratories of participating SCBRM faculty. The goal of the SCBRM program is to provide an avenue for graduate education to translate the best of basic research into a clinical setting.

## APPLICATION AND ADMISSION

Application should be made by November 8, 2011. Application is made through the Graduate Admissions web site. In addition to the standard graduate student application, applicants must fill out a program-specific supplemental application. See the Stem Cell Biology and Regenerative Medicine Application web site for further information and to download the supplemental application.

Applications are evaluated by the SCBRM predoctoral committee based upon: GRE scores; grades; evidence of research experience; letters of recommendation, including letters from research sponsor(s); and commitment to a career in biomedical research. Subject tests are not required.

Students admitted to the program are offered financial support covering tuition, a living stipend, insurance coverage, and an allowance for books/travel. Applicants are urged to apply for independent fellowships such as from the National Science Foundation. Fellowship applications are due in November of the year prior to matriculation in the graduate program, but SCBRM graduate students may continue to apply for outside fellowships after matriculation. Because of the small number of department-funded slots, students who have been awarded an outside fellowship have an improved chance of acceptance into the program. On matriculation, each student is assisted by a first-year advising committee in selecting courses and lab rotations in the first year and in choosing a lab for the dissertation research. Once a dissertation adviser has been selected, a dissertation committee including the dissertation adviser and two additional SCBRM faculty, is constituted to guide the student during the dissertation research. The student must meet with the dissertation committee at least once a year.

## REQUIREMENTS

Candidates for Ph.D. degrees at Stanford must satisfactorily complete a program of study that includes 135 units of graduate course work and research.

Requirements for the Ph.D. degree in SCBRM include—

1. Completion of at least 3 research rotations (STEMREM 399) in the labs of SCBRM faculty members.
2. STEMREM 250. Attendance at Regenerative Medicine (ReMS) weekly seminar series which provides the unique material required for a firm foundation in innovation in the SCBRM field.
3. Completion of the following courses:
  - a. SCBRM-I, develops a fundamental understanding of introductory stem cell principles in human development, aging, and disease accompanied by a laboratory-based module with immersion in stem cell-based methods (embryology, embryonic stem cells, reprogramming, adult stem cells).
  - b. SCBRM-II, advanced topics related to individual organ systems, cancer stem cells, translational principles of medicine and immunology as related to regenerative medicine, as well as bioengineering and bioinformatics as related to stem cell biology.

- c. SCBRM—III, students specialize and choose a clinical immersion, rotation in a biotechnology company or venture firm, or further delve into cutting edge technologies, bioinformatics, materials and/or engineering approaches for stem cell applications in industry, diagnostics and medicine.
4. Students have the option to select from the following courses in the first year:
  - GENE 203. Advanced Genetics
  - BIO 214. Advanced Cell Biology
  - PEDS 251A. Medical Ethics I
  - DBIO 210. Developmental Biology
  - MED 255. Responsible Conduct of Research
  - STEMREM 399. SCBRM Independent Research
5. Students have the option to select two electives in the second year.
6. Biochemistry proficiency is required by the end of the second year, as well as a total of 80 units and completed qualifying examinations. Students who do not pass the qualifying examination may retake a full qualifying exam, be retested in a few areas, or be asked to redo their presentation.
7. STEMREM 802. Dissertation  
Students unable to meet Ph.D. milestones after remediation are offered a M.S. degree if they have completed all requirements.
- j. Students may also take two courses (6 units) of elective course work
5. Participation in the SCBRM journal club and attendance at the annual SCBRM Retreat.
6. The qualifying examination process in SCBRM before admission to PhD candidacy has two parts:
  - *Part I*—a comprehensive written exam in the form of a 5-page NIH grant proposal
  - *Part II*—a 15-minute oral presentation of the proposal to the thesis committee followed by open questions from the qualifying exam committee on the proposal or encompassing areas of research/academic scholarship that are deemed relevant to the proposal.

At the time of application to take the qualifying exam, the student and research adviser must present a folder to the executive committee that includes the academic background at the undergraduate university, academic background during the first two years in the SCBRM program, and letters regarding rotation completion and quality from advisers in rotation laboratories. Students who do not pass the qualifying exam may retake the full qualifying exam, be retested in a sub-area, or be asked to redo their presentation. Those students who fail the qualifying exam twice may be awarded a master's degree based on completion of course work and rotations. In addition, students who choose to voluntarily leave the program are also awarded a master's degree based on completion of the qualifying exam.

## MASTER OF SCIENCE IN STEM CELL BIOLOGY AND REGENERATIVE MEDICINE

University requirements for the M.S. degree are described in the "Graduate Degrees" section of this bulletin.

Students in the Ph.D. program in SCBRM may apply for an M.S. degree in SCBRM, assuming completion of appropriate requirements. The program does not accept applications for a standalone M.S. degree.

To receive an M.S. in Stem Cell Biology and Regenerative Medicine, Students must complete:

1. Four full-tuition quarters of residency as a graduate student at Stanford.
2. At least 45 units of academic work, all of which must be in courses at or above the 100 level, 16 units of which must be at or above the 200 level.
3. Four quarters of graduate research, consisting of rotations in the labs of at least three SCBRM faculty members.
4. Course work in Stem Cell Biology and Regenerative Medicine as follows:
  - a. SCBRM-I, develops a fundamental understanding of introductory stem cell principles in human development, aging, and disease accompanied by a laboratory-based module with immersion in stem cell-based methods (embryology, embryonic stem cells, reprogramming, adult stem cells).
  - b. SCBRM-II, advanced topics related to individual organ systems, cancer stem cells, translational principles of medicine and immunology as related to regenerative medicine, as well as bioengineering and bioinformatics as related to stem cell biology.
  - c. SCBRM—III, students specialize and choose a clinical immersion, rotation in a biotechnology company or venture firm, or further delve into cutting edge technologies, bioinformatics, materials and/or engineering approaches for stem cell applications in industry, diagnostics and medicine.
  - d. Regenerative Medicine weekly seminar series
  - e. DEVBIO 210. Developmental Biology
  - f. GENE 203. Advanced Genetics
  - g. BIO 214. Advanced Cell Biology or MCP 256. Molecular and Cellular Physiology
  - h. MED 250A. Ethical, Legal and Social Issues in Stem Cell Research
  - i. MED 255. Responsible Conduct of Research

## STRUCTURAL BIOLOGY

*Chair:* Joseph D. Puglisi

*Associate Chair:* Michael Levitt

*Professors:* Theodore Jardetzky, Roger D. Kornberg, Michael Levitt, Peter Parham, Joseph D. Puglisi, William I. Weis

*Associate Professor:* K. Christopher Garcia

*Associate Professor (Research):* Yahli Lorch

*Assistant Professor (Research):* Elizabetta Viani Puglisi

*Courtesy Professor:* Axel Brunger

*Courtesy Associate Professor:* Vijay Pande

*Courtesy Assistant Professor:* Zev Bryant

*Department Offices:* Fairchild Building, D100

*Mail Code:* 94305- 5126

*Phone:* (650) 723-7576

*Email:* structuralbio@med.stanford.edu

*Web Site:* <http://structuralbio.stanford.edu>

Courses offered by the Department of Structural Biology are listed under the subject code SBIO on the *Stanford Bulletin's* ExploreCourses web site.

The department offers course work and opportunities for research in structural biology. Courses fall into two categories: (1) a series of one quarter courses that treat topics of current interest in structural biology and biophysics at an advanced level; and (2) INDE 216, Cells to Tissues, a course for medical students that includes lectures on structure-function relationships of mammalian cells and tissues and a lab on medical histology.

The emphasis of research in the department is on understanding fundamental cellular processes in terms of the structure and function of biological macromolecules and their assemblies. Techniques used include standard methods of biochemistry, cell culture, single-molecule fluorescence spectroscopy, genetic engineering, and three dimensional structure determination by x-ray diffraction, nuclear magnetic resonance spectroscopy and electron microscopy, coupled with the development of computational methods.

## DOCTOR OF PHILOSOPHY IN STRUCTURAL BIOLOGY

University requirements for the Ph.D. are described in the "Graduate Degrees" section of this bulletin.



The graduate program in Structural Biology leads to the Ph.D. degree. The department also participates in the Medical Scientists Training Program (MSTP) in which individuals are candidates for both Ph.D. and M.D. degrees.

The graduate program is intended to prepare students for careers as independent investigators in cell and molecular biology. The principal requirement of a Ph.D. degree is the completion of research constituting an original and significant contribution to the advancement of knowledge. The requirements and recommendations for the Ph.D. degree include:

1. Training in a major with connections to biophysics (e.g., physics, chemistry, or biology, with a quantitative background equivalent to that of an undergraduate physics or chemistry major at Stanford).
2. Completion of the following background courses or their equivalents at other institutions:
  - a. CHEM 131, 171, 173, and 175
  - b. BIOC 200, 201
3. Completion of the following courses or their equivalents:
  - a. SBIO 241 or BIOE 300 and SBIO 242
  - b. At least four additional graduate-level courses in physical or biological science, with at least one in physical science and one as a literature-based biological science course
  - c. MED 255
4. Opportunities for teaching are available during the first nine quarters at the discretion of the advising committee.
5. The student must prepare a dissertation proposal defining the research to be undertaken including methods of procedure. This proposal should be submitted by Winter Quarter of the third year, and it must be approved by a committee of at least three members including the principal research adviser and at least one member from the Department of Structural Biology. The candidate must defend the dissertation proposal in an oral examination. The dissertation reading committee normally evolves from the dissertation proposal review committee.
6. The student must present a Ph.D. dissertation as the result of independent investigation and expressing a contribution to knowledge in the field of structural biology.
7. The student must pass the University oral examination, taken only after the student has substantially completed the research. The examination is preceded by a public seminar in which the research is presented by the candidate.

Applicants to the program should have a bachelor's degree and should have completed at least a year of course work in biology, mathematics, organic chemistry, physical chemistry, and physics. Application forms must be received by the department before December 15 for notification by April 15. Application to the National Science Foundation for fellowship support is also encouraged. Remission of fees and a personal stipend are available to graduate students in the department. Prospective applicants should contact the Department of Structural Biology for further information.

Current topics of research in the department lie in the areas of gene expression; theoretical, crystallographic, and genetic analysis of protein structure; and cell-cell interaction. See <http://www.med.stanford.edu/school/structuralbio> for further information.

# COURSES OF INSTRUCTION

## 2011-12

*This listing is based on a static extract of courses performed on September 21, 2011. For latest and correct information, including scheduling, see the Bulletin's ExploreCourses web site at <http://explorecourses.stanford.edu>.*

Courses of instruction are listed in alphabetical order by subject name, and then numerically by catalog number.

Stanford does not have a standard course catalog numbering system. Courses numbered from 1 through 99 are primarily for freshmen and sophomores. Courses numbered from 100 through 199 are primarily for juniors and seniors; some departments, however, offer courses numbered from 200 through 299 for juniors and seniors. Most courses numbered 200 and above are for graduate students; no graduate career course is numbered below 200, and all courses above 300 are for graduate students.

Courses offered for variable units require different amounts of work depending upon the units for which a student enrolls. Students are advised to consult with the department or instructor offering the course to determine the appropriate number of units.

Beginning in Autumn Quarter 2005, a modified and redefined set of undergraduate General Education Requirements, designated in this bulletin as GERs, went into effect. Students who matriculated Autumn Quarter 2004-05 or later are subject to the revised General Education Requirements effective Autumn Quarter 2005-06. Students who matriculated Autumn Quarter 2003-04 or earlier remain on the old General Education Requirements, but may elect to change to the new system. Students interested in electing the revised GER system should contact the Office of the University Registrar. No further changes are allowed once a student has elected to move to the new system.

WIM indicates courses that fulfill the undergraduate departmental Writing in the Major requirement. AU indicates Activity courses that are subject to undergraduate University Activity Unit limitations (8 units maximum).

### **SUBJECT CODES**

Each course is identified by a subject code and a catalog number. Throughout this bulletin, Axxss subject codes have been printed wherever relevant.

### **SUMMER SESSION**

This bulletin includes, for the Summer Session, only those courses that can be tentatively scheduled at publication time by each department. For the complete list of courses and faculty, refer to <http://summer.stanford.edu>, updated in February. Courses added during the academic year are available on the *Stanford Bulletin's* ExploreCourses web site at <http://explorecourses.stanford.edu>.

### **OVERSEAS STUDIES**

Undergraduate courses taught overseas at Stanford's Bing Overseas Studies Program are listed under the relevant Overseas Studies Center subject code. Courses applicable to an undergraduate major are also listed at the end of many department degree requirement sections above.

### **SCHEDULE OF CLASSES**

Scheduling information is available on the *Stanford Bulletin's* ExploreCourses web site at <http://explorecourses.stanford.edu>. Students enroll on Axxss at <http://axess.stanford.edu>.

# AERONAUTICS AND ASTRONAUTICS (AA) COURSES

## UNDERGRADUATE COURSES IN AERONAUTICS AND ASTRONAUTICS

Primarily for undergraduates; graduate students may enroll with consent of adviser.

### AA 100. Introduction to Aeronautics and Astronautics

The principles of fluid flow, flight, and propulsion; the creation of lift and drag, aerodynamic performance including takeoff, climb, range, and landing performance, structural concepts, propulsion systems, trajectories, and orbits. The history of aeronautics and astronautics. Prerequisites: MATH 41, 42; elementary physics. GER:DB-EngrAppSci

3 units, Aut (Kroo, I)

### AA 113N. Structures: Why Things Don't (and Sometimes Do) Fall Down

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. How structures created by nature or built by human beings keep things up and keep things in. Topics: nature's structures from microorganisms to large vertebrae; buildings from ancient dwellings to modern skyscrapers; spacecraft and airplanes; boats from ancient times to America's Cup sailboats, and how they win or break; sports equipment; and biomedical devices including bone replacements and cardiovascular stents. How composite materials are used to make a structure light and strong. GER:DB-EngrAppSci

3 units, Win (Springer, G)

### AA 115N. The Global Positioning System: Where on Earth are We, and What Time is It?

Preference to freshmen. Why people want to know where they are: answers include cross-Pacific trips of Polynesians, missile guidance, and distraught callers. How people determine where they are: navigation technology from dead-reckoning, sextants, and satellite navigation (GPS). Hands-on experience. How GPS works; when it does not work; possibilities for improving performance. GER:DB-EngrAppSci

3 units, not given this year

### AA 116N. Electric Automobiles and Aircraft

(S,Sem) (Same as EE 25Q) Stanford Introductory Seminar. Transportation accounts for nearly one-third of American energy use and greenhouse gas emissions and three-quarters of American oil consumption. It has crucial impacts on climate change, air pollution, resource depletion, and national security. Students wishing to address these issues will need to reconsider how we move, finding sustainable transportation solutions. This course will provide an introduction to the issue, covering the past and present of transportation and its impacts; examining alternative fuel proposals; and digging deeper into the most promising option: battery electric vehicles. Energy requirements of air, ground, and maritime transportation; design of electric motors, power control systems, drive trains, and batteries; and technologies for generating renewable energy. Two fun opportunities for hands-on experiences with electric cars. Prerequisites: Introduction to calculus and Physics AP or elementary mechanics. GER:DB-EngrAppSci

3 units, Win (Cox, D; Enge, P)

### AA 190. Directed Research and Writing in Aero/Astro

For undergraduates. Experimental or theoretical work under faculty direction, and emphasizing development of research and communication skills. Written report(s) and letter grade required; if this is not appropriate, enroll in 199. Consult faculty in area of interest for appropriate topics, involving one of the graduate research groups or other special projects. May be repeated for credit. Prerequisite: consent of student services manager and instructor. WIM

3-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### AA 199. Independent Study in Aero/Astro

Directed reading, lab, or theoretical work for undergraduate students. Consult faculty in area of interest for appropriate topics

involving one of the graduate research groups or other special projects. May be repeated for credit. Prerequisite: consent of instructor.

1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

## GRADUATE COURSES IN AERONAUTICS AND ASTRONAUTICS

Primarily for graduate students; undergraduates may enroll with consent of instructor.

### AA 200. Applied Aerodynamics

Analytical and numerical techniques for the aerodynamic analysis of aircraft, focusing on airfoil theory, finite wing theory, far-field and Trefftz-plane analysis, two-dimensional laminar and turbulent boundary layers in airfoil analysis, laminar-to-turbulent transition, compressibility effects, and similarity rules. Biweekly assignments require MATLAB or a suitable programming language. Prerequisite: undergraduate courses in basic fluid mechanics and applied aerodynamics, AA 210A.

3 units, Win (Kroo, I)

### AA 201A. Fundamentals of Acoustics

Acoustic equations for a stationary homogeneous fluid; wave equation; plane, spherical, and cylindrical waves; harmonic (monochromatic) waves; simple sound radiators; reflection and transmission of sound at interfaces between different media; multipole analysis of sound radiation; Kirchoff integral representation; scattering and diffraction of sound; propagation through ducts (dispersion, attenuation, group velocity); sound in enclosed regions (reverberation, absorption, and dispersion); radiation from moving sources; propagation in the atmosphere and underwater. Prerequisite: first-year graduate standing in engineering, mathematics, sciences; or consent of instructor.

3 units, Spr (Lele, S)

### AA 201B. Topics in Aeroacoustics

Acoustic equations for moving medium, simple sources, Kirchoff formula, and multipole representation; radiation from moving sources; acoustic analogy approach to sound generation in compact flows; theories of Lighthill, Powell, and Mohring; acoustic radiation from moving surfaces; theories of Curl, Ffowcs Williams, and Hawkings; application of acoustic theories to the noise from propulsive jets, and airframe and rotor noise; computational methods for acoustics. Prerequisite: 201A or consent of instructor.

3 units, not given this year

### AA 202. Hypersonic Flow

The fundamental principals and equations governing hypersonic flight and high temperature gas dynamics, including chemical and thermal equilibrium and non-equilibrium; statistical thermodynamics; kinetic theory; transport phenomena; radiation; surface heating; and scramjet engines. Prerequisite: understanding of aerodynamics. Recommended: AA 200A.

3 units, Spr (MacCormack, R)

### AA 206. Bio-Aerodynamics

Topics: flapping flight, low Reynolds number aerodynamics, wing design, flocks, swarms, and dynamic soaring. Readings from current and historical literature dealing with theoretical and observational studies. Applications in aircraft design, and simulation-based problem sets. Prerequisite: course in aerodynamics such as 100, 200A, or 241A.

3 units, not given this year

### AA 208. Aerodynamics of Aircraft Dynamic Response and Stability

Companion to 200A for those interested in control and guidance. Typical vehicles and the technical tradeoffs affecting their design. Equations of motion, stressing applications to dynamic performance, stability, and forced response. Forms and sources for the required aerodynamic data. Response to small disturbances and stability derivatives. Static stability and trim. Review of aerodynamic fundamentals, leading to airload predictions for wings, bodies, and complete aircraft. Paneling and other methods for derivative estimation. Natural motions of the aircraft, and the influence on them of various configuration parameters. Vehicle behavior in maneuvers of small and large amplitudes. Prerequisites: 200A, 210A, or equivalents (may be taken

concurrently).

*3 units, not given this year*

#### **AA 210A. Fundamentals of Compressible Flow**

Topics: development of the three-dimensional, non-steady, field equations for describing the motion of a viscous, compressible fluid; differential and integral forms of the equations; constitutive equations for a compressible fluid; the entropy equation; compressible boundary layers; area-averaged equations for one-dimensional steady flow; shock waves; channel flow with heat addition and friction; flow in nozzles and inlets; oblique shock waves; Prandtl-Meyer expansion; unsteady one-dimensional flow; the shock tube; small disturbance theory; acoustics in one-dimension; steady flow in two-dimensions; potential flow; linearized potential flow; lift and drag of thin airfoils. Prerequisites: undergraduate background in fluid mechanics and thermodynamics.

*3 units, Aut (Cantwell, B)*

#### **AA 210B. Fundamentals of Compressible Flow**

Continuation of 210A with emphasis on more general flow geometry. Use of exact solutions to explore the hypersonic limit. Identification of similarity parameters. Solution methods for the linearized potential equation with applications to wings and bodies in steady flow; their relation to physical acoustics and wave motion in nonsteady flow. Nonlinear solutions for nonsteady constant area flow and introduction to Riemann invariants. Elements of the theory of characteristics; nozzle design; extension to nonisentropic flow. Real gas effects in compressible flow. Flows in various gas dynamic testing facilities. Prerequisite: 210A.

*3 units, not given this year*

#### **AA 214A. Introduction to Numerical Methods for Engineering**

(Same as CME 206, ME 300C) Numerical methods from a user's point of view. Lagrange interpolation, splines. Integration: trapezoid, Romberg, Gauss, adaptive quadrature; numerical solution of ordinary differential equations: explicit and implicit methods, multistep methods, Runge-Kutta and predictor-corrector methods, boundary value problems, eigenvalue problems; systems of differential equations, stiffness. Emphasis is on analysis of numerical methods for accuracy, stability, and convergence. Introduction to numerical solutions of partial differential equations; Von Neumann stability analysis; alternating direction implicit methods and nonlinear equations. Prerequisites: CME 200/ME 300A, CME 204/ME 300B.

*3 units, Spr (Iaccarino, G)*

#### **AA 214B. Numerical Computation of Compressible Flow**

Numerical methods for solving hyperbolic sets of partial differential equations. Explicit, implicit, flux-split, finite difference, and finite volume procedures for approximating the governing equations and boundary conditions. Numerical solution by direct approximate factorization and iterative Gauss-Seidel line relaxation. Application to Euler equations. Computational problems. Prerequisite: 214A.

*3 units, Win (MacCormack, R)*

#### **AA 214C. Numerical Computation of Viscous Flow**

Numerical methods for solving parabolic sets of partial differential equations. Numerical approximation of the equations describing compressible viscous flow with adiabatic, isothermal, slip, and no-slip wall boundary conditions. Applications to the Navier-Stokes equations in two and three dimensions at high Reynolds number. Computational problems are assigned. Prerequisite: 214B.

*3 units, Spr (MacCormack, R)*

#### **AA 215A. Advanced Computational Fluid Dynamics**

(Same as CME 215A) High resolution schemes for capturing shock waves and contact discontinuities; upwinding and artificial diffusion; LED and TVD concepts; alternative flow splittings; numerical shock structure. Discretization of Euler and Navier Stokes equations on unstructured meshes; the relationship between finite volume and finite element methods. Time discretization; explicit and implicit schemes; acceleration of steady state calculations; residual averaging; math grid preconditioning. Automatic design; inverse problems and aerodynamic shape optimization via adjoint methods. Pre- or corequisite: 214B or equivalent.

*3 units, Win (Jameson, A)*

#### **AA 215B. Advanced Computational Fluid Dynamics**

(Same as CME 215B) High resolution schemes for capturing shock waves and contact discontinuities; upwinding and artificial diffusion; LED and TVD concepts; alternative flow splittings; numerical shock structure. Discretization of Euler and Navier Stokes equations on unstructured meshes; the relationship between finite volume and finite element methods. Time discretization; explicit and implicit schemes; acceleration of steady state calculations; residual averaging; math grid preconditioning. Automatic design; inverse problems and aerodynamic shape optimization via adjoint methods. Pre- or corequisite: 214B or equivalent.

*3 units, Spr (Jameson, A)*

#### **AA 218. Introduction to Symmetry Analysis**

Methods of symmetry analysis and their use in the reduction and simplification of physical problems. Topics: dimensional analysis, phase-space analysis of autonomous systems of ordinary differential equations, use of Lie groups to reduce the order of nonlinear ODEs and to generate integrating factors, use of Lie groups to reduce the dimension of partial differential equations and to generate similarity variables, exact solutions of nonlinear PDEs generated from groups. Mathematica-based software developed by the instructor is used for finding invariant groups of ODEs and PDEs.

*3 units, Spr (Cantwell, B)*

#### **AA 222. Introduction to Multidisciplinary Design Optimization**

Design of aerospace systems within a formal optimization environment. Mathematical formulation of the multidisciplinary design problem (parameterization of design space, choice of objective functions, constraint definition); survey of algorithms for unconstrained and constrained optimization and optimality conditions; description of sensitivity analysis techniques. Hierarchical techniques for decomposition of the multidisciplinary design problem; use of approximation theory. Applications to design problems in aircraft and launch vehicle design. Prerequisites: multivariable calculus; familiarity with a high-level programming language: FORTRAN, C, C++, or MATLAB.

*3 units, Spr (Kroo, I)*

#### **AA 236A. Spacecraft Design**

The design of unmanned spacecraft and spacecraft subsystems emphasizing identification of design drivers and current design methods. Topics: spacecraft configuration design, mechanical design, structure and thermal subsystem design, attitude control, electric power, command and telemetry, and design integration and operations.

*3-5 units, Aut (Kalman, A)*

#### **AA 236B. Spacecraft Design Laboratory**

Continuation of 236A. Emphasis is on practical application of systems engineering to the life cycle program of spacecraft design, testing, launching, and operations. Prerequisite: 236A or consent of instructor.

*3 units, Win (Kalman, A)*

#### **AA 236C. Spacecraft Design Laboratory**

*3 units, Spr (Kalman, A)*

#### **AA 240A. Analysis of Structures**

Elements of two-dimensional elasticity theory. Boundary value problems; energy methods; analyses of solid and thin walled section beams, trusses, frames, rings, monocoque and semimonocoque structures. Prerequisite: ENGR 14 or equivalent.

*3 units, Aut (Chang, F)*

#### **AA 240B. Analysis of Structures**

Thin plate analysis. Structural stability. Material behavior: plasticity and fracture. Introduction of finite element analysis; truss, frame, and plate structures. Prerequisite: 240A or consent of instructor.

*3 units, not given this year*

#### **AA 241A. Introduction to Aircraft Design, Synthesis, and Analysis**

New aircraft systems emphasizing commercial aircraft. Economic and technological factors that create new aircraft markets. Determining market demands and system mission performance requirements; optimizing configuration to comply with requirements; the interaction of disciplines including

aerodynamics, structures, propulsion, guidance, payload, ground support, and parametric studies. Applied aerodynamic and design concepts for use in configuration analysis. Application to a student-selected aeronautical system; applied structural fundamentals emphasizing fatigue and fail-safe considerations; design load determination; weight estimation; propulsion system performance; engine types; environmental problems; performance estimation. Direct/indirect operating costs prediction and interpretation. Aircraft functional systems; avionics; aircraft reliability and maintainability. Prerequisite: 100 or equivalent.

3 units, Aut (Alonso, J)

#### AA 241B. Introduction to Aircraft Design, Synthesis, and Analysis

New aircraft systems emphasizing commercial aircraft. Economic and technological factors that create new aircraft markets. Determining market demands and system mission performance requirements; optimizing configuration to comply with requirements; the interaction of disciplines including aerodynamics, structures, propulsion, guidance, payload, ground support, and parametric studies. Applied aerodynamic and design concepts for use in configuration analysis. Application to a student-selected aeronautical system; applied structural fundamentals emphasizing fatigue and fail-safe considerations; design load determination; weight estimation; propulsion system performance; engine types; environmental problems; performance estimation. Direct/indirect operating costs prediction and interpretation. Aircraft functional systems; avionics; aircraft reliability and maintainability. Prerequisite: 100 or equivalent.

3 units, Win (Alonso, J)

#### AA 241X. Design, Construction, and Testing of Autonomous Aircraft

Students grouped according to their expertise to carry out the multidisciplinary design of a solar-powered autonomous aircraft that must meet a clearly stated set of design requirements. Design and construction of the airframe, integration with existing guidance, navigation, and control systems, and development and operation of the resulting design. Design reviews and reports. Prerequisites: expertise in any of the following disciplines by having satisfied the specified courses or equivalent work elsewhere: conceptual design (241A,B); applied aerodynamics (200A,B); structures (240A); composite manufacturing experience; guidance and control (208/271, ENGR 205).

3 units, NEXTYEAR

#### AA 242A. Classical Dynamics

Accelerating and rotating reference frames. Kinematics of rigid body motion; Euler angles, direction cosines. D'Alembert's principle, equations of motion. Inertia properties of rigid bodies. Dynamics of coupled rigid bodies. Lagrange's equations and their use. Dynamic behavior, stability, and small departures from equilibrium. Prerequisite: ENGR 15 or equivalent.

3 units, Aut (Close, S)

#### AA 242B. Mechanical Vibrations

For M.S.-level graduate students. Covers the vibrations of discrete systems and continuous structures. Introduction to the computational dynamics of linear engineering systems. Review of analytical dynamics of discrete systems; undamped and damped vibrations of N-degree-of-freedom systems; continuous systems; approximation of continuous systems by displacement methods; solution methods for the Eigenvalue problem; direct time-integration methods. Prerequisites: AA 242A or equivalent (recommended but not required); basic knowledge of linear algebra and ODEs; no prior knowledge of structural dynamics is assumed.

3 units, Win (Farhat, C)

#### AA 244. Introduction to Plasma Physics

Physics of space plasmas. Single-particle motions. Drifts. Kinetic theory, including stability and instability. Plasmas as fluids and fluid drifts. Waves in plasmas. Radiation in a plasma. Diffusion and resistivity. Fluid stability and instability. Kinetic stability and instability.

3 units, Win (Close, S)

#### AA 251. Introduction to the Space Environment

The environment through which space probes and vehicles travel and orbit. Survey of physical phenomena in the sun, solar wind,

magnetospheres, ionospheres, and upper atmospheres of objects in the solar system. Introduction to the physical processes governing space plasmas, solar-terrestrial interactions, and ionized and neutral media surrounding the Earth and other solar system bodies. Prerequisite: Introduction to Plasma Physics.

3 units, Spr (Close, S)

#### AA 252. Techniques of Failure Analysis

Introduction to the field of failure analysis, including fire and explosion analysis, large scale catastrophe projects, traffic accident reconstruction, aircraft accident investigation, human factors, biomechanics and accidents, design defect cases, materials failures and metallurgical procedures, and structural failures. Product liability, failure modes and effects analysis, failure prevention, engineering ethics, and the engineer as expert witness.

3 units, Spr (Murray, S)

#### AA 253. Product and Systems Development

(Same as MS&E 205) Modern approaches to aerospace design development for life cycle value. Concepts of air and space systems development in a systems context. Stakeholder value issues and requirements through manufacturing and delivery. Processes and practices for functional analysis, concept and architecture development, trades, domain criteria, interfaces, and verification and validation. Reliability, risk, and safety. Value stream analysis, integrated product and process development, key characteristics, and hardware/software integration aimed at information systems. Tools involve quality function deployment, design structure matrices, and decision mechanisms.

3 units, Spr (Weiss, S)

#### AA 254. Information Systems in Aerospace Vehicles

Sensors, processors, activators, and operators, and the media and protocols that integrate them for performance and safety.

2 units, not given this year

#### AA 256. Mechanics of Composites

Fiber reinforced composites. Stress, strain, and strength of composite laminates and honeycomb structures. Failure modes and failure criteria. Environmental effects. Manufacturing processes. Design of composite structures. Individual design project required of each student, resulting in a usable computer software. Prerequisite: ENGR 14 or equivalent.

3 units, Win (Chang, F)

#### AA 257. Design of Composite Structures

Hands-on design, analysis, and manufacturing in composites. Composite beams, columns, and plates; application of finite element methods to composite structures; failure analysis and damage tolerance design of composite structures; and impact damage, compression after impact, and bolted and bonded composites joints. Class divided into working teams (design, analysis, manufacturing, and tests) to design and build a composite structure to be tested to failure; the structure may enter the national SAMPE composite bridge design contest. Prerequisite: 256 or consent of instructor.

3 units, not given this year

#### AA 260. Sustainable Aviation

Quantitative assessment of the impact of aviation on the environment including noise, local, and global emissions, and models used to predict it. Current and future technologies that may allow the air transportation system to meet anticipated growth while reducing or minimizing environmental problems. Atmospheric effects of NO<sub>x</sub>, CO<sub>2</sub>, particulates, unburned hydrocarbons, and water vapor deposition at high altitudes and metrics for assessing global climate effects. Noise sources, measurement, and mitigation strategies. Fundamentals of aircraft and engine performance needed to assess current and future concepts. Major national and international policy implications of existing and future technology choices. Recommended: AA 241B.

3 units, not given this year

#### AA 261. Aerodynamics and Aeroacoustics of Rotorcraft

Introduction to vertical flight, helicopter configurations, blade element momentum theory for hover and forward flight, vehicle performance modeling. Modeling of unsteady aerodynamic phenomena, static and dynamic stall on airfoils, rotor wake aerodynamics, acoustics in the rotating frame. Relevant concepts from potential theory for analytical representations of noise from rotating blades, hovering rotor noise, blade-vortex interactions and

forward flight noise. Topics in rotorcraft aeromechanics and aeroacoustics research. Prerequisite: background in basic fluid mechanics and applied aerodynamics at AA 200 level.

3 units, Spr (Duraismy, K)

#### AA 271A. Dynamics and Control of Spacecraft and Aircraft

The dynamic behavior of aircraft and spacecraft, and the design of automatic control systems for them. For aircraft: non-linear and linearized longitudinal and lateral dynamics; linearized aerodynamics; natural modes of motion; autopilot design to enhance stability, control the flight path, and perform automatic landings. For spacecraft in orbit: natural longitudinal and lateral dynamic behavior and the design of attitude control systems. Prerequisites: AA242A, ENGR 105.

3 units, Spr (Rock, S)

#### AA 272C. Global Positioning Systems

The principles of satellite navigation using GPS. Positioning techniques using code tracking, single and dual frequency, carrier aiding, and use of differential GPS for improved accuracy and integrity. Use of differential carrier techniques for attitude determination and precision position determination. Prerequisite: familiarity with matrix algebra and MatLab (or another mathematical programming language).

3 units, Win (Van Diggelen, F)

#### AA 272D. Integrated Navigation Systems

Navigation satellites (GPS, GLONASS), GPS receivers, principles of inertial navigation for ships, aircraft, and spacecraft. Kalman Filters to integrate GPS and inertial sensors. Radio navigation aids (VOR, DME, LORAN, ILS). Doppler navigation systems. Prerequisites: 272C; ENGR 15, 105. Recommended: ENGR 205.

3 units, not given this year

#### AA 279. Space Mechanics

Orbits of near-earth satellites and interplanetary probes; transfer and rendezvous; decay of satellite orbits; influence of earth's oblateness; sun and moon effects on earth satellites. Prerequisite: ENGR 15 or equivalent, and familiarity with MatLab (or another mathematical programming language).

3 units, Spr (Enge, P; Close, S)

#### AA 283. Aircraft and Rocket Propulsion

Introduction to the design and performance of airbreathing and rocket engines. Topics: the physical parameters used to characterize propulsion system performance; gas dynamics of nozzles and inlets; cycle analysis of ramjets, turbojets, turbofans, and turboprops; component matching and the compressor map; introduction to liquid and solid propellant rockets; multistage rockets; hybrid rockets; thermodynamics of reacting gases. Prerequisites: undergraduate background in fluid mechanics and thermodynamics.

3 units, Win (Cantwell, B)

#### AA 284A. Advanced Rocket Propulsion

The principles of rocket propulsion system design and analysis. Fundamental aspects of the physics and chemistry of rocket propulsion. Focus is on the design and analysis of chemical propulsion systems including liquids, solids, and hybrids. Nonchemical propulsion concepts such as electric and nuclear rockets. Launch vehicle design and optimization issues including trajectory calculations. Limited enrollment. Prerequisites: 283 or consent of instructor.

3 units, Spr (Karabeyoglu, M)

#### AA 284B. Propulsion System Design Laboratory

Propulsion systems engineering through the design and operation of a sounding rocket. Students work in small teams through a full project cycle including requirements definition, performance analysis, system design, fabrication, ground and flight testing, and evaluation. Prerequisite: 284A and consent of instructor.

3 units, Aut (Zilliac, G)

#### AA 284C. Propulsion System Design Laboratory

Continuation of 284A,B. Prerequisite: 284B, and consent of instructor.

3 units, Win (Zilliac, G)

#### AA 290. Problems in Aero/Astro

(Undergraduates register for 190 or 199.) Experimental or theoretical investigation. Students may work in any field of special interest. Register for section belonging to your research supervisor.

May be repeated for credit.

1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

#### AA 291. Practical Training

Educational opportunities in high-technology research and development labs in aerospace and related industries. Internship integrated into a student's academic program. Research report outlining work activity, problems investigated, key results, and any follow-on projects. Meets the requirements for Curricular Practical Training for students on F-1 visas. Student is responsible for arranging own employment and should see department student services manager before enrolling. May be repeated for credit.

1-3 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

#### AA 294. Case Studies in Aircraft Design

Presentations by researchers and industry professionals. Registration for credit optional. May be repeated for credit.

1 unit, Spr (Jameson, A)

#### AA 295. Aerospace Structures and Materials

Presentations by researchers and industry professionals in aerospace structures and materials. May be repeated for credit.

1 unit, Spr (Chang, F)

#### AA 297. Seminar in Guidance, Navigation, and Control

For graduate students with an interest in automatic control applications in flight mechanics, guidance, navigation, and mechanical design of control systems; others invited. Problems in all branches of vehicle control, guidance, and instrumentation presented by researchers on and off campus. Registration for credit optional. May be repeated for credit.

1 unit, not given this year

#### AA 300. Engineer Thesis

Thesis for degree of Engineer. Students register for section belonging to their thesis adviser.

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

#### AA 301. Ph.D. Dissertation

Prerequisite: completion of Ph.D qualifying exams. Students register for section belonging to their thesis adviser. (Staff)

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

#### AA 801. TGR Engineer Thesis

Engineer's thesis or non-doctoral work for a TGR student.

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

## AFRICAN AND AFRICAN AMERICAN STUDIES (AFRICAAM) COURSES

### UNDERGRADUATE COURSES IN AFRICAN AND AFRICAN AMERICAN STUDIES

Primarily for undergraduates; graduate students may enroll with consent of adviser.

#### AFRICAAM 16N. African Americans and Social Movements

(F,Sem) (Same as CSRE 16N, SOC 16N) Stanford Introductory Seminar. Theory and research on African Americans' roles in post-Civil Rights, US social movements. Topics include women's right, LGBT rights, environmental movement, and contemporary political conservatism. GER:DB-SocSci

3 units, Aut (Fields, C)

#### AFRICAAM 21. African American Vernacular English

(Same as LINGUIST 65, LINGUIST 265) The English vernacular spoken by African Americans in big city settings, and its relation to Creole English dialects spoken on the S. Carolina Sea Islands (Gullah), in the Caribbean, and in W. Africa. The history of expressive uses of African American English (in soundin' and rappin'), and its educational implications. Service Learning Course (certified by Haas Center). GER:DB-SocSci, EC-AmerCul

3-5 units, Win (Rickford, J)

#### AFRICAAM 43. Introduction to African American Literature

(Same as AMSTUD 143, ENGLISH 43, ENGLISH 143) (English

majors and others taking 5 units, register for 143.) African American literature from its earliest manifestations in the spirituals, trickster tales, and slave narratives to recent developments such as black feminist theory, postmodern fiction, and hip hop lyricism. We will engage some of the defining debates and phenomena within African American cultural history, including the status of realist aesthetics in black writing; the contested role of literature in black political struggle; the question of diaspora; the problem of intra-racial racism; and the emergence of black internationalism. Attuned to the invariably hybrid nature of this tradition, we will also devote attention to the discourse of the Enlightenment, modernist aesthetics, and the role of Marxism in black political and literary history. GER:DB-Hum, EC-AmerCul  
3-5 units, Aut (Rasberry, G)

#### **AFRICAAM 47. History of South Africa**

(Same as HISTORY 47) (Same as HISTORY 147. History majors and others taking 5 units, register for 147.) Introduction, focusing particularly on the modern era. Topics include: precolonial African societies; European colonization; the impact of the mineral revolution; the evolution of African and Afrikaner nationalism; the rise and fall of the apartheid state; the politics of post-apartheid transformation; and the AIDS crisis. GER:DB-SocSci  
3 units, Aut (Campbell, J)

#### **AFRICAAM 48Q. South Africa: Contested Transitions**

(S,Sem) (Same as HISTORY 48Q) Stanford Introductory Seminar. Preference to sophomores. The inauguration of Nelson Mandela as president in May 1994 marked the end of an era and a way of life for S. Africa. The changes have been dramatic, yet the legacies of racism and inequality persist. Focus: overlapping and sharply contested transitions. Who advocates and opposes change? Why? What are their historical and social roots and strategies? How do people reconstruct their society? Historical and current sources, including films, novels, and the Internet. GER:DB-Hum, EC-GlobalCom  
3 units, Win (Samoff, J)

#### **AFRICAAM 50B. 19th Century America**

(Same as HISTORY 50B) (Same as HISTORY 150B. History majors and others taking 5 units, register in 150B.) Territorial expansion, social change, and economic transformation. The causes and consequences of the Civil War. Topics include: urbanization and the market revolution; slavery and the Old South; sectional conflict; successes and failures of Reconstruction; and late 19th-century society and culture. GER:DB-SocSci, EC-AmerCul  
3 units, Win (White, R)

#### **AFRICAAM 51. Congolese Dance**

(Same as AFRICAST 51, DANCE 51) Movements and choreography from Central Africa. Elements unique to all African dance movement: body isolation, polyrhythmic movement, and body posture. Live drumming. Open to all levels of dancers.  
1 unit, alternate years, not given this year

#### **AFRICAAM 54N. African American Women's Lives**

(Same as HISTORY 54N) Preference to freshmen. The everyday lives of African American women in 19th- and 20th-century America in comparative context of histories of European, Hispanic, Asian, and Native American women. Primary sources including personal journals, memoirs, music, literature, and film, and historical texts. Topics include slavery and emancipation, labor and leisure, consumer culture, social activism, changing gender roles, and the politics of sexuality. GER:DB-Hum, EC-Gender  
4-5 units, not given this year

#### **AFRICAAM 56N. Mixed Race in the New Millennium: Crossings of Kin, Faith & Culture**

(F,Sem) (Same as CSRE 56N, ENGLISH 56N) Stanford Introductory Seminar. Preference to freshmen. How literature, theater, graphic art and popular culture shape understandings of contemporary mixed race identity and other complex experiences of cultural hybridity. Course explores implications for racial identity, art, and politics for the new millennium. GER:DB-Hum  
3 units, Win (Elam, M)

#### **AFRICAAM 64C. From Freedom to Freedom Now!: African American History, 1865-1965**

(Same as HISTORY 64C) (Same as HISTORY 164C. History

majors and others taking 5 units, register for 164C.) Explores the working lives, social worlds, political ideologies and cultural expressions of African Americans from emancipation to the early civil rights era. Topics include: the transition from slavery to freedom, family life, work, culture, leisure patterns, resistance, migration and social activism. Draws largely on primary sources including autobiographies, memoirs, letters, personal journals, newspaper articles, pamphlets, speeches, literature, film and music. GER:DB-SocSci, EC-AmerCul

3 units, not given this year

#### **AFRICAAM 75. Black Cinema**

How filmmakers represent historical and cultural issues in Black cinema.

2 units, Aut (Barker-Alexander, J; Wooden, I)

#### **AFRICAAM 75C. Black Sitcoms: The Fresh Prince of Bel-Air**

The portrayal of black life on television in the 90s. Critical framework including concepts of identity, race, gender, and class. In-class viewings. Sitcoms in relation to theoretical work including that of Toni Morrison, Marlon Riggs, Hermann Gray, Ann duCille, and Mark Anthony Neal.

2 units, OCCASIONAL

#### **AFRICAAM 105. Introduction to African and African American Studies**

Interdisciplinary. Central themes in African American culture and history related to race as a definitive American phenomenon. African survivals and interpretations of slavery in the New World, contrasting interpretations of the Black family, African American literature, and art. Possible readings: Frederick Douglass, Harriet Jacobs, Booker T. Washington, W.E.B. DuBois, Richard Wright, Maya Angelou, James Baldwin, Malcolm X, Alice Walker, and bell hooks. Focus may vary each year. This course is a WIM course. GER:DB-Hum, EC-AmerCul

5 units, Win (Brown, C; Caruthers, J)

#### **AFRICAAM 106. Race, Ethnicity, and Linguistic Diversity in Classrooms: Sociocultural Theory and Practices**

(Same as CSRE 103B, EDUC 103B, EDUC 337) Focus is on classrooms with students from diverse racial, ethnic and linguistic backgrounds. Studies, writing, and media representation of urban and diverse school settings; implications for transforming teaching and learning. Issues related to developing teachers with attitudes, dispositions, and skills necessary to teach diverse students.

3-5 units, Spr (Ball, A)

#### **AFRICAAM 107C. The Black Mediterranean: Greece, Rome and Antiquity**

(Same as CLASSGEN 107, CSRE 107) Explore problems of race and ethnicity as viable criteria in studying ancient societies and consider the question, What is the Mediterranean?, in relation to premodern evidence. Investigate the role of blackness as a marker of ethnicity; the demography of slavery and its roles in forming social identities; and environmental determinism as a factor in ethnic and racial thinking. Consider Greek and Roman perspectives and behavior, and their impact on later theories of race and ethnicity as well as the Mediterranean as a whole. GER:EC-GlobalCom

4-5 units, not given this year

#### **AFRICAAM 112. Urban Education**

(Same as EDUC 112X, EDUC 212X, SOC 129X, SOC 229X) (Graduate students register for EDUC 212X or SOC 229X). Combination of social science and historical perspectives trace the major developments, contexts, tensions, challenges, and policy issues of urban education. GER:DB-SocSci

3-4 units, Spr (Ball, A)

#### **AFRICAAM 121X. Hip Hop, Youth Identities, and the Politics of Language**

(Same as AMSTUD 121X, ANTHRO 121A, CSRE 121X, EDUC 121X, LINGUIST 155) Focus is on issues of language, identity, and globalization, with a focus on Hip Hop cultures and the verbal virtuosity within the Hip Hop nation. Beginning with the U.S., a broad, comparative perspective in exploring youth identities and the politics of language in what is now a global Hip Hop movement. Readings draw from the interdisciplinary literature on Hip Hop cultures with a focus on sociolinguistics and youth culture.

3-4 units, Spr (Alim, H)

**AFRICAAM 123. Great Works of the African American Tradition**

Foundational African and African American scholarly figures and their work from the 19th century to the present. Historical, political, and scholarly context. Dialogues distinctive to African American culture. May be repeated for credit.

*5 units, not given this year*

**AFRICAAM 145A. Poetics and Politics of Caribbean Women's Literature**

(Same as CSRE 145A) Mid 20th-century to the present. How historical, economic, and political conditions in Haiti, Cuba, Jamaica, Antigua, and Guadeloupe affected women. How Francophone, Anglophone, and Hispanophone women novelists, poets, and short story writers respond to similar issues and pose related questions. Caribbean literary identity within a multicultural and diasporic context; the place of the oral in the written feminine text; family and sexuality; translation of European master texts; history, memory, and myth; and responses to slave history, colonialism, neocolonialism, and globalization. GER:DB-SocSci, DB-SocSci, EC-Gender

*5 units, not given this year*

**AFRICAAM 146. New Possibilities for Writing and Art**

Writing workshop to explore conventional as well as innovative approaches to writing, including digital, sound and movement. How different forms of music can inspire poetry. How still art, live performance, interviews or film shape the way one can think about and compose stories. What those stories and poems look and feel like when put to movement. CWriting experiments, museum visits, and performance of students' works. Guest poets, fiction writers, and artists who blur these boundaries. Students submit written pieces each week to be discussed.

*5 units, Spr (Staff), ONCEONLY*

**AFRICAAM 147. History of South Africa**

(Same as HISTORY 147) (Same as HISTORY 47. History majors and others taking 5 units, register for 147.) Introduction, focusing particularly on the modern era. Topics include: precolonial African societies; European colonization; the impact of the mineral revolution; the evolution of African and Afrikaner nationalism; the rise and fall of the apartheid state; the politics of post-apartheid transformation; and the AIDS crisis. GER:DB-SocSci

*5 units, Aut (Campbell, J)*

**AFRICAAM 150B. 19th-Century America**

(Same as AMSTUD 150B, HISTORY 150B) (Same as HISTORY 50B. History majors and others taking 5 units, register for 150B.) Territorial expansion, social change, and economic transformation. The causes and consequences of the Civil War. Topics include: urbanization and the market revolution; slavery and the Old South; sectional conflict; successes and failures of Reconstruction; and late 19th-century society and culture. GER:DB-SocSci, EC-AmerCul

*5 units, Win (White, R)*

**AFRICAAM 152. DuBois and American Culture**

(Same as AMSTUD 152D, ENGLISH 152D) His life and career. Focus on first half of his life from his Harvard doctoral dissertation to the end of the Harlem Renaissance in which he played a crucial role. Sources include his books on history and sociology, scholarly essays, novels, and journals that he edited. AAAS WIM course. GER:DB-Hum, EC-AmerCul

*5 units, Spr (Elam, M)*

**AFRICAAM 152G. Global Harlem Renaissance**

(Same as AMSTUD 152G, ENGLISH 152G) Examination of the explosion of African American artistic expression during 1920s and 30s New York known as the Harlem Renaissance. Amiri Baraka once referred to the Renaissance as a kind of 'vicious Modernism,' as a 'BangClash,' that impacted and was impacted by political, cultural and aesthetic changes not only in the U.S. but Europe, the Caribbean and Latin America. Focus on the literature, graphic arts, and the music of the era in this global context. GER:DB-Hum, EC-AmerCul

*5 units, not given this year*

**AFRICAAM 156T. Africa in the African American Imaginary: Black Drama in the United States from 1950 to the Present**

(Same as DRAMA 156T) What role has imagining Africa played in the construction of an African American identity? How do

playwrights stage Afrocentric politics? We shall interrogate the intellectual questions that come to bear at the juncture where Africa meets African America and discuss themes that include Christianity, exploitation, gender relations, and more. By the end of the quarter students will have a critical understanding of how playwrights interweave politics and ideologies that articulated African/African American relationships.

*4 units, Spr (Mbowe, A)*

**AFRICAAM 163S. Post Black Drama in the Age of Obama**

(Same as AMSTUD 163S, CSRE 163S, DRAMA 163S, DRAMA 363S) This course will examine works of the new millennium that confront questions of African American experience. These plays are written by African American and non-black writers. In analyzing these works, this course will investigate such questions as: In a time that has been called 'Post Race' or 'Post Soul' or even 'Post Black,' what can we discern about African American drama? How do these plays reflect or contradict such labeling? How do these works speak to our times? Who does the form relate to in matters of content in these works? What do these works tell us about the contemporary constructions and meanings of blackness? GER:DB-Hum

*5 units, Win (Elam, H)*

**AFRICAAM 166. Introduction to African American History: The Modern African American Freedom Struggle**

(Same as AMSTUD 166, HISTORY 166) Focus is on political thought and protest movements after 1930. Individuals who have shaped and been shaped by modern African American struggles for freedom and justice. Sources include audiovisual materials. Research projects required for fifth unit. GER:DB-SocSci, EC-AmerCul

*4-5 units, not given this year*

**AFRICAAM 173S. Transcultural and Multiethnic Lives: Contexts, Controversies, and Challenges**

(Same as ASNAMST 173S, CSRE 173S) Lived experience of people who dwell in the border world of race and nation where they negotiate transcultural and multiethnic identities and politics. Comparative, historical, and global contexts such as family and class. Controversies, such as representations of mixed race people in media and multicultural communities. What the lives of people like Tiger Woods and Barack Obama reveal about how the marginal is becoming mainstream.

*5 units, not given this year*

**AFRICAAM 176H. Black Women Playwrights, 1900-the present**

(Same as DRAMA 176H, DRAMA 336, FEMST 140W) From the rave reviews garnered by Angelina Weld Grimke's lynching play, Rachel to recent work by Lynn Nottage on Rwanda, black women playwrights have addressed key issues in modern culture and politics. We will analyze and perform work written by black women in the U.S., Britain and the Caribbean in the 20th and 21st centuries. Topics include: sexuality, surrealism, colonialism, freedom, violence, colorism, love, history, community and more. Playwrights include: Angelina Grimke, Lorriane Hansberry, Winsome Pinnock, Adrienne Kennedy, Suzan- Lori Parks, Ntzoze Shange, Pearl Cleage, Sarah Jones, Anna DeVeaere Smith, Alice Childress, Lydia Diamond and Zora Neale Hurston.

*4 units, Aut (Brody, J)*

**AFRICAAM 190. Directed Reading**

May be repeated for credit. Prerequisite: consent of instructor.

*1-5 units, Aut (Staff), Win (Staff), Spr (Staff)*

**AFRICAAM 196. African Visual Art & Graphic Communication in the Americas**

(Same as ARTHIST 196, ARTHIST 396, CSRE 186) The class addresses the modes of visual expression used among the Bakongo people in Central Africa and their descendents in Cuba, Haiti, and Brazil and argues that together these constitute identifiable graphic writing systems. After providing a brief overview of the forms of graphic expression in use within Kongo and Kongo Atlantic cultures, the class focuses on the most central of the traditional cosmograms, Dikenga. By mapping the meanings and forms of Dikenga, the essay attempts to demonstrate its continuity throughout the Kongo diaspora. Finally, the class highlights the rich cosmology, cosmogony, and moral philosophy that have consistently informed the use and meaning of Dikenga in its



central role in religious narratives, moral philosophy and religious education among the Bakongo in Atlantic world. GER:DB-Hum  
4 units, not given this year

#### **AFRICAAM 199. Honors Project**

May be repeated for credit. Prerequisite: consent of instructor.  
1-5 units, Win (Staff), Spr (Staff)

#### **AFRICAAM 200X. Honors Thesis and Senior Thesis Seminar**

Required for seniors. Weekly colloquia with AAAS Director and Associate Director to assist with refinement of research topic, advisor support, literature review, research, and thesis writing. Readings include foundational and cutting-edge scholarship in the interdisciplinary fields of African and African American studies and comparative race studies. Readings assist students situate their individual research interests and project within the larger. Students may also enroll in AFRICAAM 200Y in Winter and AFRICAAM 200Z in Spring for additional research units (up to 10 units total).  
3-5 units, Aut (Staff)

#### **AFRICAAM 200Y. Honors Thesis and Senior Thesis Research**

Winter. Required for students writing an Honors Thesis. Optional for Students writing a Senior Thesis.  
3-5 units, Win (Staff)

#### **AFRICAAM 200Z. Honors Thesis and Senior Thesis Research**

Spring. Required for students writing an Honors Thesis. Optional for Students writing a Senior Thesis.  
3-5 units, Spr (Staff)

#### **AFRICAAM 204F. The Modern Tradition of Non-Violent Resistance**

(Same as CSRE 104F, HISTORY 204F) During the twentieth century, peasants and menial laborers who comprised the majority of humanity launched liberation movements to secure citizenship rights. Mohandas K. Gandhi, Martin Luther King, Jr., and Nelson Mandela are among the leaders whose ideas continue to influence contemporary movements for global peace with social justice in a sustainable environment.  
5 units, not given this year

#### **AFRICAAM 255. Racial Identity in the American Imagination**

(Same as AMSTUD 255D, CSRE 255D, HISTORY 255D, HISTORY 355D) Major historical transformations shaping the understanding of racial identity and how it has been experienced, represented, and contested in American history. Topics include: racial passing and racial performance; migration, immigration, and racial identity in the urban context; the interplay between racial identity and American identity; the problems of class, gender, and sexuality in the construction of racial identity. Sources include historical and legal texts, memoirs, photography, literature, film, and music. GER:DB-SocSci, EC-AmerCul  
4-5 units, Win (Hobbs, A)

#### **AFRICAAM 261E. Mixed Race Literature in the U.S. and South Africa**

(Same as AMSTUD 261E, ENGLISH 261E) As scholar Werner Sollors recently suggested, novels, poems, stories about interracial contacts and mixed race constitute an orphan literature belonging to no clear ethnic or national tradition. Yet the theme of mixed race is at the center of many national self-definitions, even in our U.S. post-Civil Rights and South Africa's post-Apartheid era. This course examines aesthetic engagements with mixed race politics in these trans- and post-national dialogues, beginning in the 1700s and focusing on the 20th and 21st centuries.  
5 units, not given this year

#### **AFRICAAM 262D. African American Poetics**

(Same as AMSTUD 262D, ENGLISH 262D) Examination of African American poetic expressive forms from the 1700s to the 2000s, considering the central role of the genre--from sonnets to spoken word, from blues poetry to new media performance--in defining an evolving literary tradition and cultural identity.  
5 units, not given this year

### **GRADUATE COURSES IN AFRICAN AND AFRICAN AMERICAN STUDIES**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

#### **AFRICAAM 233A. Counseling Theories and Interventions**

#### **from a Multicultural Perspective**

(Same as CSRE 233A, EDUC 233A) In an era of globalization characterized by widespread migration and cultural contacts, professionals face a unique challenge: How does one practice successfully when working with clients/students from so many different backgrounds? This course focuses upon the need to examine, conceptualize, and work with individuals according to the multiple ways in which they identify themselves. It will systematically examine multicultural counseling concepts, issues, and research. Literature on counselor and client characteristics such as social status or race/ethnicity and their effects on the counseling process and outcome will be reviewed. Issues in consultation with culturally and linguistically diverse parents and students and work with migrant children and their families are but a few of the topics covered in this course.  
3-5 units, not given this year

#### **AFRICAAM 245. Understanding Racial and Ethnic Identity Development**

(Same as CSRE 245, EDUC 245) African American, Native American, Mexican American, and Asian American racial and ethnic identity development; the influence of social, political and psychological forces in shaping the experience of people of color in the U.S. The importance of race in relationship to social identity variables including gender, class, and occupational, generational, and regional identifications. Bi- and multiracial identity status, and types of white racial consciousness.  
3-5 units, not given this year

## **AFRICAN AND MIDDLE EASTERN LANGUAGES (AMELANG) COURSES**

### **UNDERGRADUATE COURSES IN AFRICAN AND MIDDLE EASTERN LANGUAGES**

Primarily for undergraduates; graduate students may enroll with consent of adviser.

#### **AMELANG 1A. Beginning Arabic, First Quarter**

(Formerly AMELANG 120A.) One-year sequence designed to develop beginning proficiency, with additional emphasis on reading and writing standard Arabic (fusha).  
5 units, Aut (Hashem-Aramouni, E)

#### **AMELANG 1B. Beginning Arabic, Second Quarter**

(Formerly AMELANG 120B.) One-year sequence designed to develop beginning proficiency, with additional emphasis on reading and writing standard Arabic (fusha). Prerequisite: 1A or consent of instructor.  
5 units, Win (Staff)

#### **AMELANG 1C. Beginning Arabic, Third Quarter**

(Formerly AMELANG 120C.) Continuation of 1B. One-year sequence designed to develop beginning proficiency, with additional emphasis on reading and writing standard Arabic (fusha). Fulfills the University Foreign Language Requirement. Prerequisite: 1B or consent of instructor.  
5 units, Spr (Obeid, K)

#### **AMELANG 1H. Beginning Arabic for Heritage Learners, First Quarter**

For students with home background or study/living experience in the Arab world. Designed to develop reading, writing, speaking and listening abilities in Arabic, as well as cultural knowledge. The course offers Arabic heritage and semi-heritage learners an opportunity to reactivate and expand their skills while studying both Modern Standard and Colloquial Arabic (Levantine Arabic) formally in an academic setting. Prerequisite: placement, or consent of instructor.  
5 units, Aut (Aweiss, S)

#### **AMELANG 1S. Intensive Beginning Arabic, Part A**

(Formerly AMELANG 20A.) Stanford graduate students restricted

to 9 units register for 1G.

*5 units, not given this year*

**AMELANG 2H. Beginning Arabic for Heritage Learners, Second Quarter**

Continuation of 1H. For students with home background or study/living experience in the Arab world. Designed to develop reading, writing, speaking and listening abilities in Arabic, as well as cultural knowledge. The course offers Arabic heritage and semi-heritage learners an opportunity to reactivate and expand their skills while studying both Modern Standard and Colloquial Arabic (Levantine Arabic) formally in an academic setting. Prerequisite: 1H or consent of instructor.

*5 units, Win (Aweiss, S)*

**AMELANG 2S. Intensive Beginning Arabic, Part B**

(Formerly AMELANG 20A.) Continuation of 1S. Stanford graduate student restricted to 9 units register for 2G.

*5 units, not given this year*

**AMELANG 3H. Beginning Arabic for Heritage Learners, Third Quarter**

Continuation of 2H. For students with home background or study/living experience in the Arab world. Designed to develop reading, writing, speaking and listening abilities in Arabic, as well as cultural knowledge. The course offers Arabic heritage and semi-heritage learners an opportunity to reactivate and expand their skills while studying both Modern Standard and Colloquial Arabic (Levantine Arabic) formally in an academic setting. Prerequisite: 2H or consent of instructor.

*5 units, Spr (Staff)*

**AMELANG 3S. Intensive Beginning Arabic, Part C**

(Formerly AMELANG 20C.) Continuation of 2S. Stanford graduate students restricted to 9 units register for 3G.

*5 units, not given this year*

**AMELANG 11A. Intermediate Arabic, First Quarter**

(Formerly AMELANG 121A.) One-year sequence designed to develop intermediate proficiency, with additional emphasis on functional applications and reading and writing standard Arabic. Prerequisite: placement test, 1C or consent of instructor.

*5 units, Aut (Salti, R)*

**AMELANG 11B. Intermediate Arabic, Second Quarter**

(Formerly AMELANG 121B.) Continuation of 11A. One-year sequence designed to develop intermediate proficiency, with additional emphasis on functional applications and reading and writing standard Arabic. Prerequisite: placement test, 11A or consent of instructor.

*5 units, Win (Salti, R)*

**AMELANG 11C. Intermediate Arabic, Third Quarter**

(Formerly AMELANG 121C.) Continuation of 11B. One-year sequence designed to develop intermediate proficiency, with additional emphasis on functional applications and reading and writing standard Arabic. Prerequisite: placement test, 11B or consent of instructor.

*5 units, Spr (Salti, R)*

**AMELANG 11H. Intermediate Arabic for Heritage Learners, First Quarter**

For students with home background or study/living experience in the Arab world. Designed to develop reading, writing, speaking and listening abilities in Arabic, as well as cultural knowledge. The course offers Arabic heritage and semi-heritage learners an opportunity to reactivate and expand their skills while studying both Modern Standard and Colloquial Arabic (Levantine Arabic) formally in an academic setting. Prerequisite: placement, or consent of instructor.

*5 units, Aut (Salti, R)*

**AMELANG 11S. Intensive Intermediate Arabic, Part A**

(Formerly AMELANG 221A.) Speaking, listening, reading, and writing, emphasizing Arabic grammar and functional applications. Stanford graduate students restricted to 9 units register for 11G.

*4 units, not given this year*

**AMELANG 12H. Intermediate Arabic for Heritage Learners, Second Quarter**

Continuation of 11H. For students with home background or study/living experience in the Arab world. Designed to develop reading, writing, speaking and listening abilities in Arabic, as well

as cultural knowledge. The course offers Arabic heritage and semi-heritage learners an opportunity to reactivate and expand their skills while studying both Modern Standard and Colloquial Arabic (Levantine Arabic) formally in an academic setting. Prerequisite: placement tests, 11H or consent of instructor.

*5 units, Win (Staff)*

**AMELANG 12S. Intensive Intermediate Arabic, Part B**

Continuation of 11S. Speaking, listening, reading, and writing, emphasizing Arabic grammar and functional applications. Stanford graduate students restricted to 9 units register for 12G.

*4 units, not given this year*

**AMELANG 13H. Intermediate Arabic for Heritage Learners, Third Quarter**

Continuation of 12H. For students with home background or study/living experience in the Arab world. Designed to develop reading, writing, speaking and listening abilities in Arabic, as well as cultural knowledge. The course offers Arabic heritage and semi-heritage learners an opportunity to reactivate and expand their skills while studying both Modern Standard and Colloquial Arabic (Levantine Arabic) formally in an academic setting. Prerequisite: placement tests, 12H or consent of instructor.

*5 units, Spr (Staff)*

**AMELANG 13S. Intensive Intermediate Arabic, Part C**

(Formerly AMELANG 221C.) Continuation of 12S. Speaking, listening, reading, and writing, emphasizing Arabic grammar and functional applications. Stanford graduate students restricted to 9 units register for 13G.

*4 units, not given this year*

**AMELANG 21A. Advanced Arabic, First Quarter**

(Formerly AMELANG 122A.) Continuation of 11C. One-year sequence designed to develop advanced proficiency with emphasis on complex and compound sentences through use of literary works, media Arabic, the Internet, and cultural productions. Prerequisite: placement test, 11C or consent of instructor.

*5 units, Aut (Aweiss, S)*

**AMELANG 21B. Advanced Arabic, Second Quarter**

(Formerly AMELANG 122B.) Continuation of 21B. One-year sequence designed to develop advanced proficiency with emphasis on complex and compound sentences through use of literary works, media Arabic, the Internet, and cultural productions. Prerequisite: placement test, 21A or consent of instructor.

*5 units, Win (Aweiss, S)*

**AMELANG 21C. Advanced Arabic, Third Quarter**

(Formerly AMELANG 122C.) Continuation of 21B. One-year sequence designed to develop advanced proficiency with emphasis on complex and compound sentences through use of literary works, media Arabic, the Internet, and cultural productions. Prerequisite: placement test, 21B or consent of instructor.

*5 units, Spr (Aweiss, S)*

**AMELANG 21H. Advanced Arabic for Heritage Learners, First Quarter**

For students with home background or study/living experience in the Arab world. Designed to develop reading, writing, speaking and listening abilities in Arabic, as well as cultural knowledge. The course offers Arabic heritage and semi-heritage learners an opportunity to reactivate and expand their skills while studying both Modern Standard and Colloquial Arabic (Levantine Arabic) formally in an academic setting. Prerequisite: placement test, or consent of instructor.

*5 units, Aut (Aweiss, S)*

**AMELANG 22H. Advanced Arabic for Heritage Learners, Second Quarter**

Continuation of 21H. For students with home background or study/living experience in the Arab world. Designed to develop reading, writing, speaking and listening abilities in Arabic, as well as cultural knowledge. The course offers Arabic heritage and semi-heritage learners an opportunity to reactivate and expand their skills while studying both Modern Standard and Colloquial Arabic (Levantine Arabic) formally in an academic setting. Prerequisite: placement test, 21H or consent of instructor.

*5 units, Win (Staff)*

**AMELANG 23A. Reading Arabic, First Quarter**

(Formerly AMELANG 196A.) For seniors and graduate students

who need advanced ability in Arabic for the PhD or for advanced research in their own field. Prerequisite: three years of Arabic or a demonstrated equivalence.

*3-4 units, Aut (Obeid, K)*

#### **AMELANG 23B. Reading Arabic, Second Quarter**

(Formerly AMELANG 196B.) Continuation of 23A. For seniors and graduate students who need advanced ability in Arabic for the PhD or for advanced research in their own field. Prerequisite: three years of Arabic or a demonstrated equivalence.

*3-4 units, Win (Barhoum, K)*

#### **AMELANG 23C. Reading Arabic, Third Quarter**

(Formerly AMELANG 196C.) Continuation of 23B. For seniors and graduate students who need advanced ability in Arabic for the PhD or for advanced research in their own field. Prerequisite: three years of Arabic or a demonstrated equivalence.

*3-4 units, Spr (Barhoum, K)*

#### **AMELANG 23H. Advanced Arabic for Heritage Learners, Third Quarter**

Continuation of 22H. For students with home background or study/living experience in the Arab world. Designed to develop reading, writing, speaking and listening abilities in Arabic, as well as cultural knowledge. The course offers Arabic heritage and semi-heritage learners an opportunity to reactivate and expand their skills while studying both Modern Standard and Colloquial Arabic (Levantine Arabic) formally in an academic setting. Prerequisite: placement test, 22H or consent of instructor.

*5 units, Spr (Staff)*

#### **AMELANG 24A. Arabic Skills Workshop, First Quarter**

Emphasis on the necessary Arabic skills (Reading, Writing, Listening, Speaking) needed by graduate students to conduct research in their own respective fields. Prerequisite: four years of Arabic or consent of instructor's field. Prerequisite: four years of Arabic or instructor's permission.

*3-4 units, Aut (Barhoum, K)*

#### **AMELANG 24B. Arabic Skills Workshop, Second Quarter**

Continuation of 24A. Emphasis on the necessary Arabic skills (Reading, Writing, Listening, Speaking) needed by graduate students to conduct research in their own respective fields. Prerequisite: 23B or consent of instructor's,

*3-4 units, Win (Staff)*

#### **AMELANG 24C. Arabic Skills Workshop, Third Quarter**

Continuation of 24B. Emphasis on the necessary Arabic skills (Reading, Writing, Listening, Speaking) needed by graduate students to conduct research in their own respective fields. Prerequisite: 24B, or consent of instructor's.

*3-4 units, Spr (Barhoum, K)*

#### **AMELANG 25A. Colloquial Arabic, First Quarter**

(Formerly AMELANG 198A.) Sources include authentic videotaped conversations with native speakers, conversations, and texts of these conversations to enhance comprehension and improve aural skills. Prerequisite: 2 years of Arabic.

*2-4 units, not given this year*

#### **AMELANG 25B. Colloquial Arabic, Second Quarter**

(Formerly AMELANG 198B.) Continuation of 25A. Sources include authentic videotaped conversations with native speakers, conversations, and texts of these conversations to enhance comprehension and improve aural skills. Prerequisite: 2 years of Arabic. Prerequisite: 25A.

*2-4 units, Win (Staff)*

#### **AMELANG 25C. Colloquial Arabic, Third Quarter**

(Formerly AMELANG 198C.) Continuation of 25B. Sources include authentic videotaped conversations with native speakers, conversations, and texts of these conversations to enhance comprehension and improve aural skills. Prerequisite: 2 years of Arabic. Prerequisite: 25B

*2-4 units, Spr (Staff)*

#### **AMELANG 26A. Media Arabic, First Quarter**

(Formerly AMELANG 199A.) Arabic language used today in the printed and electronic media, including the Internet. Emphasizes current vocabulary and structures used in different modes of media coverage. Prerequisite: 2 years of Arabic.

*2-4 units, not given this year*

#### **AMELANG 26B. Media Arabic, Second Quarter**

(Formerly AMELANG 199B.) Continuation of 26A. Arabic language used today in the printed and electronic media, including the Internet. Emphasizes current vocabulary and structures used in different modes of media coverage. Prerequisite: 2 years of Arabic. Prerequisite: 26A.

*2-4 units, not given this year*

#### **AMELANG 26C. Media Arabic, Third Quarter**

(Formerly AMELANG 199C.) Continuation of 26B. Arabic language used today in the printed and electronic media, including the Internet. Emphasizes current vocabulary and structures used in different modes of media coverage. Prerequisite: 2 years of Arabic. Prerequisite: 26B.

*2-4 units, not given this year*

#### **AMELANG 27A. Advanced Arabic Conversation, First Quarter**

(Formerly AMELANG 143A.) Repeatable once for credit. Prerequisite: second-year year Arabic or consent of instructor.

*2 units, not given this year*

#### **AMELANG 27B. Advanced Arabic Conversation, Second Quarter**

Continuation of 27A. Repeatable once for credit. Prerequisite: second-year Arabic or consent of instructor.

*2 units, not given this year*

#### **AMELANG 27C. Advanced Arabic Conversation, Third Quarter**

Continuation of 27B. Repeatable once for credit. Prerequisite: second-year year Arabic or consent of instructor.

*2 units, not given this year*

#### **AMELANG 30. Arabic Calligraphy**

Calligraphy requires no linguistic background, stipulates no artistic skill for one to appreciate it and is the supreme art form of the Islamic world. Other Islamic arts (architecture, metal work, ceramics, glass, and textiles) draw on calligraphy as their principal source of embellishment. Interactive lecture-workshop sketches its development and illustrates the forms of Arabic calligraphy in use today.

*2 units, Spr (Barhoum, K)*

#### **AMELANG 31. The Contemporary Arab World and Culture through Literature**

(Formerly AMELANG 161.) Readings from prominent authors dealing with topics such as gender and women, kinship and social concepts, nationalism, and religion. Texts delineating the cultural uniqueness of the Arab world include works by Naguib Mahfouz, Nawal El-Saadawi, Ghassan Kanafani, Tayyeb Salih, Etel Adnan, and short stories and poetry. All texts in English. No knowledge of Arabic required. Limited enrollment. GER:DB-Hum, EC-GlobalCom

*4 units, Aut (Barhoum, K)*

#### **AMELANG 32. Arab Women Writers and Issues**

(Formerly AMELANG 162.) Fiction and non-fiction work. The major cultural factors shaping their feminist attitudes. Readings: Fatima Mernissi, Nawal El-Saadawi, Etel Adnan, Alifa Rifaat, and Sahar Khalifeh. All texts in English. No knowledge of Arabic required. Limited enrollment. GER:DB-Hum, EC-Gender

*4 units, Win (Barhoum, K)*

#### **AMELANG 33. The Arab World through Travel Literature**

(Formerly AMELANG 163.) Popular colonialist and post colonialist portrayals of Arab culture and Islam. Recent Western depictions of Arabs and Muslims in travel literature. Readings include Flaubert in Egypt, Guests of the Sheik, Justine, Covering Islam, Nine Parts of Desire, and Motoring with Mohammed. All texts in English. No knowledge of Arabic required. Limited enrollment. GER:DB-Hum, EC-GlobalCom

*4 units, Spr (Staff)*

#### **AMELANG 36. The Arabic Language and Culture**

(Same as LINGUIST 36, LINGUIST 270) Arabic language from historical, social, strategic, and linguistic perspectives. History of the Arabic language and the stability of classical Arabic over the last 15 centuries. Why the functionality of classical Arabic has not changed as Latin, Old English, and Middle English have. Social aspects of the Arabic language, Ferguson's notion of diglossia. The main varieties of Arabic, differences among them, and when

and where they are spoken. Role of Arabic and culture in current world politics, culture, and economy. Linguistic properties of Arabic such as root-based morphology, lexical ambiguity, and syntactic structure relating it to current linguistic theories.

3 units, not given this year

**AMELANG 50A. Reading Hebrew, First Quarter**

(Same as JEWISHST 50A) Introduction to Hebrew literature through short stories and poetry by notable Israeli writers. In Hebrew. Prerequisite: one year of Hebrew or equivalent.

2-4 units, not given this year

**AMELANG 50B. Reading Hebrew, Second Quarter**

Introduction to Hebrew literature through short stories and poetry by notable Israeli writers. In Hebrew. Prerequisite: one year of Hebrew or equivalent.

2-4 units, not given this year

**AMELANG 51A. Reading Biblical Hebrew, First Quarter**

2 units, not given this year

**AMELANG 100A. Beginning Amharic, First Quarter**

4 units, Aut (Tefamariam, I)

**AMELANG 100B. Beginning Amharic, Second Quarter**

Continuation of 100A. Prerequisite 100A or consent of instructor.

4 units, Win (Tefamariam, I)

**AMELANG 100C. Beginning Amharic, Third Quarter**

Continuation of 100B. Prerequisite 100B or consent of instructor.

Fulfills the University Foreign Language Requirement.

4 units, Win (Tefamariam, I), Spr (Tefamariam, I)

**AMELANG 101A. Intermediate Amharic, First Quarter**

Continuation of 100C. Fulfills the University Foreign Language Requirement.

3 units, not given this year

**AMELANG 101B. Intermediate Amharic, Second Quarter**

Continuation of 101A.

3 units, not given this year

**AMELANG 101C. Intermediate Amharic, Third Quarter**

Continuation of 101B.

3 units, not given this year

**AMELANG 103A. Beginning Hausa, First Quarter**

3 units, not given this year

**AMELANG 103B. Beginning Hausa, Second Quarter**

Continuation of 103A.

3 units, not given this year

**AMELANG 103C. Beginning Hausa, Third Quarter**

Continuation of 103B.

3 units, not given this year

**AMELANG 106A. Beginning Swahili, First Quarter**

5 units, Aut (Rutechura, M), Spr (Rutechura, M)

**AMELANG 106B. Beginning Swahili, Second Quarter**

Continuation of 106A. Prerequisite 106A or consent of instructor.

5 units, Aut (Rutechura, M), Win (Rutechura, M)

**AMELANG 106C. Beginning Swahili, Third Quarter**

Continuation of 106B. Prerequisite 106B or consent of instructor.

Fulfills the University foreign language requirement.

5 units, Win (Rutechura, M), Spr (Rutechura, M)

**AMELANG 107A. Intermediate Swahili, First Quarter**

Continuation of 106C. Prerequisite 106C or consent of instructor.

5 units, Aut (Rutechura, M)

**AMELANG 107B. Intermediate Swahili, Second Quarter**

Continuation of 107A. Prerequisite 107A or consent of instructor.

5 units, Win (Rutechura, M)

**AMELANG 107C. Intermediate Swahili, Third Quarter**

Continuation of 107B. Prerequisite 107B or consent of instructor.

5 units, Spr (Rutechura, M)

**AMELANG 108A. Advanced Swahili, First Quarter**

Continuation of 107C. Prerequisite: 107C or consent of instructor.

5 units, Aut (Staff)

**AMELANG 108B. Advanced Swahili, Second Quarter**

Continuation of 108A. Prerequisite: 108A or consent of instructor.

5 units, Win (Staff)

**AMELANG 108C. Advanced Swahili, Third Quarter**

Continuation of 108B. Prerequisite: 108B or consent of instructor.

5 units, Spr (Mapunda, C)

**AMELANG 117A. Beginning Shona, First Quarter**

4 units, Aut (Staff)

**AMELANG 117B. Beginning Shona, Second Quarter**

Continuation of 117A. Prerequisite: 117A or consent of instructor.

4 units, Win (Staff)

**AMELANG 117C. Beginning Shona, Third Quarter**

Continuation of 117B. Prerequisite: 117B or consent of instructor.

Fulfills the University Foreign Language Requirement.

4 units, Spr (Sibanda, G)

**AMELANG 118A. Intermediate Shona, First Quarter**

Prerequisite: 117C or consent of instructor.

4 units, Aut (Staff)

**AMELANG 118B. Intermediate Shona, Second Quarter**

(Staff)

3 units, Win (Staff)

**AMELANG 118C. Intermediate Shona, Third Quarter**

(Staff)

3 units, Spr (Sibanda, G)

**AMELANG 126. Reflection on the Other: The Jew in Arabic Literature, the Arab in Hebrew Literature**

How literary works outside the realm of western culture struggle with questions such as identity, minority, and the issue of the other. How the Arab is viewed in Hebrew literature and how the Jew is viewed in Arabic literature. Historical, political, and sociological forces that have contributed to the shaping of the writer's views. Arab and Jewish (Israeli) culture. GER:DB-Hum, EC-GlobalCom

4 units, Win (Shemtov, V)

**AMELANG 127. Land and Literature**

(Same as JEWISHST 102) Israel has captured the imagination of writers throughout the generations. It has been portrayed as promised land, holy land, homeland, empty land, occupied land, and land of dreams. Ideological views and political events have shaped writers' conception of Israel. Readings include poems, prose, and theoretical texts about place and literature. No knowledge of Hebrew required. GER:DB-Hum, EC-GlobalCom

4 units, not given this year

**AMELANG 128A. Beginning Hebrew, First Quarter**

(Same as JEWISHST 101A)

5 units, Aut (Porat, G; Greif, E)

**AMELANG 128B. Beginning Hebrew, Second Quarter**

(Same as JEWISHST 101B)

5 units, Win (Greif, E; Keydar, R)

**AMELANG 128C. Beginning Hebrew, Third Quarter**

(Same as JEWISHST 101C)

5 units, Spr (Porat, G; Greif, E)

**AMELANG 129A. Intermediate Hebrew, First Quarter**

(Same as JEWISHST 102A)

4 units, Aut (Shemtov, V)

**AMELANG 129B. Intermediate Hebrew, Second Quarter**

(Same as JEWISHST 102B)

4 units, Win (Shemtov, V)

**AMELANG 129C. Intermediate Hebrew, Third Quarter**

(Same as JEWISHST 102C)

4 units, Spr (Porat, G)

**AMELANG 130A. Advanced Hebrew, First Quarter**

(Same as JEWISHST 103A)

1-4 units, not given this year

**AMELANG 131. Hebrew Forum**

(Same as JEWISHST 104) Intermediate and advanced level. Bi-weekly Hebrew discussion on contemporary issues with Israeli guest speakers. Vocabulary enhancement. Focus on exposure to academic Hebrew.

2-4 units, Aut (Shemtov, V)

**AMELANG 133B. The African Forum, Second Quarter**

1 unit, not given this year

**AMELANG 133C. The African Forum, Third Quarter**  
1 unit, not given this year

**AMELANG 134A. Beginning Igbo, First Quarter**  
3 units, not given this year

**AMELANG 134B. Beginning Igbo, Second Quarter**  
Continuation of 134A.  
3 units, not given this year

**AMELANG 134C. Beginning Igbo, Third Quarter**  
Continuation of 134B.  
3 units, not given this year

**AMELANG 135A. Intermediate Igbo, First Quarter**  
Continuation of 134C. Fulfills the University foreign language requirement.  
3 units, not given this year

**AMELANG 135B. Intermediate Igbo, Second Quarter**  
Continuation of 135A.  
3 units, not given this year

**AMELANG 135C. Intermediate Igbo, Third Quarter**  
Continuation of 135B.  
3 units, not given this year

**AMELANG 136A. Beginning Xhosa, First Quarter**  
4 units, Aut (Staff)

**AMELANG 136B. Beginning Xhosa, Second Quarter**  
Continuation of 136A. Prerequisite 136A or consent of instructor.  
4 units, Win (Staff)

**AMELANG 136C. Beginning Xhosa, Third Quarter**  
Continuation of 136B. Prerequisite 136B or consent of instructor. Fulfills the University Foreign Language Requirement.  
4 units, Spr (Sibanda, G)

**AMELANG 137A. Intermediate Xhosa, First Quarter**  
Continuation of 137C. Prerequisite 137C or consent of instructor  
4 units, Aut (Staff)

**AMELANG 137B. Intermediate Xhosa, Second Quarter**  
Continuation of 137A. Prerequisite: 137A or consent of instructor.  
4 units, Win (Staff)

**AMELANG 137C. Intermediate Xhosa, Third Quarter**  
Continuation of 137B. Prerequisite 137B or consent of instructor.  
4 units, Spr (Sibanda, G)

**AMELANG 138A. Advanced Xhosa, First Quarter**  
Continuation of 137C.  
3 units, not given this year

**AMELANG 138B. Advanced Xhosa, Second Quarter**  
Continuation of 138A.  
3 units, not given this year

**AMELANG 138C. Advanced Xhosa, Third Quarter**  
Continuation of 138B.  
3 units, not given this year

**AMELANG 140A. Beginning Yiddish, First Quarter**  
(Same as JEWISHST 104A) Reading, writing, and speaking.  
4 units, Aut (Levitow, J)

**AMELANG 140B. Beginning Yiddish, Second Quarter**  
(Same as JEWISHST 104B) Reading, writing, and speaking.  
4 units, Win (Levitow, J)

**AMELANG 140C. Beginning Yiddish, Third Quarter**  
(Same as JEWISHST 104C) Reading, writing, and speaking.  
4 units, Spr (Levitow, J)

**AMELANG 141A. Intermediate Yiddish, First Quarter**  
4 units, Aut (Levitow, J)

**AMELANG 141B. Intermediate Yiddish, Second Quarter**  
4 units, Win (Levitow, J)

**AMELANG 141C. Intermediate Yiddish, Third Quarter**  
4 units, Spr (Levitow, J)

**AMELANG 144A. First-Year Modern Persian, First Quarter**  
One-year sequence. Modern Persian for beginners; concentrates on rapidly developing basic skills in speaking, reading, writing, and understanding modern Persian. Strong emphasis is on the links between language and culture. The course is based on a fully integrated multimedia program. Students will learn the language with an emphasis on communicative and interactive classroom

activities.

4 units, Aut (Fahimi, S)

**AMELANG 144B. First-Year Modern Persian, Second Quarter**

Continuation of 144A. One-year sequence. Modern Persian for beginners; concentrates on rapidly developing basic skills in speaking, reading, writing, and understanding modern Persian. Strong emphasis is on the links between language and culture. The course is based on a fully integrated multimedia program. Students will learn the language with an emphasis on communicative and interactive classroom activities. Prerequisite: placement test, 144A or consent of instructor.

4 units, Win (Fahimi, S)

**AMELANG 144C. First-Year Modern Persian, Third Quarter**

Continuation of 144B. One-year sequence. Modern Persian for beginners; concentrates on rapidly developing basic skills in speaking, reading, writing, and understanding modern Persian. Strong emphasis is on the links between language and culture. The course is based on a fully integrated multimedia program. Students will learn the language with an emphasis on communicative and interactive classroom activities. Fulfills the University Foreign Language Requirement. Prerequisite: placement test, 144B, or consent of instructor.

4 units, Spr (Fahimi, S)

**AMELANG 145A. Second-Year Modern Persian, First Quarter**

Continuation of 144C. Expands students' proficiency in Persian language and culture at intermediate level through various texts and multimedia. It stresses oral fluency, written expression, and reading comprehension. Students will continue to learn the language with an emphasis on communicative and interactive classroom activities. Students will be introduced to contemporary as well as classical short poems by famous Persian poets like Rumi. Prerequisite: placement test, 144C or consent of instructor.

4 units, Aut (Fahimi, S)

**AMELANG 145B. Second-Year Modern Persian, Second Quarter**

Continuation of 145A. Expands students' proficiency in Persian language and culture at intermediate level through various texts and multimedia. It stresses oral fluency, written expression, and reading comprehension. Students will continue to learn the language with an emphasis on communicative and interactive classroom activities. Students will be introduced to contemporary as well as classical short poems by famous Persian poets like Rumi. Prerequisite: placement test, 144A or consent of instructor.

4 units, Win (Fahimi, S)

**AMELANG 145C. Second-Year Modern Persian, Third Quarter**

Continuation of 145B. expands students' proficiency in Persian language and culture at intermediate level through various texts and multimedia. It stresses oral fluency, written expression, and reading comprehension. Students will continue to learn the language with an emphasis on communicative and interactive classroom activities. Students will be introduced to contemporary as well as classical short poems by famous Persian poets like Rumi. Prerequisite: placement test, 144B or consent of instructor.

4 units, Spr (Fahimi, S)

**AMELANG 147A. Beginning Bambara, First Quarter**

3 units, not given this year

**AMELANG 147B. Beginning Bambara, Second Quarter**

3 units, not given this year

**AMELANG 147C. Beginning Bambara, Third Quarter**

Continuation of 147B.

3 units, not given this year

**AMELANG 153A. Beginning Twi, First Quarter**

3 units, not given this year

**AMELANG 153B. Beginning Twi, Second Quarter**

Continuation of 153A.

3 units, not given this year

**AMELANG 153C. Beginning Twi, Third Quarter**

Continuation of 153B.

3 units, not given this year

**AMELANG 154A. Intermediate Twi, First Quarter***3 units, not given this year***AMELANG 154B. Intermediate Twi, Second Quarter***3 units, not given this year***AMELANG 154C. Intermediate Twi, Third Quarter***3 units, not given this year***AMELANG 156A. Beginning Zulu, First Quarter***4 units, Aut (Staff), Spr (Sibanda, G)***AMELANG 156B. Beginning Zulu, Second Quarter**

Continuation of 156A. Prerequisite 156A or consent of instructor.

*4 units, Win (Staff)***AMELANG 156C. Beginning Zulu, Third Quarter**

Continuation of 156B. Prerequisite 156B or consent of instructor.

Fulfills the University Foreign Language Requirement

*4 units, Spr (Staff)***AMELANG 157A. Intermediate Zulu, First Quarter**

Continuation of 156C. Prerequisite 156C or consent of instructor.

*4 units, Aut (Staff)***AMELANG 157B. Intermediate Zulu, Second Quarter**

Continuation of 157A. Prerequisite 157A or consent of instructor.

*4 units, Win (Staff)***AMELANG 157C. Intermediate Zulu, Third Quarter**

Continuation of 157B. Prerequisite 157B or consent of instructor.

*4 units, Spr (Sibanda, G)***AMELANG 158A. Advanced Zulu, First Quarter***3 units, not given this year***AMELANG 158B. Advanced Zulu, Second Quarter***3 units, not given this year***AMELANG 158C. Advanced Zulu, Third Quarter***3 units, not given this year***AMELANG 170A. Biblical Hebrew, First Quarter**

(Same as JEWISHST 107A, RELIGST 170A) Establish a basic familiarity with the grammar and vocabulary of Biblical Hebrew and will begin developing a facility with the language. This course requires no prior knowledge of Hebrew and will begin with learning the alphabet. By the end of the quarter, students will be able to translate basic biblical texts, will be familiar with common lexica and reference grammars, and will have sufficient foundational knowledge to enable them to continue expanding their knowledge either in a subsequent course or own their own.

*2-4 units, Aut (Weitzman, S; DeBold, R)***AMELANG 170B. Biblical Hebrew, Second Quarter**

(Same as JEWISHST 107B) Continuation of 170A

*2-4 units, Spr (Porat, G)***AMELANG 170C. Biblical Hebrew, Third Quarter**

(Same as JEWISHST 107C) Continuation of 170B.

*2-4 units, Spr (Staff)***AMELANG 171. The Bible in Modern Hebrew Literature**

The role of biblical myths in shaping Israeli identity and the development of a secular Hebrew literature. Readings include modern Hebrew poems and novels which offer new meanings to the stories of Genesis, Exodus, David, and the Song of Songs and make them relevant to the context of modern and postmodern Israeli culture. Readings in Hebrew and English. Prerequisite: intermediate Hebrew. GER:DB-Hum

*3-4 units, not given this year***AMELANG 176. Introduction to Ladino: Language, Literature, and Culture**

Prerequisite: two quarters of Spanish.

*1-4 units, not given this year***AMELANG 177. Middle Eastern Cities in Literature and Film**

Sources include short stories, novels, and movies about Beirut, Tel Aviv, Jerusalem, Cairo, and Amman. Focus is on a cultural and intellectual history of each city. Issues such as the role that Middle Eastern cities play in the development of the modern Hebrew and Arabic novels, the city as a center of social and political life, and the city as a space of collective memory. GER:EC-GlobalCom

*4-5 units, not given this year***AMELANG 180A. Beginning Kinyanwanda, First Quarter***3 units, Spr (Rwigara, D)***AMELANG 180B. Beginning Kinyanwanda, Second Quarter***3 units, not given this year***AMELANG 180C. Beginning Kinyanwanda, Third Quarter***3 units, not given this year***AMELANG 182A. Intermediate Fulani, First Quarter**

Fulfill the University foreign language requirement.

*3 units, not given this year***AMELANG 182B. Intermediate Fulani, Second Quarter**

Continuation of 182A.

*3 units, not given this year***AMELANG 182C. Intermediate Fulani, Third Quarter**

Continuation of 182B.

*3 units, not given this year***AMELANG 184A. First-Year Turkish, First Quarter**

Designed for students who have interest in learning Turkish language, culture, history, cuisine and social life. Proficiency-based orientation with emphasis on oral comprehension and speaking. The grammar is presented through communicative activities where students are exposed to authentic input.

*5 units, Aut (Ergul, S)***AMELANG 184B. First-Year Turkish, Second Quarter**

Continuation of 184A. Emphasis on speaking, oral comprehension and beginning reading and writing skills. Turkish culture and social life is integrated in daily language learning process through authentic materials. Prerequisite: 184A or consent of instructor.

*5 units, Win (Ergul, S)***AMELANG 184C. First-Year Turkish, Third Quarter**

Continuation of 184B. Emphasis is on speaking, oral comprehension, reading and writing skills. Reading simple texts, studying Turkish pop music, viewing short documentaries and communicative writing exercises are part of daily class activities. Fulfills the University Foreign Language Requirement. Prerequisite: 184B or consent of instructor.

*5 units, Spr (Ergul, S)***AMELANG 185A. Second-Year Turkish, First Quarter**

Continuation of 184C. Continuation of 184C. Designed for students with previous knowledge of Turkish who wish to learn in depth about Turkish culture, history, social life, literature, cuisine and artistic trends. Emphasis on developing intermediate proficiency in reading, writing, listening and speaking. Class discussions and activities aim to enable students to perform various tasks in the target language. Prerequisite: 184C or consent of instructor.

*5 units, Aut (Ergul, S)***AMELANG 185B. Second-Year Turkish, Second Quarter**

Continuation of 185A. Continuation of 185A. Main focus is on class discussions and essay writing practices about daily life in Turkey. Prerequisite: 185A or consent of instructor.

*5 units, Win (Ergul, S)***AMELANG 185C. Second-Year Turkish, Third Quarter**

Continuation of 185B. Main focus is on class discussions and essay writing practices about daily life in Turkey. End of quarter presentation in Turkish. Prerequisite: 185B or consent of instructor.

*5 units, Spr (Ergul, S)***AMELANG 187A. Beginning Yoruba, First Quarter***4 units, Aut (Fashokun, A)***AMELANG 187B. Beginning Yoruba, Second Quarter**

Continuation of 187A.

*4 units, Win (Staff)***AMELANG 187C. Beginning Yoruba, Third Quarter**

Continuation of 187B.

*4 units, Spr (Staff)***AMELANG 206B. Intensive Beginning Swahili, Part B***4 units, not given this year***AMELANG 206C. Intensive Beginning Swahili, Part C***4 units, not given this year***AMELANG 216A. Contemporary Language of Iran, First Quarter***3 units, not given this year*

**AMELANG 216B. Contemporary Language of Iran, Second Quarter**

3 units, not given this year

**AMELANG 216C. Contemporary Language of Iran, Third Quarter**

3 units, not given this year

**GRADUATE COURSES IN AFRICAN AND MIDDLE EASTERN LANGUAGES**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**AMELANG 11G. Intensive Intermediate Arabic, Part A**

For Stanford graduate students restricted to 9 units. Speaking, listening, reading, and writing, emphasizing Arabic grammar and functional applications.

3-4 units, not given this year

**AMELANG 12G. Intensive Intermediate Arabic, Part B**

Continuation of 11G. For Stanford graduate students restricted to 9 units. Speaking, listening, reading, and writing, emphasizing Arabic grammar and functional applications.

3-4 units, not given this year

**AMELANG 13G. Intensive Intermediate Arabic, Part C**

Continuation of 12G. For Stanford graduate students restricted to 9 units. Speaking, listening, reading, and writing, emphasizing Arabic grammar and functional applications.

3-4 units, not given this year

**AMELANG 203A. Beginning Hausa, First Quarter**

For grads only.

3 units, Sum (Staff)

**AMELANG 203B. Beginning Hausa, Second Quarter**

For grads only

3 units, Sum (Staff)

**AMELANG 297. Directed Reading in African and Middle Eastern Languages**

May be repeated for credit. Prerequisite: consent of instructor.

1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**AMELANG 395. Graduate Studies in African and Middle Eastern Languages**

Prerequisite: consent of instructor.

1-5 units, Aut (Staff), Win (Staff), Spr (Staff)

**AFRICAN STUDIES (AFRICAST) COURSES****UNDERGRADUATE COURSES IN AFRICAN STUDIES**

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**AFRICAST 51. Congolese Dance**

(Same as AFRICAAM 51, DANCE 51) Movements and choreography from Central Africa. Elements unique to all African dance movement: body isolation, polyrhythmic movement, and body posture. Live drumming. Open to all levels of dancers.

1 unit, alternate years, not given this year

**AFRICAST 111. Education for All? The Global and Local in Public Policy Making in Africa**

(Same as AFRICAST 211) Policy making in Africa and the intersection of policy processes and their political and economic dimensions. The failure to implement agreements by international institutions, national governments, and nongovernmental organizations to promote education. Case studies of crowded and poorly equipped schools, overburdened and underprepared teachers, and underfunded education systems. GER:EC-GlobalCom, EC-GlobalCom

5 units, Spr (Samoff, J)

**AFRICAST 112. AIDS, Literacy, and Land: Foreign Aid and Development in Africa**

(Same as AFRICAST 212) Public policy issues, their roots, and the conflicts they engender. The policy making process: who participates, how, why, and with what results? Innovative approaches to contested policy issues. Foreign roles and their consequences. Case studies such as: a clinic in Uganda that addresses AIDS as a family and community problem; and strategies in Tanzania to increase girls' schooling. GER:EC-GlobalCom

5 units, Win (Samoff, J)

**AFRICAST 151. AIDS in Africa**

Medical, social, and political aspects of the HIV epidemic in sub-Saharan Africa including: biology, transmission, diagnosis, and treatment of HIV; mother-to-child transmission and breastfeeding; vaccines; community and activist responses to the HIV epidemic; economics of HIV treatment; governance and health; ethics in research and program implementation.

3 units, not given this year

**AFRICAST 199. Independent Study or Directed Reading**

May be repeated for credit.

1-5 units, Aut (Staff), Win (Staff), Spr (Staff)

**AFRICAST 200. The HIV/AIDS Epidemic in Tanzania: A Pre-Field Seminar**

Goal is to prepare students for an HIV/AIDS prevention, service-learning experience in Tanzania. Topics include: history of HIV/AIDS epidemic globally and in Tanzania; social and economic impact of AIDS; national and societal responses; ethical issues in crosscultural service learning; teaching for prevention; biology of HIV transmission, disease progression, and prevention; introduction to Tanzanian history and politics; HIV/AIDS and development; social, cultural, and economic context of HIV risk; and strategies for HIV prevention in Tanzania.

1 unit, Spr (Katzenstein, D)

**GRADUATE COURSES IN AFRICAN STUDIES**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**AFRICAST 211. Education for All? The Global and Local in Public Policy Making in Africa**

(Same as AFRICAST 111) Policy making in Africa and the intersection of policy processes and their political and economic dimensions. The failure to implement agreements by international institutions, national governments, and nongovernmental organizations to promote education. Case studies of crowded and poorly equipped schools, overburdened and underprepared teachers, and underfunded education systems.

5 units, Spr (Samoff, J)

**AFRICAST 212. AIDS, Literacy, and Land: Foreign Aid and Development in Africa**

(Same as AFRICAST 112) Public policy issues, their roots, and the conflicts they engender. The policy making process: who participates, how, why, and with what results? Innovative approaches to contested policy issues. Foreign roles and their consequences. Case studies such as: a clinic in Uganda that addresses AIDS as a family and community problem; and strategies in Tanzania to increase girls' schooling.

5 units, Win (Samoff, J)

**AFRICAST 278. Special Topics (Francophone Literature): From Exoticism to a Discourse of Auto-Representation**

(Same as COMPLIT 278, FRENLIT 278) Critical analysis of major issues relating to literatures in French language in and outside France. Focus is on exoticism and self-representation, with an emphasis on the evolution of mentalities, new sensitivities and the role of literature in developing individual or collective identity. Readings include Le Clézio, Memmi, Malouf, Lopes, Schwarz-Bart, Delaygue, Glissant, Todorov, Kane and others. Primary sources, secondary sources and film. Taught in French.

3-5 units, not given this year

**AFRICAST 299. Independent Study or Directed Reading**

1-10 units, Aut (Staff), Win (Samoff, J), Spr (Staff)



**AFRICAST 300. Contemporary Issues in African Studies**

Guest scholars present analyses of major African themes and topics. Brief response papers required. May be repeated for credit.

1 unit, Aut (Hubbard, L; Samoff, J), Win (Hubbard, L), Spr (Hubbard, L)

**AFRICAST 301A. The Dynamics of Change in Africa**

(Same as HISTORY 346, POLISCI 246P, POLISCI 346P) Crossdisciplinary colloquium; required for the M.A. degree in African Studies. Open to advanced undergraduates and PhD students. Addresses critical issues including patterns of economic collapse and recovery; political change and democratization; and political violence, civil war, and genocide. Focus on cross-cutting issues including the impact of colonialism; the role of religion, ethnicity, and inequality; and Africa's engagement with globalization.

4-5 units, Win (Weinstein, J)

**AFRICAST 302. Research Workshop**

Required for African Studies master's students. Student presentations.

1 unit, Spr (Roberts, R)

## AMERICAN STUDIES (AMSTUD) COURSES

### UNDERGRADUATE COURSES IN AMERICAN STUDIES

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**AMSTUD 1B. Media, Culture, and Society**

(Same as COMM 1B) The institutions and practices of mass media, including television, film, radio, and digital media, and their role in shaping culture and social life. The media's shifting relationships to politics, commerce, and identity. GER:DB-SocSci

5 units, Win (Turner, F)

**AMSTUD 2. Introduction to American National Government and Politics**

(Same as POLISCI 2) The role and importance of the ideal of democracy in the evolution of the American political system. American political institutions (the Presidency, Congress, and the Court) and political processes (the formation of political attitudes and voting) are examined against the backdrop of American culture and political history. The major areas of public policy in the current practice of the ideal of democracy. GER:DB-SocSci

5 units, Win (Fiorina, M; Frisby, T)

**AMSTUD 15. Global Flows: The Globalization of Hip Hop Art, Culture, and Politics**

(Same as CSRE 15) This course consists of film screenings, dialogues, and performances that examine and engage Hip Hop Cultures and artists from around the world. We will explore diverse scenes and artists, from the formation of new musical genres such as hiplife in Ghana, to the impact of the first Hip Hop concert in Morocco, to comparative investigations of race and citizenship in Japan, Cuba, Palestine, France, and the United States (including Black, Mexican and Arab-Americans).

1-2 units, not given this year

**AMSTUD 25N. Understanding the Sixties**

(F,Sem) (Same as SOC 25N) Stanford Introductory Seminar. Preference to freshmen. The tendency of critics to view the 60s through ideological lenses as either the best or worst of times has made a balanced perspective difficult to achieve. Goal is to provide a sociological explanation for the political and cultural turbulence that marked the era. The confluence of demographic, political, economic, and cultural trends that date back to at least the 30s. The ambiguous legacy of the 60s. Using the 60s to shed light on the 80s and 90s. Enrollment limited to 16. GER:DB-SocSci

3 units, Win (Staff)

**AMSTUD 51N. Comparative Fictions of Ethnicity**

(S,Sem) (Same as COMPLIT 51N, CSRE 51N) Stanford Introductory Seminar. We may know who we are, but we are, after all, social creatures. How does our sense of self interact with those

around us? How does literature provide a particular medium for not only self expression, but also for meditations on what goes into the construction of the Self? After all, don't we tell stories in response to the question, who are you? Besides a list of nouns and names and attributes, we give our lives flesh and blood in telling how we process the world. Our course focuses in particular on this question--Does this universal issue (who am I) become skewed differently when we add a qualifier before it, like ethnic? GER:DB-Hum

5 units, Win (Palumbo-Liu, D)

**AMSTUD 68N. Mark Twain and American Culture**

(F,Sem) (Same as ENGLISH 68N) Stanford Introductory Seminar. Preference to freshmen. Mark Twain has been called our Rabelais, our Cervantes, our Homer, our Tolstoy, our Shakespeare. Ernest Hemingway maintained that all modern American literature comes from one book by Mark Twain called *The Adventures of Huckleberry Finn*. President Franklin D. Roosevelt got the phrase New Deal from A Connecticut Yankee in King Arthur's Court. Class discussions will focus on how Twain's work illuminates and complicates his society's responses to such issues as race, technology, heredity versus environment, religion, education, and what it means to be American. GER:DB-Hum

4 units, Aut (Fishkin, S)

**AMSTUD 101. American Fiction into Film: How Hollywood Scripts and Projects Black and White Relations**

Movies and the fiction that inspires them; power dynamics behind production including historical events, artistic vision, politics, and racial stereotypes. What images of black and white does Hollywood produce to forge a national identity? How do films promote equality between the races? What is lost or gained in film adaptations of books? GER:DB-Hum, EC-AmerCul

3-5 units, Spr (Mesa, C)

**AMSTUD 107. Introduction to Feminist Studies**

(Same as CSRE 108, FEMST 101, HISTORY 107) Introduction to interdisciplinary feminist scholarship, which seeks to understand the creation, perpetuation, and critiques of gender inequalities. Topics include the historical emergence of feminist politics and contemporary analyses of work and family, health and sexuality, creativity, and politics. Close attention to the intersections of race, gender, ethnicity, and sexuality and to international, as well as U.S., perspectives. Students learn to think critically about gender in the past, present, and future. GER:DB-SocSci, EC-Gender

4-5 units, Aut (Freedman, E)

**AMSTUD 114N. Visions of the 1960s**

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Introduction to the ideas, sensibility, and, to a lesser degree, the politics of the American 60s. Topics: the early 60s vision of a beloved community; varieties of racial, generational, and feminist dissent; the meaning of the counterculture; and current interpretive perspectives on the 60s. Film, music, and articles and books. GER:DB-Hum, EC-AmerCul

5 units, Aut (Gillam, R)

**AMSTUD 116. American Economic History**

(Same as ECON 116) The American economy from colonial times to the present, illustrating the role of history in economic life. Topics: U.S. economic development in global and comparative context; slavery as an economic system; origins and consequences of the American technology and business organization; economics of the Great Depression and New Deal; post-World War II economic performance and social change; recent U.S. economic record in historical perspective. Prerequisite: 1A. GER:DB-SocSci, EC-AmerCul

5 units, Spr (Wright, G)

**AMSTUD 120. Digital Media in Society**

(Same as COMM 120, COMM 220) (Graduate students register for 220.) Contemporary debates concerning the social and cultural impact of digital media. Topics include the historical origins of digital media, cultural contexts of their development and use, and influence of digital media on conceptions of self, community, and state. Priority to Juniors and Seniors. GER:DB-SocSci

4-5 units, not given this year

**AMSTUD 121. Masterpieces of American Literature**

(Same as ENGLISH 21, ENGLISH 121) (English majors and others taking 5 units, register for 121.) A survey of some of the



definitive texts of American writing, such as *Leaves of Grass*, *Benito Cereno*, *Adventures of Huckleberry Finn*, *The Waste Land*, *The Sun Also Rises*, *The Golden Apples*, and *The Crying of Lot 49*. GER:DB-Hum

3-5 units, not given this year

**AMSTUD 121X. Hip Hop, Youth Identities, and the Politics of Language**

(Same as AFRICAAM 121X, ANTHRO 121A, CSRE 121X, EDUC 121X, LINGUIST 155) Focus is on issues of language, identity, and globalization, with a focus on Hip Hop cultures and the verbal virtuosity within the Hip Hop nation. Beginning with the U.S., a broad, comparative perspective in exploring youth identities and the politics of language in what is now a global Hip Hop movement. Readings draw from the interdisciplinary literature on Hip Hop cultures with a focus on sociolinguistics and youth culture.

3-4 units, Spr (Alim, H)

**AMSTUD 123D. American Literature, 1855 to World War I**

(Same as ENGLISH 123D) A survey of American writers from Whitman to T.S. Eliot, including Emily Dickinson, Mark Twain, Stephen Crane, Frank Norris, Kate Chopin, Theodore Dreiser, and Henry James. Topics include the tension between romance and realism, the impact of naturalism and modernism, as well as race, gender, and the literary evolution of the American language. GER:DB-Hum

5 units, not given this year

**AMSTUD 123G. Mark Twain: A Fresh Look at an Icon and Iconoclast, 100 Years after His Death**

(Same as ENGLISH 123G) The vitality and versatility of a writer who has been called America's Rabelais, Cervantes, Homer, Tolstoy, and Shakespeare. Journalism, travel books, fiction, drama, and sketches by Mark Twain; how Twain engaged such issues as personal and national identity, satire and social justice, imperialism, race and racism, gender, performance, travel, and technology. What are Twain's legacies in 2010, the centennial of his death, the 175th anniversary of his birth, and the 125th anniversary of his most celebrated novel? Guests include actor Hal Holbrook. GER:DB-Hum, EC-AmerCul

3-5 units, not given this year

**AMSTUD 130. Introduction to Environmental Humanities: Cultures of Nature in the American West**

(Same as MTL 130) What do we mean when we use the terms nature and culture? This course examines these two complex ideas in the context of the nineteenth, twentieth, and twenty-first century American West. Topics include Los Angeles as a lived space and its place in the national spatial imaginary, urban environmental movements, mining cultures, toxics legacies, geographies of social difference, animal studies, and biodiversity and Native American DNA databases. The approach is interdisciplinary, and includes environmental history, cultural geography, critical race studies, literature, and documentary film methodologies and texts. GER:DB-Hum

3-5 units, not given this year

**AMSTUD 132. American Art and Culture, 1528-1860**

(Same as ARTHIST 132, ARTHIST 332) The visual arts and literature of the U.S. from the beginnings of European exploration to the Civil War. Focus is on questions of power and its relation to culture from early Spanish exploration to the rise of the middle classes. Cabeza de Vaca, Benjamin Franklin, John Singleton Copley, Phillis Wheatley, Charles Willson Peale, Emerson, Hudson River School, American Genre painters, Melville, Hawthorne and others. GER:DB-Hum

4 units, Win (Wolf, B)

**AMSTUD 137. The Dialogue of Democracy**

(Same as COMM 137W, COMM 237, POLISCI 232T, POLISCI 332T) All forms of democracy require some kind of communication so people can be aware of issues and make decisions. This course looks at competing visions of what democracy should be and different notions of the role of dialogue in a democracy. Is it just campaigning or does it include deliberation? Small scale discussions or sound bites on television? Or social media? What is the role of technology in changing our democratic practices, to mobilize, to persuade, to solve public problems? This course will include readings from political theory

about democratic ideals - from the American founders to J.S. Mill and the Progressives to Joseph Schumpeter and modern writers skeptical of the public will. It will also include contemporary examinations of the media and the internet to see how those practices are changing and how the ideals can or cannot be realized. GER:EC-EthicReas

4-5 units, Win (Fishkin, J)

**AMSTUD 139B. American Women Writers, 1850-1920**

(Same as ENGLISH 139B) The ways in which female writers negotiated a series of literary, social, and intellectual movements, from abolitionism and sentimentalism in the nineteenth century to Progressivism and avant-garde modernism in the twentieth. Authors include Harriet Beecher Stowe, Harriet Jacobs, Rebecca Harding Davis, Emily Dickinson, Kate Chopin, Edith Wharton, Gertrude Stein, Willa Cather, and Charlotte Perkins Gilman. GER:DB-Hum

5 units, Win (Richardson, J)

**AMSTUD 140. Stand Up Comedy and the Great American Joke Since 1945**

Development of American Stand Up Comedy in the context of social and cultural eruptions after 1945, including the Borscht Belt, the Chitlin' Circuit, the Cold War, censorship battles, Civil Rights and other social movements of the 60s and beyond. The artistry of stories, monologues, jokes, impersonations, persona, social satire, scatology, obscenity, riffs, rants, shtick, and more by such artists as Lenny Bruce, Dick Gregory, Richard Pryor, George Carlin, Margaret Cho, Sarah Silverman, Jon Stewart, Stephen Colbert, as well as precursors such as Mark Twain, minstrelsy and vaudeville and related films, TV shows, poems and other manifestations of similar sensibilities and techniques. GER:DB-Hum

3-5 units, Aut (Obenzinger, H)

**AMSTUD 142. The Literature of the Americas**

(Same as COMPLIT 142, ENGLISH 172E) This course offers a wide-ranging overview of the literatures of the Americas in comparative perspective, emphasizing continuities and crises that are common to North American, Central American, and South American literatures as well as the distinctive national and cultural elements of a diverse array of primary works. Topics include the definitions of such concepts as empire and colonialism, the encounters between worldviews of European and indigenous peoples, the emergence of creole and racially mixed populations, slavery, the New World voice, myths of America as paradise or utopia, the coming of modernism, twentieth-century avant-gardes, and distinctive modern episodes; the Harlem Renaissance, the Beats, magic realism, Noigandres; in unaccustomed conversation with each other. GER:DB-Hum, EC-AmerCul

5 units, Win (Greene, R; Saldivar, R)

**AMSTUD 143. Introduction to African American Literature**

(Same as AFRICAAM 43, ENGLISH 43, ENGLISH 143) (English majors and others taking 5 units, register for 143.) African American literature from its earliest manifestations in the spirituals, trickster tales, and slave narratives to recent developments such as black feminist theory, postmodern fiction, and hip hop lyricism. We will engage some of the defining debates and phenomena within African American cultural history, including the status of realist aesthetics in black writing; the contested role of literature in black political struggle; the question of diaspora; the problem of intra-racial racism; and the emergence of black internationalism. Attuned to the invariably hybrid nature of this tradition, we will also devote attention to the discourse of the Enlightenment, modernist aesthetics, and the role of Marxism in black political and literary history. GER:DB-Hum, EC-AmerCul

3-5 units, Aut (Rasberry, G)

**AMSTUD 146. Asian American Culture and Community**

(Same as COMPLIT 146, ASNAMST 146S, CSRE 146S) An examination of the history of Asians in America via one case history: the International Hotel in San Francisco. Background history of Asians in America, and the specifics of the I Hotel case as involving the convergence of global and local economies, urban redevelopment, and housing issues for minorities. Focus on the convergence of community and cultural production. Service learning component involving community work at the Manilatown Heritage Foundation in San Francisco. Service Learning Course (certified by Haas Center). GER:DB-Hum

5 units, Spr (Palumbo-Liu, D)

**AMSTUD 146C. Hemingway, Hurston, Faulkner, and Fitzgerald**

(Same as ENGLISH 146C) While Hemingway and Fitzgerald were flirting with the expatriate avant-garde in Europe, Hurston and Faulkner were performing anthropological field-work in the local cultures of the American South. Focus on the tremendous diversity of concerns and styles of four writers who marked America's coming-of-age as a literary nation with their multifarious experiments in representing the regional and the global, the racial and the cosmopolitan, the macho and the feminist, the decadent and the impoverished. GER:DB-Hum, EC-AmerCul

5 units, Spr (Jones, G)

**AMSTUD 150. American Literature and Culture to 1855**

(Same as ENGLISH 123) A survey of early American writings, including sermons, poetry, captivity and slave narratives, essays, autobiography, and fiction, from the colonial era to the eve of the Civil War. GER:DB-Hum, EC-AmerCul

5 units, Spr (Richardson, J)

**AMSTUD 150A. Colonial and Revolutionary America**

(Same as HISTORY 150A) (Same as HISTORY 50A. History majors and others taking 5 units, register for HISTORY 150A.) Survey of the origins of American society and polity in the 17th and 18th centuries. Topics: the migration of Europeans and Africans and the impact on native populations; the emergence of racial slavery and of regional, provincial, Protestant cultures; and the political origins and constitutional consequences of the American Revolution. GER:DB-SocSci, EC-AmerCul

5 units, Aut (Winterer, C)

**AMSTUD 150B. 19th-Century America**

(Same as AFRICAAM 150B, HISTORY 150B) (Same as HISTORY 50B. History majors and others taking 5 units, register for 150B.) Territorial expansion, social change, and economic transformation. The causes and consequences of the Civil War. Topics include: urbanization and the market revolution; slavery and the Old South; sectional conflict; successes and failures of Reconstruction; and late 19th-century society and culture. GER:DB-SocSci, EC-AmerCul

5 units, Win (White, R)

**AMSTUD 150C. The United States in the Twentieth Century**

(Same as HISTORY 150C) (Same as HISTORY 50C. History majors and others taking 5 units, register for 150C.) Major political, economic, social, and diplomatic developments in the U.S. Themes: the economic and social role of government (Progressive, New Deal, Great Society, and Reagan-Bush eras); ethnic and racial minorities in society (mass immigration at the turn of the century and since 1965, the civil rights era of the 50s and 60s); the changing status of women since WW II; shifting ideological bases, institutional structures, and electoral characteristics of the political system (New Deal and post-Vietnam); determinants of foreign policy in WW I and II, and the Cold War. GER:DB-SocSci, EC-AmerCul

5 units, Spr (Camarillo, A)

**AMSTUD 152A. Mutually Assured Destruction: American Culture and the Cold War**

(Same as ENGLISH 152A) The temperature of the early Cold War years via readings of Soviet and U.S. propaganda; documentary film and film noir; fiction by Bellow, Ellison, O'Connor, and Mailer; social theory by Arendt, the New York Intellectuals, and the Frankfurt School; and political texts such as Kennan's Sources of Soviet Conduct, the Truman Doctrine speech, and the National Security Council Report 68. Major themes include the discourse of totalitarianism, MacCarthyism, strategies of containment, the nuclear threat, the figure of the outsider and the counterculture, and the cultural shift from sociological to psychological idioms. GER:DB-Hum

5 units, not given this year

**AMSTUD 152D. DuBois and American Culture**

(Same as AFRICAAM 152, ENGLISH 152D) His life and career. Focus on first half of his life from his Harvard doctoral dissertation to the end of the Harlem Renaissance in which he played a crucial role. Sources include his books on history and sociology, scholarly essays, novels, and journals that he edited. AAAS WIM course. GER:DB-Hum, EC-AmerCul

5 units, Spr (Elam, M)

**AMSTUD 152G. Global Harlem Renaissance**

(Same as AFRICAAM 152G, ENGLISH 152G) Examination of the explosion of African American artistic expression during 1920s and 30s New York known as the Harlem Renaissance. Amiri Baraka once referred to the Renaissance as a kind of vicious Modernism, as a BangClash that impacted and was impacted by political, cultural and aesthetic changes not only in the U.S. but Europe, the Caribbean and Latin America. Focus on the literature, graphic arts, and the music of the era in this global context. GER:DB-Hum, EC-AmerCul

5 units, not given this year

**AMSTUD 154. American Intellectual and Cultural History to the Civil War**

(Same as HISTORY 154) (Same as HISTORY 54. History majors and others taking 5 units, register for 154.) How Americans considered problems such as slavery, imperialism, and sectionalism. Topics include: the political legacies of revolution; biological ideas of race; the Second Great Awakening; science before Darwin; reform movements and utopianism; the rise of abolitionism and proslavery thought; phrenology and theories of human sexuality; and varieties of feminism. Sources include texts and images. GER:DB-Hum, EC-AmerCul

5 units, Spr (Winterer, C)

**AMSTUD 156H. Women and Medicine in US History: Women as Patients, Healers and Doctors**

Women's bodies in sickness and health, and encounters with lay and professional healers from the 18th century to the present. Historical construction of thought about women's bodies and physical limitations; sexuality; birth control and abortion; childbirth; adulthood; and menopause and aging. Women as healers, including midwives, lay physicians, the medical profession, and nursing. GER:EC-Gender

5 units, Aut (Horn, M)

**AMSTUD 156H. Women and Medicine in US History: Women as Patients, Healers and Doctors**

Women's bodies in sickness and health, and encounters with lay and professional healers from the 18th century to the present. Historical construction of thought about women's bodies and physical limitations; sexuality; birth control and abortion; childbirth; adulthood; and menopause and aging. Women as healers, including midwives, lay physicians, the medical profession, and nursing. GER:EC-Gender

5 units, Aut (Horn, M)

**AMSTUD 159. Introduction to Asian American History**

(Same as HISTORY 159) (Same as HISTORY 59. History majors and others taking 5 units, register for 159.) The historical experience of people of Asian ancestry in the U.S. Immigration, labor, community formation, family, culture and identity, and contemporary social and political controversies. Readings: interpretative texts, primary material, and historical fiction. (Chang)

5 units, Aut (Chang, G)

**AMSTUD 160. Perspectives on American Identity**

Required for American Studies majors. Changing interpretations of American identity and Americanness. GER:DB-Hum, EC-AmerCul

5 units, Win (Gillam, R), Spr (Richardson, J)

**AMSTUD 161. WOMEN IN MODERN AMERICA**

(Same as CSRE 162, HISTORY 161) Considers the political, economic, and social development of women in the United States during a long twentieth century. How have women been shaped or constrained by gendered conceptions of work, reproduction, education, family, and culture? Have all women reacted similarly to wars and depression or domestic and foreign policy? Through personal narratives and historical accounts, the course will answer these questions, observing how women negotiated gender, race, sexuality, and class difference to achieve greater opportunity and citizenship rights. GER:DB-SocSci, EC-Gender

4-5 units, Spr (Sbardellati, L)

**AMSTUD 163S. Post Black Drama in the Age of Obama**

(Same as AFRICAAM 163S, CSRE 163S, DRAMA 163S, DRAMA 363S) This course will examine works of the new millennium that confront questions of African American experience. These plays are written by African American and non-

black writers. In analyzing these works, this course will investigate such questions as: In a time that has been called 'Post Race' or 'Post Soul' or even 'Post Black,' what can we discern about African American drama? How do these plays reflect or contradict such labeling? How do these works speak to our times? Who does the form relate to in matters of content in these works? What do these works tell us about the contemporary constructions and meanings of blackness? GER:DB-Hum

5 units, *Win (Elam, H)*

**AMSTUD 164C. From Freedom to Freedom Now: African American History, 1865-1965**

(Same as HISTORY 164C) (Same as HISTORY 64C. History majors and others taking 5 units, register for 164C.) Explores the working lives, social worlds, political ideologies and cultural expressions of African Americans from emancipation to the early civil rights era. Topics include: the transition from slavery to freedom, family life, work, culture, leisure patterns, resistance, migration and social activism. Draws largely on primary sources including autobiographies, memoirs, letters, personal journals, newspaper articles, pamphlets, speeches, literature, film and music. GER:DB-SocSci, EC-AmerCul

5 units, *not given this year*

**AMSTUD 165. History of Higher Education in the U.S.**

(Same as EDUC 165, EDUC 265, HISTORY 158C) Major periods of evolution, particularly since the mid-19th century. Premise: insights into contemporary higher education can be obtained through its antecedents, particularly regarding issues of governance, mission, access, curriculum, and the changing organization of colleges and universities. (SSPEP-APA)

3-5 units, *Win (Labaree, D)*

**AMSTUD 166. Introduction to African American History: The Modern African American Freedom Struggle**

(Same as AFRICAAM 166, HISTORY 166) Focus is on political thought and protest movements after 1930. Individuals who have shaped and been shaped by modern African American struggles for freedom and justice. Sources include audiovisual materials. Research projects required for fifth unit. GER:DB-SocSci, EC-AmerCul

4-5 units, *not given this year*

**AMSTUD 167. The Hollywood Musical**

(Same as FILMSTUD 167, FILMSTUD 367) The sense of physical, emotional, aesthetic, and social liberation in this most colorful of film genres. Musicals as a place for the staging of issues of identity, including the impact of African American and Jewish culture, and issues of gay reception and interpretation. Attention to technologies of sound and color, the relation to vaudeville and Broadway, and ethnic and aesthetic diversity. Musicals as the epitome of filmic illusionism and the Hollywood studio system; the implications of their seduction of audiences; the meaning of spectacle, the centrality of performance. Busby Berkeley, Fred Astaire, Judy Garland, Bob Fosse, Stanley Donen, Gene Kelly, Vincente Minnelli. GER:DB-Hum

4 units, *not given this year*

**AMSTUD 179. Introduction to American Law**

(Same as POLISCI 122, PUBLPOL 302A) For undergraduates. The structure of the American legal system including the courts; American legal culture; the legal profession and its social role; the scope and reach of the legal system; the background and impact of legal regulation; criminal justice; civil rights and civil liberties; and the relationship between the American legal system and American society in general. GER:DB-SocSci

3-5 units, *Aut (Friedman, L)*

**AMSTUD 183. Border Crossings and American Identities**

(Same as ANTHRO 183A, CSRE 183) How novelists, filmmakers, and poets perceive racial, ethnic, gender, sexual preference, and class borders in the context of a national discussion about the place of Americans in the world. How Anna Deavere Smith, Sherman Alexie, or Michael Moore consider redrawing such lines so that center and margin, or self and other, do not remain fixed and divided. How linguistic borderlines within multilingual literature by Caribbean, Arab, and Asian Americans function. Can Anzaldúa's conception of borderlands be constructed through the matrix of language, dreams, music, and cultural memories in these American narratives? Course includes examining one's own

identity. GER:DB-Hum, EC-AmerCul

5 units, *Aut (Duffey, C)*

**AMSTUD 183C. Feminism and American Literature**

(Same as ENGLISH 183C, JEWISHST 153C) Exploration of the ways in which an eclectic group of American writers from the 19th century to the 20th have endeavored to enlarge the canvas on which women can paint their lives. Readings include stories, novels, journalism, poetry and drama that engage the social, cultural, and political forces that can shape the kinds of futures students can imagine for themselves--forces that are further inflected by issues of race, ethnicity and class. GER:DB-Hum, EC-Gender

5 units, *Win (Fishkin, S)*

**AMSTUD 185. American Studies Internship**

Restricted to declared majors. Practical experience working in a field related to American Studies for six to ten weeks. Students make internship arrangements with a company or agency, under the guidance of a sponsoring faculty member, and with the consent of the director or a program coordinator of American Studies. Required paper focused on a topic related to the internship and the student's studies. May be repeated for credit.

1-3 units, *Aut (Staff), Win (Fishkin, S), Spr (Staff), Sum (Staff)*

**AMSTUD 186. Tales of Three Cities: New York, Chicago, Los Angeles**

(Same as ENGLISH 186) How urban form and experience shape literary texts and how literary texts participate in the creation of place, through the literature of three American cities as they ascended to cultural and iconographical prominence: New York in the early to mid 19th century; Chicago in the late 19th and early 20th centuries; and Los Angeles in the mid to late 20th century. GER:DB-Hum

5 units, *not given this year*

**AMSTUD 195. Individual Work**

1-5 units, *Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**AMSTUD 210. Critical Theory and The Environment**

(Same as ANTHRO 210B, MTL 210) Critical theoretical approaches (such as cultural studies, Marxism, postcolonial theory, cultural geography, feminism, and science studies) have generally been underutilized as methodologies for grappling with environmental situations, yet they hold much promise for addressing their complexity. This course asks: How does critical theory about the environment construe the current situation? What kinds of political or technological solutions do these theories call for or imply? The first half of the seminar introduces critical approaches and methodologies in relation to the environment. In the second section, we will use a variety of theoretical approaches to address Native American environmental politics, water, agriculture, toxics, and animals.

3-5 units, *Spr (Koelle, A)*

**AMSTUD 214. The American 1960s: Thought, Protest, and Culture**

The meaning of the American 60s emphasizing ideas, culture, protest, and the new sensibility that emerged. Topics: black protest, the new left, the counterculture, feminism, the new literature and journalism of the 60s, the role of the media in shaping dissent, and the legacy of 60s protest. Interpretive materials from film, music, articles, and books. GER:DB-Hum, EC-AmerCul

5 units, *Aut (Gillam, R)*

**AMSTUD 240. Sister Arts: Image and Text in America**

(Same as ARTHIST 240) Seminar focuses equally on painting and literature in American history. Classes meet twice per week: one session devoted to a literary text, and the other to a visual artifact. The course is organized topically, placing text and images into dialogue with each other, asking for example, how Glen Ligon's contemporary reworking of nineteenth century runaway slave posters relates to Toni Morrison's *Beloved*, or how Melville's story of urban life, *Bartleby the Scrivener*, alludes to Hudson River School painting. GER:DB-Hum

5 units, *not given this year*

**AMSTUD 240A. Pre-Honors Seminar**

Methods, interpretations, and issues pertinent to honors work in American Studies. Open to juniors interested in honors.

2-5 units, *Spr (Gillam, R)*

**AMSTUD 250. Senior Research**

Research and writing of senior honors thesis under the supervision of a faculty member. The final grade for the thesis is assigned by the chair based on the evaluations of the primary thesis adviser and a second reader appointed by the program. Prerequisite: consent of chair.

*1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**AMSTUD 251C. The American Enlightenment**

(Same as HISTORY 251C) Eighteenth century America was like a laboratory for exciting new social, political, religious, scientific, and artistic theories that we collectively call the Enlightenment. With readings in original texts and studies of material culture, examines ways in which eighteenth century Americans applied Enlightenment thinking to some of the most important problems and questions of their time. What was the best kind of government, and how could this be known? Was the new world of America fundamentally different or the same as Europe, and did animals, plants, and people improve or worsen there? What creatures (children, apes, women, slaves) were considered unreasonable in the Age of Reason, and why? What was the place of religion and passion in the Age of Reason? GER:DB-Hum

*5 units, not given this year*

**AMSTUD 253. American Wonders**

(Same as ARTHIST 253) Seminar on American art, literature and culture of the nineteenth century organized around the exhibition, *The Great American Hall of Wonders*, on view at the Smithsonian American Art Museum. Taking our cue from the exhibition, course focuses on three topics from the world of nature and three from technology, all serving as cultural lightning rods during the period: the buffalo, the Giant Sequoia, Niagara Falls, the clock, the gun and the railroad. The class travels to Washington, D.C. to view the exhibition during an extended weekend.

*5 units, Aut (Wolf, B)*

**AMSTUD 255D. Racial Identity in the American Imagination**

(Same as AFRICAAM 255, CSRE 255D, HISTORY 255D, HISTORY 355D) Major historical transformations shaping the understanding of racial identity and how it has been experienced, represented, and contested in American history. Topics include: racial passing and racial performance; migration, immigration, and racial identity in the urban context; the interplay between racial identity and American identity; the problems of class, gender, and sexuality in the construction of racial identity. Sources include historical and legal texts, memoirs, photography, literature, film, and music. GER:DB-SocSci, EC-AmerCul

*4-5 units, Win (Hobbs, A)*

**AMSTUD 258. Topics in the History of Sexuality: Sexual Violence**

(Same as CSRE 192E, HISTORY 258, HISTORY 358) Recent historical interpretations of sexual violence, with particular attention to the intersections of gender and race in the construction of rape, from early settlement through the twentieth century. Topics include the legal prosecution of rape in Early America; the racialization of rape in the U.S.; lynching and anti-lynching in the U.S.; and feminist responses to sexual violence. GER:DB-SocSci, EC-Gender

*4-5 units, not given this year*

**AMSTUD 268E. American Foreign Policy and International History since 1941**

(Same as HISTORY 268E, HISTORY 368E) Major events and interpretations from WW II to the war in Iraq. Issues of race, expansionism and power; nuclear weapons; and war. GER:DB-SocSci

*4-5 units, Spr (Bernstein, B)*

**GRADUATE COURSES IN AMERICAN STUDIES**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**AMSTUD 201. History of Education in the United States**

(Same as EDUC 201, HISTORY 158B) How education came to its current forms and functions, from the colonial experience to the present. Focus is on the 19th-century invention of the common

school system, 20th-century emergence of progressive education reform, and the developments since WW II. The role of gender and race, the development of the high school and university, and school organization, curriculum, and teaching. (SSPEP)

*3-5 units, not given this year*

**AMSTUD 257. Journalism and Imaginative Writing in America**

(Same as COMM 278, ENGLISH 257) Walt Whitman spent twenty-five years as a journalist before publishing his first book of poems. Mark Twain was a journalist for twenty years before publishing his first novel. Topics include examination of how writers' backgrounds in journalism shaped the poetry or fiction for which they are best known; study of recent controversies surrounding writers who blurred the line between journalism and fiction. Writers include Whitman, Fanny Fern, Twain, Pauline Hopkins, Theodore Dreiser, Charlotte Perkins Gilman, Ernest Hemingway, Meridel LeSueur.

*5 units, not given this year*

**AMSTUD 261A. Geography, Time, and Trauma in Asian American Literature**

(Same as ASNAMST 187, ENGLISH 261A) The notion that homes can be stable locations for cultural, racial, ethnic, and similarly situated identity categories. The possibility that there really is no place like home for Asian American subjects. How geography, landscape, and time situate traumas within fictional Asian American narratives.

*5 units, not given this year*

**AMSTUD 261E. Mixed Race Literature in the U.S. and South Africa**

(Same as AFRICAAM 261E, ENGLISH 261E) As scholar Werner Sollors recently suggested, novels, poems, stories about interracial contacts and mixed race constitute an orphan literature belonging to no clear ethnic or national tradition. Yet the theme of mixed race is at the center of many national self-definitions, even in our U.S. post-Civil Rights and South Africa's post-Apartheid era. This course examines aesthetic engagements with mixed race politics in these trans- and post-national dialogues, beginning in the 1700s and focusing on the 20th and 21st centuries.

*5 units, not given this year*

**AMSTUD 261F. Gender and Sexuality in Asian American Literature**

(Same as ASNAMST 188, ENGLISH 261F) How writers and representations dialogue, challenge, resist, and complicate such formative constructions of gendered/sexual identities. How queer Asian Americans face multiple negations that include potential expulsion from their own families and from various communities. Authors include Bharati Mukherjee, Russell Leong, Suki Kim, Shawn Wong, Louis Chu, Lawrence Chua, Catherine Liu, Jessica Hagedorn, Timothy Liu, Shani Mootoo, David Mura, among others. Secondary readings will include literary criticism, feminist and queer theory.

*5 units, not given this year*

**AMSTUD 262C. African American Literature and the Retreat of Jim Crow**

(Same as ENGLISH 262C) After the unprecedented carnage of WWII, the postwar era witnessed the slow decline of the segregated Jim Crow order and the onset of landmark civil rights legislation. What role did African American literature and culture play in this historical process? What does this shift in racial theory and praxis mean for black literary production, a tradition constituted by the experience of slavery and racial oppression? Focus on these questions against the backdrop of contemporaneous developments: the onset of the Cold War, decolonization and the formation of the Third World, and the emergence of the new liberalism.

*5 units, not given this year*

**AMSTUD 262D. African American Poetics**

(Same as AFRICAAM 262D, ENGLISH 262D) Examination of African American poetic expressive forms from the 1700s to the 2000s, considering the central role of the genre--from sonnets to spoken word, from blues poetry to new media performance--in defining an evolving literary tradition and cultural identity.

*5 units, not given this year*

# ANTHROPOLOGY (ANTHRO) COURSES

## UNDERGRADUATE COURSES IN ANTHROPOLOGY

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**ANTHRO 1. Introduction to Cultural and Social Anthropology**  
(Same as ANTHRO 201) Crosscultural anthropological perspectives on human behavior, including cultural transmission, social organization, sex and gender, culture change, technology, war, ritual, and related topics. Case studies illustrating the principles of the cultural process. Films. GER:DB-SocSci, EC-GlobalCom

5 units, Spr (Ferguson, J), Sum (Staff)

**ANTHRO 3. Introduction to Prehistoric Archeology**  
(Same as ARCHLGY 1) Aims, methods, and data in the study of human society's development from early hunters through late prehistoric civilizations. Archaeological sites and remains characteristic of the stages of cultural development for selected geographic areas, emphasizing methods of data collection and analysis appropriate to each. GER:DB-SocSci, EC-GlobalCom

3-5 units, Aut (Rick, J)

**ANTHRO 4. Language and Culture**  
Comparative approach, using examples from many languages. Emphasis is on generally non-Western speech communities. Topics include: the structure of language; the theory of signs; vocabulary and culture; grammar, cognition, and culture (linguistic relativism and determinism); encodability of cultural information in language; language adaptiveness to social function; the ethnography of speaking; registers; discourse (conversation, narrative, verbal art); language and power; language survival and extinction; and linguistic ideology (beliefs about language). GER:DB-SocSci

4-5 units, not given this year

**ANTHRO 6. Human Origins**  
(Same as ANTHRO 206, HUMBIO 6) The human fossil record from the first non-human primates in the late Cretaceous or early Paleocene, 80-65 million years ago, to the anatomically modern people in the late Pleistocene, between 100,000 to 50,000 B.C.E. Emphasis is on broad evolutionary trends and the natural selective forces behind them. GER: DB-NatSci

5 units, not given this year

**ANTHRO 6A. Introduction to Biological Anthropology: Biological Variation and Evolution in the Human Species**  
Humans are amazingly diverse, differing in size, shape, color, and myriad less tangible dimensions. What is the significance of such diversity and how did it come to be? This course introduces the study of biological variation and evolution of the human species. It draws on evidence from a variety of disciplines (i.e. evolutionary biology, comparative anatomy, paleontology, archaeology and genetics) to foster an appreciation for human variation grounded in a scientific framework. Major topics to be discussed include evolution and adaptation, primate taxonomy, the fossil record, human growth and development, phenotypic differences within and among modern human populations, and variation in disease susceptibility. No Prerequisite.

3-5 units, Aut (Melillo, S)

**ANTHRO 7. Introduction to Forensic Anthropology**  
The application of anthropological and archaeological methods to forensics. Topics include the recovery and identification of individuals via skeletal and DNA analysis, reconstruction of premortem and postmortem histories of remains, analysis of mass graves, human rights issues, surveillance tape analysis, analysis of crime scene materials, and expert witness testimony. Legal and ethical dimensions. GER: DB-NatSci

3 units, Spr (Staff)

**ANTHRO 12. Anthropology and Art**  
Modernity. How the concept of art appears timeless and commonsensical in the West, and with what social consequences.

Historicizing the emergence of art. Modernist uses of primitive, child art, asylum, and outsider art. GER:DB-Hum

5 units, not given this year

**ANTHRO 14. Introduction to Anthropological Genetics**  
For upper division undergraduates. The extent and pattern of variation among human genomes, the origin of these patterns in human evolution, and the social and medical impact of recent discoveries. Topics include: the Human Genome Project; human origins; ancient DNA; genetic, behavioral, linguistic, cultural, and racial diversity; the role of disease in shaping genetic diversity; DNA forensics; genes and reproductive technology. GER: DB-NatSci

3 units, not given this year

**ANTHRO 15. Sex and Gender**  
Commonality and diversity of gender roles in crosscultural perspective. Cultural, ecological, and evolutionary explanations for such diversity. Theory of the evolution of sex and gender, changing views about men's and women's roles in human evolution, conditions under which gender roles vary in contemporary societies, and issues surrounding gender equality, power, and politics. GER:DB-SocSci, EC-Gender

3 units, not given this year

**ANTHRO 16. Native Americans in the 21st Century: Encounters, Identity, and Sovereignty in Contemporary America**  
(Same as NATIVEAM 16) What does it mean to be a Native American in the 21st century? Beyond traditional portrayals of military conquests, cultural collapse, and assimilation, the relationships between Native Americans and American society. Focus is on three themes leading to in-class moot court trials: colonial encounters and colonizing discourses; frontiers and boundaries; and sovereignty of self and nation. Topics include gender in native communities, American Indian law, readings by native authors, and Indians in film and popular culture. GER:DB-SocSci, EC-AmerCul

5 units, Win (Wilcox, M)

**ANTHRO 18. Peopling of the Globe: Changing Patterns of Land Use and Consumption Over the Last 50,000 Years**  
(Same as ARCHLGY 12, EARTHSYS 21, HUMBIO 182) Fossil, genetic and archaeological evidence suggest that modern humans began to disperse out of Africa about 50,000 years ago. Subsequently, humans have colonized every major landmass on earth. This class introduces students to the data and issues regarding human dispersal, migration and colonization of continents and islands around the world. We explore problems related to the timing and cause of colonizing events, and investigate questions about changing patterns of land use, demography and consumption. Students are introduced to critical relationships between prehistoric population changes and our contemporary environmental crisis. GER:DB-SocSci

3-5 units, Aut (Bird, D)

**ANTHRO 19Q. Hauntings, Visions, and Prophecy**  
Preference to sophomores. Why do people see ghosts? Why do people believe that stars foretell the future? When do people see demons and angels? Focus is on the conditions under which people experience themselves as having sensory evidence of supernatural phenomena and the role of training and expectation in the process. Intellectual exploration of what is known from the ethnographic, historical, and psychological record. Practical experimental projects involve attempting to induce positive supernatural experience. Prerequisite: consent of instructor.

1-3 units, not given this year

**ANTHRO 21N. The Anthropology of Globalization**  
(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Anthropological approach to how cultural change, economic restructuring, and political mobilization are bound up together in the process of globalization. GER:DB-SocSci

4 units, Aut (Ebron, P)

**ANTHRO 22. Archaeology of North America**  
Why and how people of N. America developed. Issues and processes that dominate or shape developments during particular periods considering the effects of history and interactions with physical and social environment. Topics include the peopling of the New World, explaining subsequent diversity in substance and

settlement adaptations, the development of social complexity, and the impact of European contact. GER:DB-SocSci, EC-AmerCul  
3-5 units, not given this year

**ANTHRO 22N. Ethnographies of North America: An Introduction to Cultural and Social Anthropology**

Preference to freshmen. Ethnographic look at human behavior, including cultural transmission, social organization, sex and gender, culture change, and related topics in N. America. Films. GER:DB-SocSci

3-4 units, not given this year

**ANTHRO 23N. Glimpses of Divinity**

Preference to freshmen. How human beings search for and identify the presence of the divine in everyday human life. Sources include spiritual classics in the Christian, Jewish, and Hindu traditions including works by Augustine, Teresa of Avila, Jonathan Edwards, the Bhagavad Gita, the Zohar, and some ethnographies of non-literate traditions.

3 units, not given this year

**ANTHRO 24N. Maya Hieroglyphic Writing**

Preference to freshmen. Decipherment of classic Maya writing. Principles of archaeological decipherment. Maya calendrical, astronomical, historical, mythological, and political texts on stone, wood, bone, shell, murals, ceramics, and books (screenfold codices). Archaeology and ethnohistory of Maya scribal practice and literacy. Related Mesoamerican writing systems. The evolution of writing and the relevance of writing to theories of culture and civilization. GER:DB-SocSci, EC-GlobalCom

4 units, not given this year

**ANTHRO 25N. Contemporary Japanese Popular Culture**

This is a seminar focusing on the intersection between politics and popular culture in contemporary Japan. It will survey a range of social and political implications of practices of popular culture. Topics include representations of gender in J-pop, manga, and anime, the otaku culture and its pathologization. Students will be introduced to theories of popular culture in general, and a variety of contemporary anthropological studies on Japanese popular culture in particular as well.

1-3 units, not given this year

**ANTHRO 26N. Hauntings, Visions, and Prophecy**

(F,Sem) Stanford Introductory Seminar. This course explores the conditions under which people have experiences that they identify as *supernatural*: experiences of something that is not physically present. We will explore the cultural and psychological dimensions of this very real phenomenon. We will not, however, make ontological judgments about whether something which is experienced as externally present is in fact externally present: in other words, this is a class about culture and psychology, not about metaphysics. We will do experimental work, using our selves and fellow classmates, as subjects, to understand who, when and how people have experiences that they deem *super*natural.

3-5 units, Win (Luhmann, T)

**ANTHRO 27N. Ethnicity and Violence: Anthropological Perspectives**

(F,Sem) Stanford Introductory Seminar. Ethnicity is one of the most compelling and most modern ways in which people - in the midst of considerable global and local uncertainty - all across the world imagine and narrate themselves. This seminar will take an anthropological look at both the modernity and the compulsions of ethnic allegiance, and, why struggles over ethnic identity are so frequently violent. Our questions will be both historical *how*, why and when did people come to think of themselves as possessing different ethnic identities - and contemporary *how* are these identities lived, understood, narrated, and transformed and what is the consequence of such ethnicisation. We follow this through anthropological perspectives which ask persistently how people themselves locally narrate and act upon their experiences and histories. Through this we will approach some of the really big and yet everyday questions that many of us around the world face: how do we relate to ourselves and to those

3-5 units, Aut (Thiranagama, S)

**ANTHRO 28. Indigenous Australia**

(Same as ANTHRO 228) The prehistory and ethnology of New Guinea and Australia. Regional climate, environment, and pre-European history. Ethnography of the contact period focusing on

theoretical problems central to the development of anthropological theory. Contemporary sociopolitical issues. Films. GER:DB-SocSci

5 units, Spr (Bird, R)

**ANTHRO 30. Linguistic Field Methods**

(Same as LINGUIST 174, LINGUIST 274A) Practical training in the collection and analysis of linguistic data from native speakers of a language largely unknown to the investigator. Documentation of endangered languages. Research goals, field trip preparation, ethics (including human subjects, cooperation with local investigators, and governmental permits), working in the community, technical equipment, and analytical strategies. Emphasis is on the use of recording devices and computers in collection and analysis. Prerequisite: introductory course in linguistics.

3-5 units, not given this year

**ANTHRO 30Q. The Big Shift: An Anthropological Approach to Wealth, Migration, and the New Margins of America**

(S,Sem) Stanford Introductory Seminar. Is the middle class shrinking? How do people who live at the extremes of American society- the super rich, the working poor and those who live on the margins, imagine and experience the good life? How do we understand phenomena such as gang cultures, addiction and the realignment of white consciousness? This class uses the methods and modes of ethnographic study in an examination of American culture. Ethnographic materials range from an examination of the new American wealth boom of the last 20 years (Richistan by Robert Frank) to the extreme and deadly world of the invisible underclass of homeless addicts on the streets of San Francisco (Righteous Dopefiend by Phillippe Bourgois and Jeff Schonberg). The experiences of Hispanic immigrants and the struggle to escape gang life in Los Angeles are highlighted in the story of Homeboy Industries a job creation program initiated by a priest working in LA's most deadly neighborhoods (G-Dog and the Homeboys by

4 units, Aut (Wilcox, M)

**ANTHRO 31. Ecology, Evolution, and Human Health**

(Same as ANTHRO 331A) Ecology, Evolution, and Human Health Human ecology, environments, adaptation and plasticity, and their relationship to health and well-being considered in the broad comparative context. Topics include human population history, subsistence ecology, demography, reproductive decision making, urbanization, migration, infectious disease, the physiology of stress and the inflammatory response, social capital and social networks, nutrition, nutritional deficiencies, growth, and social inequalities. No prior course work in ecological or medical anthropology required. GER:DB-SocSci, EC-GlobalCom

3-5 units, not given this year

**ANTHRO 32. Theories in Race and Ethnicity**

Concepts and theories of race and ethnicity in the social sciences and cultural studies. U.S. based definitions, ideas, and problems of race and ethnicity are compared to those that have emerged in other areas of the world. GER:DB-SocSci

5 units, not given this year

**ANTHRO 55A. Introduction to Archaeobotany**

(Same as ARCHLGY 55) The aim of this course is to provide a short introduction to archaeobotany. An overview of types of archaeobotanical remains will include an examination of macrobotanical remains (seeds, charcoal), microfossil remains (starch, pollen, phytoliths) and molecular remains (aDNA, isotopes). The ways in which various types of plant remains have been used will be discussed through case studies. Major debates that archaeobotanical research has shed light on, including the origins of agriculture and issues around domestication will also be examined. Some practical work will allow students to gain familiarity with botanical nomenclature and some archaeobotanical protocols and plant identification techniques. Students will look at microfossil residues from local grinding slabs and write a short paper on the residues recovered. They will also look at seed remains from either Chinese or local flotation samples using microscopes in the lab.

5 units, not given this year

**ANTHRO 60A. Stanford Alpine Archaeology Project 2010**

Alpine Archaeology is a discipline that applies traditional archaeology in montane contexts. While survey and excavation are

standard methodologies, topography and climate bear on archaeological praxes in different ways. Soil chemistry in alpine contexts' testable by pH and other parameters - usually integrates less organic material and more geological material. Material preservation in alpine contexts factors in cold temperature for up to half a year with resulting lower diffusion for reduced oxidation and inhibited deterioration of organic materials. Because of montane environment, this course incorporates elements of paleoclimatology (including glaciation) and geomorphology (including geological processes of long term orogeny and erosion). Alpine ecology is studied including natural vegetation zones from 1000-3000 meters, along with transhumance, trade patterns, deforestation, constricted seasonal agriculture and anthropogenic change as well as restricted mobility along natural cor

3 units, Aut (*Hunt, P*)

#### **ANTHRO 71. Linguistic Field Methods**

(Same as LINGUIST 174, LINGUIST 274) Workshop applying methods for gathering and analyzing linguistic data in the field, i.e., from consultants who are native speakers of a language essentially unknown to the investigator. Principles of language documentation. Students will do local field projects and work on these both in and out of class. Format involves lectures, discussion, working with native speakers, and student presentations. Topics include: choosing a language; planning the project; computerized collection, storage, and analysis of linguistic data; field recording equipment; interviews and elicitation; diagnostic vocabulary lists and grammatical schedules; field study of everyday communication and discourse; area surveys and the ethnography of communication; ethics, reflexivity, and bias; working with human subjects and governments. Prerequisite: a course in linguistics or in anthropological field methods.

5 units, Spr (*Fox, J*)

#### **ANTHRO 77. Japanese Society and Culture**

(Same as ANTHRO 277) Focus is on power, identity, and the politics of knowledge production. How transnational interactions influence Japanese identity. How anthropological knowledge has contributed to understanding Japanese culture and society. Gender, race and class; contemporary ethnographies. Modernity and globalization. Cultural politics, domestic work, labor management, city planning, ad images, anime, martial art, fashion, theater, leisure, and tourism. GER:DB-SocSci, EC-GlobalCom

5 units, not given this year

#### **ANTHRO 82. Medical Anthropology**

(Same as ANTHRO 282) Emphasis is on how health, illness, and healing are understood, experienced, and constructed in social, cultural, and historical contexts. Topics: biopower and body politics, gender and reproductive technologies, illness experiences, medical diversity and social suffering, and the interface between medicine and science. GER:DB-SocSci, EC-GlobalCom

5 units, Spr (*Jain, S*)

#### **ANTHRO 90A. History of Archaeological Thought**

(Same as ARCHLGY 103) Introduction to the history of archaeology and the forms that the discipline takes today, emphasizing developments and debates over the past five decades. Historical overview of culture, historical, processual and post-processual archaeology, and topics that illustrate the differences and similarities in these theoretical approaches.

5 units, Aut (*Meskell, L*)

#### **ANTHRO 90B. Theory of Cultural and Social Anthropology**

Preference to Anthropology majors. Anthropological interpretations of other societies contain assumptions about Western societies. How underlying assumptions and implicit categories have influenced the presentation of data in major anthropological monographs. Emphasis is on Karl Marx, Emile Durkheim, Max Weber, and anthropological analyses of non-Western societies. GER:DB-SocSci

5 units, Win (*Ebron, P*)

#### **ANTHRO 90C. Theory of Ecological and Environmental Anthropology**

(Same as HUMBIO 118) Dynamics of culturally inherited human behavior and its relationship to social and physical environments. Topics include a history of ecological approaches in anthropology, subsistence ecology, sharing, risk management, territoriality, warfare, and resource conservation and management. Case studies

from Australia, Melanesia, Africa, and S. America. GER:DB-SocSci, WIM

5 units, Win (*Bird, D*)

#### **ANTHRO 90D. Social Theory in the Anthropological Sciences**

Required of majors. Foundational course in the history of social theory in anthropology from the late 19th century to the present. Major approaches to human culture and society: symbolic, social, material, and psychological. Questions about the role of theory in anthropology and how it can be applied to human issues. (HEF IV) GER:DB-SocSci

5 units, not given this year

#### **ANTHRO 91. Method and Evidence in Anthropology**

This course provides a broad introduction to various ways of designing anthropological questions and associated methods for collecting evidence and supporting arguments. We review the inherent links between how a question is framed, the types of evidence that can address the question, and way that data are collected. Research activities such as interviewing, participant observation, quantitative observation, archival investigation, ecological survey, linguistic methodology, tracking extended cases, and demographic methods are reviewed. Various faculty and specialists will be brought in to discuss how they use different types of evidence and methods for supporting arguments in anthropology.

5 units, Win (*Coll, K*)

#### **ANTHRO 91A. Archaeological Methods**

(Same as ARCHLGY 102) Methodological issues related to the investigation of archaeological sites and objects. Aims and techniques of archaeologists including: location and excavation of sites; dating of places and objects; analysis of artifacts and technology and the study of ancient people, plants, and animals. How these methods are employed to answer the discipline's larger research questions.

5 units, Spr (*Staff*)

#### **ANTHRO 92A. Undergraduate Research Proposal Writing Workshop**

Practicum. Students develop independent research projects and write research proposals. How to formulate a research question; how to integrate theory and field site; and step-by-step proposal writing.

2-3 units, Aut (*Staff*)

#### **ANTHRO 92B. Undergraduate Research Proposal Writing Workshop**

Practicum. Students develop independent research projects and write research proposals. How to formulate a research question; how to integrate theory and field site; and step-by-step proposal writing.

2-3 units, Win (*Staff*)

#### **ANTHRO 93. Prefield Research Seminar**

For Anthropology majors only; non-majors register for 93B. Preparation for anthropological field research in other societies and the U.S. Data collection techniques include participant observation, interviewing, surveys, sampling procedures, life histories, ethnohistory, and the use of documentary materials. Strategies of successful entry into the community, research ethics, interpersonal dynamics, and the reflexive aspects of fieldwork. Prerequisites: two ANTHRO courses or consent of instructor.

5 units, Spr (*Malkki, L*)

#### **ANTHRO 93B. Prefield Research Seminar: Non-Majors**

Preparation for anthropological field research in other societies and the U.S. Data collection techniques include participant observation, interviewing, surveys, sampling procedures, life histories, ethnohistory, and the use of documentary materials. Strategies for successful entry into the community, research ethics, interpersonal dynamics, and the reflexive aspects of fieldwork. Service Learning Course (certified by Haas Center).

5 units, Spr (*Coll, K*)

#### **ANTHRO 94. Postfield Research Seminar**

Goal is to produce an ethnographic report based on original field research gathered during summer fieldwork, emphasizing writing and revising as steps in analysis and composition. Students critique classmates' work and revise their own writing in light of others' comments. Ethical issues in fieldwork and ethnographic writing, setting research write-up concerns within broader contexts.



5 units, Aut (Wilcox, M)

**ANTHRO 95. Research in Anthropology**

Independent research conducted under faculty supervision, normally taken junior or senior year in pursuit of a senior paper or an honors project. May be repeated for credit.

1-10 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**ANTHRO 95B. Senior Paper**

Taken in the final quarter before graduation. Independent study and work on senior paper for students admitted to the program. Prerequisite: consent of program adviser and instructor.

1-10 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**ANTHRO 96. Directed Individual Study**

Prerequisite: consent of instructor.

1-10 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**ANTHRO 97. Internship in Anthropology**

Opportunity for students to pursue their specialization in an institutional setting such as a laboratory, clinic, research institute, or government agency. May be repeated for credit. Service Learning Course (certified by Haas Center).

1-10 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**ANTHRO 98B. Digital Methods in Archaeology**

(Same as ANTHRO 298B) This is a course on digital technologies in archaeology used for documentation, visualization, and analysis of archaeological spaces and objects. Emphasizes hands-on approaches to image manipulation, virtual reality, GIS, CAD, and photogrammetry modeling methods. GER:DB-EngrAppSci

3-5 units, not given this year

**ANTHRO 98E. Catalhoyuk and Neolithic Archaeology**

Catalhoyuk as a case study to understand prehistoric social life during the Neolithic in Anatolia and the Near East. Developments in agriculture, animal domestication, material technology, trade, art, religion, skull cults, architecture, and burial practices. Literature specific to Catalhoyuk and other excavations throughout the Anatolian and Levantine regions to gain a perspective on diversity and variability throughout the Neolithic. The reflexive methodology used to excavate Catalhoyuk, and responsibilities of excavators to engage with larger global audiences of interested persons and stakeholders.

3-5 units, Spr (Hodder, I)

**ANTHRO 98F. Field School Training Workshop**

Provides students important preparatory orientation to anthropology as well as the methods, ethics, and logistics of the specific field school each student will be attending in the summer.

1-3 units, not given this year

**ANTHRO 100A. India's Forgotten Empire: The Rise and Fall of Indus Civilization**

How and why cities with public baths, long-distance trade, sophisticated technologies, and writing emerged, maintained themselves, and collapsed in the deserts of present-day Pakistan and India from 2500 to 1900 B.C. GER:DB-SocSci, DB-SocSci, EC-GlobalCom

3 units, not given this year

**ANTHRO 100C. Chavín de Huantar Research Seminar**

For participants in fieldwork at Chavín de Huantar. Archaeological research techniques, especially as applied at this site. Students work on data from the previous field season to produce synthetic written materials. Maybe repeated for credit.

2-5 units, Aut (Rick, J)

**ANTHRO 101. The Aztecs and Their Ancestors: Introduction to Mesoamerican Archaeology**

The prehispanic cultures of Mesoamerica through archaeology and ethnohistory, from the archaic period to the Spanish conquest in the 16th century. GER:DB-SocSci, EC-GlobalCom

3-5 units, Win (Robertson, I)

**ANTHRO 101A. Archaeology as a Profession**

(Same as ARCHLGY 107A) Academic, contract, government, field, laboratory, museum, and heritage aspects of the profession.

5 units, Aut (Voss, B)

**ANTHRO 102A. Ancient Civilizations: Complexity and Collapse**

(Same as ANTHRO 202A) How archaeology contributes to understanding prehistoric civilizations. How and why complex

social institutions arose, and the conditions and processes behind their collapse. The development of monumental architecture, craft specialization, trade and exchange, and social stratification using examples from the archaeological record. (HEF II, III; DA-B) GER:DB-SocSci, EC-GlobalCom

3-5 units, not given this year

**ANTHRO 103. The Archaeology of Modern Urbanism**

Seminar. Urbanism as a defining feature of modern life. The perspective of archaeology on the history and development of urban cultures. Case studies are from around the globe; emphasis is on the San Francisco Bay Area megalopolis. Cities as cultural sites where economic, ethnic, and sexual differences are produced and transformed; spatial, material, and consumption practices; and the archaeology of communities and neighborhoods. GER:DB-SocSci

5 units, Spr (Staff)

**ANTHRO 104. Urban Life and Cultural Imagination in South Asia**

This course introduces the history of urban development and urban culture in South Asia. The main bulk of the readings are ethnographic accounts and historical works on conflicts, dynamics, and cultural forms in South Asian cities in the 20th century. GER:DB-SocSci

5 units, Spr (Hansen, T)

**ANTHRO 104A. Foraging for a Living**

(Same as ANTHRO 204A) As an economic mode of production, foraging has underwritten humanity for most of its existence. Drawing on archaeology, history, ethnography and new media, this class explores foraging from multiple angles ranging from early approaches in the social and biological sciences to neo-Marxist, neo-Darwinian and ecological perspectives. Topics include the expansion of humans across the planet 50,000 years ago, the emergence of diverse foraging practices in the late Quaternary, the marginalization of foraging economies following colonial invasions, contemporary foraging practices across the continents and foraging in urban environments including the promotion of foraging in modern culinary trends.

5 units, Win (Coddling, B)

**ANTHRO 105. Ancient Cities in the New World**

(Same as ANTHRO 205) Preindustrial urbanism as exemplified by prehispanic New World societies. Case studies: the central and southern highlands of Mesoamerica, and the Maya region. Comparative material from highland S. America. GER:DB-SocSci

3-5 units, not given this year

**ANTHRO 106. Incas and their Ancestors: Peruvian Archaeology**

(Same as ANTHRO 206A, ARCHLGY 102B) The development of high civilizations in Andean S. America from hunter-gatherer origins to the powerful, expansive Inca empire. The contrasting ecologies of coast, sierra, and jungle areas of early Peruvian societies from 12,000 to 2,000 B.C.E. The domestication of indigenous plants which provided the economic foundation for monumental cities, ceramics, and textiles. Cultural evolution, and why and how major transformations occurred. (HEF II, III; DA-B) GER:DB-SocSci, EC-GlobalCom

3-5 units, not given this year

**ANTHRO 106A. Gang Colors: The Racialization of Violence and the American City**

Street gangs (e.g. Bloods, Crips, Mara Salvatrucha, M-18, etc.) serve as a window onto the experience of racial, ethnic and economic marginalization under late capitalism. This class explores the context that gives rise to gang violence through a combination of anthropological, sociological, and historical approaches. Students will be familiarized with the macro-social factors that shape both gangs and the politics of violence in the Americas, North and South.

5 units, Aut (Samet, R)

**ANTHRO 109. Archaeology: World Cultural Heritage**

(Same as ANTHRO 209) Focus is on issues dealing with rights to land and the past on a global scale including conflicts and ethnic purges in the Middle East, the Balkans, Afghanistan, India, Australia, and the Americas. How should world cultural heritage be managed? Who defines what past and which sites and monuments should be saved and protected? Are existing international agreements adequate? How can tourism be balanced



against indigenous rights and the protection of the past? GER:DB-SocSci

*5 units, not given this year*

**ANTHRO 110A. Neandertals and Modern Humans: Origin, Evolution, Interactions**

(Same as ANTHRO 210A) The expansion out of Africa of our species represents the last spectacular step in the course of Human Evolution. It resulted in the colonization of the whole planet and the replacement of archaic forms of humans in Eurasia. One way to investigate why *Homo sapiens* has been such a successful species is to compare its evolution with that of its closest relative, the Neandertals. Exploring the bio-cultural processes at work in the two lineages leads to examine some of the main issues in Paleoanthropology and the most recent methodological advances in the field.

*3 units, not given this year*

**ANTHRO 111. Archaeology of Sex, Sexuality, and Gender**

(Same as ANTHRO 211) How archaeologists study sex, sexuality, and gender through the material remains left behind by past cultures and communities. Theoretical and methodological issues; case studies from prehistoric and historic archaeology.

*5 units, not given this year*

**ANTHRO 112. Public Archaeology: Market Street Chinatown Archaeology Project**

(Same as ANTHRO 212, ASNAMST 112) This internship-style course centers on the practice and theory of historical archaeology research and interpretation through a focused study of San Jose's historic Chinese communities. The course includes classroom lectures, seminar discussion, laboratory analysis of historic artifacts, and participation in public archaeology events. Course themes include immigration, urbanization, material culture, landscape, transnational identities, race and ethnicity, gender, cultural resource management, public history, and heritage politics. The course includes required lab sections, field trips, and public service. Transportation will be provided for off-site activities.

*2-5 units, Aut (Voss, B), Win (Voss, B), Spr (Voss, B)*

**ANTHRO 113. Faunal Analysis: Animal Remains for the Archaeologist**

(Same as ANTHRO 213, BIO 166, BIO 266) The analysis of fossil animal bones and shells to illuminate the behavior and ecology of prehistoric collectors, especially ancient humans. Theoretical and methodological issues. The identification, counting, and measuring of fossil bones and shells. Labs. Methods of numerical analysis.

*5 units, not given this year*

**ANTHRO 114. Prehistoric Stone Tools: Technology and Analysis**

(Same as ANTHRO 214) Archaeologists rely on an understanding of stone tools to trace much of what we know about prehistoric societies. How to make, illustrate, and analyze stone tools, revealing the method and theory intrinsic to these artifacts. GER:DB-SocSci

*5 units, not given this year*

**ANTHRO 115. Spirituality and Healing**

(Same as HUMBIO 179) This course considers the puzzle of symbolic healing. How have societies without the resources of modern medicine approached healing? Why do these rituals have common features around the world? We explore shamanism, spirit possession, prayer, and the role of placebos in modern biomedicine. Students will do ethnographic work and practical explorations along with more traditional scholarly approaches to learning.

*3-5 units, not given this year*

**ANTHRO 116. Data Analysis for Quantitative Research**

(Same as ANTHRO 216) This course allows graduate and advanced undergraduate students in archaeology and anthropology to acquire practical skills in quantitative data analysis. Some familiarity with basic statistical methods is useful but not assumed; the structure of the course will be flexible enough to accommodate a range of student expertise and interests. Topics covered include: statistics and graphics in R; database design, resampling methods, diversity measures, contingency table analysis, and introductory methods in spatial analysis.

*5 units, Spr (Robertson, I)*

**ANTHRO 117A. Conservation Medicine in Practice**

(Same as HUMBIO 117) Examination of the interconnectedness of the environment and human and animal health. Investigation of the 'One World-One Health' paradigm, by examining issues such as climate change and human health, ecological perturbation and infectious diseases, and the importance of new conceptual approaches to combat disease emergence and spread. Seminars, from experts working in government, NGOs, public health, medicine and academia, will emphasize the importance of interdisciplinary approaches (medicine, epidemiology, anthropology, ecology, environmental science) in understanding health scenarios, and also upon the importance of using science and policy to improve public health.

*4 units, Spr (Salkeld, D)*

**ANTHRO 118. Heritage, Environment, and Sovereignty in Hawaii**

(Same as EARTHSYS 118) This course explores the cultural, political economic, and environmental status of contemporary Hawaiians. What sorts of sustainable economic and environmental systems did Hawaiians use in prehistory? How was colonization of the Hawaiian Islands informed and shaped by American economic interests and the nascent imperialism of the early 20th century? How was sovereignty and Native Hawaiian identity been shaped by these forces? How has tourism and the leisure industry affected the natural environment? This course uses archaeological methods, ethnohistorical sources, and historical analysis in an exploration of contemporary Hawaiian social economic and political life.

*4 units, not given this year*

**ANTHRO 120. The Maya**

Lecture course on the ancient and modern Maya. We explore the archaeology, ecology, culture, and language history of the Maya from the earliest times to the Classic Maya Collapse in the 9th-10th Centuries A.D., and examine also the Post-Classic, the Conquest, and Colonial Periods, and the persistence and impact of the Maya in present-day Mexico, Guatemala, Belize, Honduras, El Salvador, and diasporic Maya in the United States. The course acquaints students with the cultural achievements of the Maya in the context of the anthropology and archaeology of civilization, and considers issues of identity over vast periods of time. It includes discussion of the roles of isolation, contact, and geography in Maya history; principles of archaeological excavation and interpretation as applied to the Maya city-states, especially to their rise and fall; Maya hieroglyphic writing and its decipherment; Maya mythology and the Popol Vuh; Maya art in its Mesoamerican context; ethical issues in the ma

*5 units, Win (Fox, J)*

**ANTHRO 120A. Social Zooarchaeology & Animals within Prehistoric Social Worlds**

(Same as ANTHRO 220A, ARCHLGY 120, ARCHLGY 220) The elevated status of animals in prehistory derived from their position as sentient beings sharing many of the ontological qualities of people comparable life-cycles and behavioral traits in some cases, affection, the display of dominance hierarchies, and differing degrees of sociality while at the same time retaining clear biological and behavioral differences. The course will consider aspects of the social and ontological relations between people and animals in prehistory, particularly cosmologies and folk classifications, and the place of animals in social relations and identity formation. It is aimed to understand how the presence, qualities, materialities, and networks of animal life shaped human socialities as much as human agency created engagement with the 'animal estate'. Furthermore, it intends to define how to include animals as subjects in archaeological and anthropological studies taking non-human agency as a starting point. Focusing on case studies drawn from Eur

*5 units, Aut (Marciniak, A)*

**ANTHRO 121. Language and Prehistory**

(Same as ANTHRO 221) Language classification and its implications for human prehistory. The role of linguistic data in analyzing prehistoric populations, cultures, contact, and migrations. Comparison of linguistic and biological classifications. Reconstruction, proto-vocabularies, and culture. Archaeological decipherment and the origins and evolution of writing. Archaeological and genetic evidence for human migrations. (DA-A; HEF II,III) GER:DB-SocSci, EC-GlobalCom

3-5 units, not given this year

**ANTHRO 121A. Hip Hop, Youth Identities, and the Politics of Language**

(Same as AFRICAAM 121X, AMSTUD 121X, CSRE 121X, EDUC 121X, LINGUIST 155) Focus is on issues of language, identity, and globalization, with a focus on Hip Hop cultures and the verbal virtuosity within the Hip Hop nation. Beginning with the U.S., a broad, comparative perspective in exploring youth identities and the politics of language in what is now a global Hip Hop movement. Readings draw from the interdisciplinary literature on Hip Hop cultures with a focus on sociolinguistics and youth culture.

3-4 units, Spr (Alim, H)

**ANTHRO 123. Readings in Linguistic Anthropology**

(Same as ANTHRO 223) One or two major related works on language in its cultural context. Works for 2007-08 involve attempts to correlate linguistic and non-linguistic data for analysis of prehistoric human contact and migrations. May be repeated for credit.

2 units, not given this year

**ANTHRO 123A. Human Diversity: A Linguistic Perspective**

(Same as HUMBIO 187) The diversity and distribution of human language and its implications for the origin and evolution of the human species. The origin of existing languages and the people who speak them. Where did current world languages come from and how can this diversity be used to study human prehistory? Evidence from related fields such as archaeology and human genetics. Topics: the origin of the Indo-European languages, the peopling of the Americas, and evidence that all human languages share a common origin. GER:DB-SocSci, EC-GlobalCom

3 units, Spr (Ruhlen, M)

**ANTHRO 124. Maya Mythology and the Popol Vuh**

The mythology and folklore of the ancient Maya, emphasizing the relationship between the 16th-century Quiché Maya mythological epic Popol Vuh (Book of the Council) and classic lowland Maya art, architecture, religion, and politics. General Mesoamerican mythology. Anthropological and other theories of mythology. Class participates in the creation of a web project on the Popol Vuh.

3-5 units, not given this year

**ANTHRO 124A. Politics, nationalism, heritage and archaeology in Central/Eastern Europe**

(Same as ANTHRO 224A, ARCHLGY 123, ARCHLGY 223) The current state of archaeology in central and eastern part of Europe reveals a multiplicity of regional intellectual traditions and social factors, interrelating with each other in many complex ways. The course will discuss intellectual panorama of archaeologies in this part of the continent and examine the reaction to various socio-political, economic, intellectual, institutional and organizational conditions in its different parts that created a wide variety of local strategies within which archaeology has been practiced. As nationalism requires the elaboration of a real or invented remote past, the course will then consider how archaeological data have been manipulated for nationalist purposes, and discuss the relationship of archaeology to nation-building in Central and Eastern Europe. Contrastive conceptions of nationality and ethnicity are presented. The political uses of archaeology, involving mobilization and appropriation of archaeological and cultural heritage, are also rev

5 units, Aut (Marciniak, A)

**ANTHRO 125. Language and the Environment**

(Same as ANTHRO 225) Lecture course on vocabulary and grammar as keys to peoples' understanding and use of the environment. Ethnobotany, ethnobiology, and ethnosemantics in the analysis of the language of place, plants and animals, the earth, the body, and disease. Terminological gaps and gluts and what they imply. Language as a strategic resource in environmental management. Language contact and conflict in the modern global environment, with particular attention to the vocabularies of capitalism and property. Language extinction and its environmental implications. Anthropology concentration: CS, EE. No prerequisites.

3-4 units, Aut (Fox, J)

**ANTHRO 126. Cities in Comparative Perspective**

(Same as URBANST 114) Core course for Urban Studies majors. We will study urban space both historically and cross-culturally. Urban Studies, by definition, is an interdisciplinary field, where the methodological approaches draw upon a diverse set of analytic tools. Disciplines that occupy a prominent place in this class are geography, cultural anthropology, sociology, history, media studies, and literature. In this context, we will discuss the importance of cities around the world to the economic, cultural, and political well-being of modern societies and examine how forces such as industrialization, decentralization, and globalization affect the structure and function of cities. GER:DB-SocSci

5 units, Spr (Kapur, C)

**ANTHRO 127. City and Sounds**

How do people experience modern cities and urban public cultures through auditory channels? How does sound mediate and constitute urban space? How to listen to and write about culture through sound. Students carry out narrative interviews and sound fieldwork in the Bay Area. Readings include urban anthropology, semiotics, art history, social studies of science and technology, media studies, and musicology.

5 units, not given this year

**ANTHRO 127A. Cities and the Future: Utopias, Dystopias, and Other Urbanisms to Come**

What sort of futures are being imagined for the cities of the twenty-first century? An interdisciplinary seminar, this course will critically analyze how the future of cities, and the cities of the future, are being thought about and acted upon in the present. It is designed for graduate students and advanced undergraduates with experience in the social sciences and humanities and who also have a keen interest in urban studies. Its primary objective is to develop sophisticated ways of thinking about the future of cities, since doing so has real significance for the kind of city we want to, and eventually will, ourselves inhabit.

3 units, not given this year

**ANTHRO 128. Visual Studies**

Drawing on anthropology, art history, cultural studies, and other fields, this course explores how and why one might want to think critically about the politics of visuality, social imagination, the politics of making and consuming images and things, iconophilia and iconophobia, the classification of people and things into *¿artists¿* and *¿art¿*, and cultural production more generally.

5 units, not given this year

**ANTHRO 130A. Interpreting Space and Place: An Introduction to Mapmaking**

How mapmaking, geographical information systems (GIS), and spatial tools can be applied in social research. Qualitative and quantitative approaches in the use of geospatial information. Methodologies and case examples.

5 units, not given this year

**ANTHRO 130B. Introduction to GIS in Anthropology**

(Same as ANTHRO 230B) How GIS and spatial tools can be applied in social research. Case studies and student projects address questions of social and cultural relevance using real data sets, including the collection of geospatial data and building of spatial evidence. Analytical approaches and how they can shape a social and cultural interpretation of space and place.

5 units, not given this year

**ANTHRO 130D. Spatial Approaches to Social Science**

(Same as ANTHRO 230D, POLISCI 241S) This multidisciplinary course combines different approaches to how GIS and spatial tools can be applied in social science research. We take a collaborative, project oriented approach to bring together technical expertise and substantive applications from several social science disciplines. The course aims to integrate tools, methods, and current debates in social science research and will enable students to engage in critical spatial research and a multidisciplinary dialogue around geographic space.

5 units, Win (Rodden, J; Engel, C)

**ANTHRO 131. The Politics of Humanitarianism**

(Same as ANTHRO 231) Anthropological approaches to contemporary practices of humanitarian intervention. How social theory can inform the politics of humanitarianism, charity, and philanthropy. Focus is on Africa from the colonial era to the

present. GER:DB-SocSci

5 units, not given this year

**ANTHRO 134. Object Lessons**

(Same as ANTHRO 234) Human-object relations in the processes of world making. Objectification and materiality through ethnography, archaeology, material culture studies, and cultural studies. Interpretive connotations around and beyond the object, the unstable terrain of interrelationships between sociality and materiality, and the cultural constitution of objects. Sources include: works by Marx, Hegel, and Mauss; classic Pacific ethnographies of exchange, circulation, alienability, and fetishism; and material culture studies.

5 units, Win (Staff)

**ANTHRO 135. Cultural Studies**

(Same as ANTHRO 235) Identity, community, and culture; their interactions and formation. GER:DB-SocSci

5 units, not given this year

**ANTHRO 135A. The Anthropology of Security**

(Same as ANTHRO 235A) This seminar begins by outlining the main theoretical and empirical challenges in the areas of surveillance studies and security studies. The seminar provides a space wherein students will be able to discuss these interdisciplinary areas and develop their own Anthropology-informed perspectives. The seminar then discusses the work of Anthropologists who through their ethnographic and theoretical work have helped developed and important and emergent area: *“The Anthropology of Security.”* Areas covered include, inter alia, national security, security and war, biometrics, gated-ness, and environmental and bio-security threats.

3-5 units, not given this year

**ANTHRO 135H. Conversations in CSRE: Case Studies in the Stanford Community**

(Same as CSRE 135H) Race, ethnicity, gender, and religion using the tools, analytical skills and concepts developed by anthropologists.

1-2 units, Aut (Wilcox, M), Win (Wilcox, M)

**ANTHRO 135I. CSRE House Seminar: Race and Ethnicity at Stanford**

(Same as CSRE 135I) Race, ethnicity, gender, and religion using the tools, analytical skills and concepts developed by anthropologists.

1-2 units, not given this year

**ANTHRO 137. The Politics of Humanitarianism**

(Same as ANTHRO 237) What does it mean to want to help, to organize humanitarian aid, in times of crisis? At first glance, the impulse to help issue generis a good one. Helping is surely preferable to indifference and inaction. This does not mean that humanitarian interventions entail no ethical or political stakes *¿* or that they are beyond engaged critique. We need to critique precisely that which we value, and to ask some hard questions, among them these: What are the differences among humanitarianism, charity, and philanthropy? What of social obligations and solidarities? How does the neoliberal world order currently create structural inequalities that ensure the reproduction of poverty and violence? How does the current order of things resemble or differ from the colonial world order? This course examines the history of humanitarian sensibilities and the emergence of organized action in the *¿*cause of humanity*¿*. In the early years of humanitarian intervention, political neutrality was a key principle;

5 units, not given this year

**ANTHRO 139. Ethnography of Africa**

(Same as ANTHRO 239) The politics of producing knowledge in and about Africa through the genre of ethnography, from the colonial era to the present. The politics of writing and the ethics of social imagination. Sources include novels juxtaposed to ethnographies. GER:DB-SocSci

5 units, Win (Malkki, L)

**ANTHRO 140A. Ethnographic Archaeologies**

(Same as ANTHRO 240A, ARCHLGY 137) How have ethnographic and archaeological methods been combined in anthropological research? What methodological and theoretical implications do these kinds of projects generate? Seminar topics will include ethnoarchaeology, ethnographies of archaeological

practice, public archaeology and heritage ethics. Lecture and discussion.

4-5 units, NEXTYEAR

**ANTHRO 146. Car Culture**

(Same as STS 150) Since at least the 50s, the U.S. has been notorious as a nation in love with the car. An examination of this premise, analyzing new methods of production brought by automobile manufacture, how automobiles shaped urban growth, debates about pollution and environmental degradation, and debates around auto safety. How the car has influenced American practices including courting, eating out, and suburban living.

5 units, not given this year

**ANTHRO 147. Nature, Culture, Heritage**

(Same as ANTHRO 247) Seminar. Shared histories of natural and cultural heritage and their subsequent trajectories into the present. How thought about archaeological sites and natural landscapes have undergone transformations due to factors including indigenous rights, green politics, and international tourism. The development of key ideas including conservation, wilderness, sustainability, indigenous knowledge, non-renewability and diversity. Case studies draw on cultural and natural sites from Africa, the Americas and Australia.

5 units, Aut (Meskell, L)

**ANTHRO 147A. Folklore, Mythology, and Islam in Central Asia**

(Same as REES 247A) Central Asian cults, myths, and beliefs from ancient time to modernity. Life crisis rites, magic ceremonies, songs, tales, narratives, taboos associated with childbirth, marriage, folk medicine, and calendrical transitions. The nature and the place of the shaman in the region. Sources include music from the fieldwork of the instructor and the Kyrgyz epoch Manas. The cultural universe of Central Asian peoples as a symbol of their modern outlook. GER:DB-SocSci

3-5 units, Spr (Kunanbaeva, A)

**ANTHRO 148. Health, Politics, and Culture of Modern China**

(Same as ANTHRO 248) One of the most generative regions for medical anthropology inquiry in recent years has been Asia. This seminar is designed to introduce upper division undergraduates and graduate students to the methodological hurdles, representational challenges, and intellectual rewards of investigating the intersections of health, politics, and culture in contemporary China. GER:DB-SocSci

4-5 units, Aut (Kohrman, M)

**ANTHRO 148A. Nomads of Eurasia: Culture in Transition**

(Same as ANTHRO 248A) Traditional peoples of Central and Inner Asia; their lifestyles and cultural history. Modern research approaches and recent fieldwork data published mainly in Russian and Central Asian languages. Audio-visual materials.

5 units, Win (Kunanbaeva, A)

**ANTHRO 151. Women, Fertility, and Work**

(Same as ANTHRO 251, HUMBIO 148W) How do choices relating to bearing, nursing, and raising children influence women's participation in the labor force? Cultural, demographic, and evolutionary explanations, using crosscultural case studies. Emphasis is on understanding fertility and work in light of the options available to women at particular times and places. GER:DB-SocSci, EC-Gender

5 units, not given this year

**ANTHRO 152A. Urban Poverty and Inequality in Contemporary China**

Experiences of poverty and inequality and their relationship to gender, space development, post-socialism, and globalization. How processes of class-making in China's cities are bound up with transformations in the country's sociopolitical landscape.

5 units, not given this year

**ANTHRO 153A. Japan's Minorities**

(Same as ANTHRO 253A) Cultural and social history of Japan since WWII. Falling birth rates, changing family structure, decreasing and then increasing divorce rates, coping with societal aging, expansion of higher education, solving new educational problems, increasing variability of work situation, introduction of foreign workers. Attention to the legacy of Tokugawa and pre-war Japan as antecedent to postwar developments.

3-5 units, not given this year

**ANTHRO 154. Anthropology of Drugs: Experience, Capitalism, Modernity**

This course examines the significant role of drugs play in shaping expressions of the self and social life; in the management of populations, and in the production of markets and inequality. It engages these themes through cultural representations of drugs and drug use, analyses of scientific discourse, and social theory. Topics include: the social construction of the licit and illicit; the shifting boundaries of deviance, disease and pleasure; and the relationship between local markets and global wars.

*5 units, Spr (Staff)*

**ANTHRO 154A. Japan's Postwar Demographic And Social Changes**

(Same as ANTHRO 254A) Changing birth and death rates. Restructuring education and employment. Problems with seniors. Increasing foreign workers.

*3-5 units, Win (Staff)*

**ANTHRO 155. Research Methods in Ecological Anthropology**

(Same as ANTHRO 255) The course prepare students for the methodological and practical aspects of doing ecologically oriented, quantitative anthropological field research. The primary goal is to explore what it means to ask anthropological questions in a systematic way. We will focus on understanding what can constitute an interesting question, how to frame a question in way that facilitates investigation, and how to design methods to begin investigating a question. In turn, the course will provide a format to refine research projects in preparation for doing more extensive fieldwork.

*3-5 units, Spr (Bird, D)*

**ANTHRO 159. Conservation and Development Dilemmas in Latin America: Galapagos as a Microcosm**

(Same as ANTHRO 259) The course will examine conservation and development dilemmas as they affect countries in Central and South America, eventually focusing on the Galapagos for a detailed case study. The class will explore the resolution of key issues in Galapagos in conjunction with research supported by an Environmental Ventures Project (EVP) Grant from the Woods Institute.

*3-5 units, Spr (Staff)*

**ANTHRO 160. Social and Environmental Sustainability: The Costa Rican Case**

(Same as ANTHRO 260) Seminar focused on issues of tropical sustainability with a particular emphasis on the Osa Peninsula of Costa Rica. Offered in conjunction with the Osa Initiative in the Wood's Institute for the Environment, the course highlights issues of human development in the tropics, through such means as agricultural development, ecotourism, conservation efforts, private and indigenous reserves, and mining. The course will draw from diverse disciplines including anthropology, rural sociology, conservation biology, geosciences, history, political science, and journalism. In addition to weekly discussions, students will development a research paper throughout the term which will be presented to a panel of selected Wood's Faculty during the final week of the term.

*3-5 units, Aut (Durham, W; Hunt, C)*

**ANTHRO 161. Human Behavioral Ecology**

(Same as ANTHRO 261) Theory, method, and application in anthropology. How theory in behavioral ecology developed to understand animal behavior is applied to questions about human economic decision making in ecological and evolutionary contexts. Topics include decisions about foraging and subsistence, competition and cooperation, mating, and reproduction and parenting. GER:DB-SocSci

*3-5 units, Win (Bird, R)*

**ANTHRO 162. Indigenous Peoples and Environmental Problems**

(Same as ANTHRO 262) The social and cultural consequences of contemporary environmental problems. The impact of market economies, development efforts, and conservation projects on indigenous peoples, emphasizing Latin America. The role of indigenous grass roots organizations in combating environmental destruction and degradation of homeland areas. GER:DB-Hum, EC-GlobalCom

*3-5 units, not given this year*

**ANTHRO 163. Conservation and Evolutionary Ecology**

(Same as ANTHRO 263) Environmental degradation resulting from human behavior, and what can be done about it. Patterns of interaction between people and environments, and why they vary over time and space. Topics include adaptation and behavior, resource acquisition and utilization, conflicts of interest, collective action problems, conspicuous consumption, waste, land management, and public policy. GER:DB-SocSci

*5 units, not given this year*

**ANTHRO 164A. Anthropology of Ecotourism**

Ecotourism has been touted as a win-win scenario for both biodiversity conservation and the well-being of local residents. In practice, these lofty ideals of ecotourism have proven difficult to implement. The rapid development of ecotourism over the last two decades. Focus is on the scholarly literature relating to ecotourism from both supporting and critical perspectives.

*5 units, not given this year*

**ANTHRO 164B. Anthropology of Tourism**

As the largest scale movement of goods, services, and people that humanity has ever seen, tourism is an immense phenomenon and is currently the world's most immense industry, reaching some of the most remote people and places on the planet. Yet scholars have only begun to focus on the topic in recent decades. This seminar-style course will focus on the key anthropological and social science literature relating to tourism from both supporting and critical perspectives; however, tourism is an inherently multi-disciplinary subject and students from all disciplines are encouraged to enroll. After providing an initial overview of this phenomenon and field of study, later sections of the course will focus on emerging sub-types of tourism including sustainable tourism, ecotourism, agritourism, and geotourism to name just a few.

*5 units, not given this year*

**ANTHRO 165. Parks and Peoples: The Benefits and Costs of Protected Area Conservation**

Seminar. Emphasis is on the social impact of parks and reserves. Integrated conservation and development projects (ICDPs) based on protected areas; alternative ways to derive local social benefits from them. Cases include Yellowstone, Manu, Galápagos, Ngorongoro, and Guanacaste.

*5 units, not given this year*

**ANTHRO 165A. People and Parks: Management of Protected Areas**

As resources become scarcer, parks increasingly serve as ideological battlegrounds for contested core human values and often put livelihoods at stake. Their historical development and the complex array of present-day issues associated with the formal protection of biodiversity. The ideas behind parks and the evolution of these ideas.

*5 units, not given this year*

**ANTHRO 166. Political Ecology of Tropical Land Use: Conservation, Natural Resource Extraction, and Agribusiness**

(Same as ANTHRO 266) Seminar. The state, private sector, development agencies, and NGOs in development and conservation of tropical land use. Focus is on the socioeconomic and political drivers of resource extraction and agricultural production. Case studies used to examine the local-to-global context from many disciplines. Are maps and analyses used for gain, visibility, accountability, or contested terrain? How are power dynamics, land use history, state-private sector collusion, and neoliberal policies valued? What are the local and extra-local responses?

*3 units, Win (Curran, L)*

**ANTHRO 167. Signaling Theory**

(Same as ANTHRO 267) (Graduate students register for 267.) Why does the peacock have such a large elaborate tail? Why does conspicuous consumption serve to create markers of distinction? How does the pursuit of social capital generate prestige? Answers to these questions from convergent scholarship in social theory, economic theory, and evolutionary theory. The use of signaling theory to explain disparate social and material phenomena. Authors include Veblen, Bourdieu, and Zahavi. Prerequisite for undergraduates: consent of instructor.

*3 units, Spr (Bird, R)*

**ANTHRO 168A. Risky Environments: The Nature of Disaster**  
(Same as ANTHRO 268A) This seminar explores topics including environmental movements and countercultures, human agency and geoengineering ecotourism, and indigenous perspectives of changing climates to query how humans view nature in terms of stability, instability, risk and disaster in the 21st century. Case studies draw upon a broad range of geographical regions including the Arctic, Iceland, Australia, and the Americas. Discussions will draw upon film portrayals and interviews with researchers in addition to readings.

*5 units, not given this year*

**ANTHRO 169A. New Citizenship: Grassroots Movements for Social Justice in the U.S.**

(Same as CHICANST 168, CSRE 168, FEMST 140H) Focus is on the contributions of immigrants and communities of color to the meaning of citizenship in the U.S. Citizenship, more than only a legal status, is a dynamic cultural field in which people claim equal rights while demanding respect for differences. Academic studies of citizenship examined in dialogue with the theory and practice of activists and movements. Engagement with immigrant organizing and community-based research is a central emphasis.

*5 units, Win (Coll, K)*

**ANTHRO 171. The Biology and Evolution of Language**

(Same as ANTHRO 271, HUMBIO 145L) Lecture course surveying the biology, linguistic functions, and evolution of the organs of speech and speech centers in the brain, language in animals and humans, the evolution of language itself, and the roles of innateness vs. culture in language. Suitable both for general education and as preparation for further studies in anthropology, biology, linguistics, medicine, psychology, and speech & language therapy. Anthropology concentration: CS, EE. No prerequisites. GER: DB-NatSci

*4-5 units, Win (Fox, J)*

**ANTHRO 172. Seminar on Cultural Evolution and Coevolution**

(Same as ANTHRO 272) Upper division/graduate seminar on recent approaches to the study of cultural evolution and coevolution. Critical evaluation of Darwinian and non-Darwinian theories, with special attention to the interplay of culture, genes, environment and society. Students will undertake projects of their own design to review, test, or improve current theoretical formulations. Prerequisite: a university-level course in evolution, ecology, or human behavioral biology.

*3-5 units, not given this year*

**ANTHRO 172A. Human Walking: Evolution Anatomy and Disease Human Locomotion and Musculoskeletal Pathology**

(Same as ANTHRO 272A) This course takes an in-depth look at the unique form of locomotion specific to our lineage: bipedality. It will introduce the fossil evidence for when bipedality first arose and how locomotion has changed throughout human evolution. It will also examine the consequences of that change, presenting case studies of common musculoskeletal diseases that result from bipedality. Suggested Prerequisite: Introduction to Biological/Physical Anthropology, HUMBIO 2B, or ANTHRO 6, Human Origins.

*3-5 units, Win (Melillo, S)*

**ANTHRO 173. Human Dimensions of Global Environmental Change: Resilience, Vulnerability, and Environmental Justice**

(Same as HUMBIO 111) The complexity of social and political issues surrounding global environmental change. Emphasis is on synergies precipitated by human-induced climatic change. Case studies and scenarios to explore the vulnerability and resilience in households, communities, regions, and nation-states most affected by extreme weather conditions. Their concerns, livelihood changes, and diverse responses of rural smallholders, indigenous communities, the state, and local and regional migrants. Central theme is environmental justice.

*3 units, not given this year*

**ANTHRO 174. Beginnings of Social Complexity**

(Same as ANTHRO 274) Models and examples of the social evolution of stratification and political centralization in prehistoric human societies. Inferences from the archaeological record concerning the forces and mechanisms behind the rise and fall of complex societies, particularly in S. America. (HEF II; DA-B)

*5 units, not given this year*

**ANTHRO 175. Human Osteology**

(Same as ANTHRO 275, HUMBIO 180) The human skeleton. Focus is on identification of fragmentary human skeletal remains. Analytical methods include forensic techniques, archaeological analysis, paleopathology, and age/sex estimation. Students work independently in the laboratory with the skeletal collection. GER: DB-NatSci

*5 units, Spr (Klein, R; Coddling, B)*

**ANTHRO 177. Environmental Change and Emerging Infectious Diseases**

(Same as ANTHRO 277, HUMBIO 114) The changing epidemiological environment. How human-induced environmental changes, such as global warming, deforestation and land-use conversion, urbanization, international commerce, and human migration, are altering the ecology of infectious disease transmission, and promoting their re-emergence as a global public health threat. Case studies of malaria, cholera, hantavirus, plague, and HIV. GER:DB-SocSci

*3-5 units, Aut (Durham, W; Jones, J)*

**ANTHRO 179. Cultures of Disease: Cancer**

History, politics, science, and anthropology of cancer; political and economic issues of disease and health care in the U.S., including the ethics and economics of health care provision, the pharmaceutical industry, carcinogen production, and research priorities.

*5 units, Spr (Jain, S)*

**ANTHRO 180. Science, Technology, and Gender**

Why is engineering often seen as a masculine profession? What have women's experiences been in entering fields of science and technology? How has gender been defined by scientists? Issues: the struggles of women in science to negotiate misogyny and cultural expectation (marriage, children), reproductive issues (surrogate motherhood, visual representations of the fetus, fetal surgery, breast feeding, childbirth practices), how the household became a site of consumerism and technology, and the cultural issues at stake as women join the ranks of scientists. GER:DB-SocSci, EC-Gender

*3-5 units, not given this year*

**ANTHRO 181. Culture and Madness: Anthropological Approaches to Psychiatric Illness**

(Same as ANTHRO 281, HUMBIO 146) Interdisciplinary. Culture and social context on the identification, course, and outcome of psychiatric illness. What is known from psychiatry about the nature of illness as a biomedical process and from anthropology about the life course of illness within particular settings. Prerequisite: Human Biology core or equivalent or consent of instructor.

*3-5 units, Aut (Luhmann, T)*

**ANTHRO 181A. Gender in the Middle East: Iran, Turkey, and Egypt**

This course explores the construction of gender in the Middle East. Drawing on the historical, sociological and anthropological research in the region, the course aims to question the stereotypes about the subordination of Muslim women and to offer students a systematic reading and analytical discussion of the political, economic and cultural structures that inform gender relations and practices in the region. The course starts with an examination of early Islam and religious sources with regard to women's status, then moves on to nationalist and modernization movements in the 19th and 20th centuries, and finally explores women's and men's lives in contemporary Egypt, Turkey and Iran. In this framework, we will pay special attention to Islamist mobilizations, family and sexual relations, as well as women's changing livelihoods and labor.

*3-5 units, not given this year*

**ANTHRO 182. An Anthropology of Annihilation: Tobacco at the Turn of the Millennium**

The cigarette as the world's greatest weapon of mass destruction: 100 million dead worldwide from cigarettes during the 20th century, one billion expected to die in the 21st century. How to understand this toll, its production, management, politicization, and depoliticization? What can anthropological and allied perspectives disclose? How does the catastrophe challenge key

precepts within anthropology and other branches of the academy?  
GER:EC-GlobalCom

*3-5 units, not given this year*

**ANTHRO 183A. Border Crossings and American Identities**

(Same as AMSTUD 183, CSRE 183) How novelists, filmmakers, and poets perceive racial, ethnic, gender, sexual preference, and class borders in the context of a national discussion about the place of Americans in the world. How Anna Deavere Smith, Sherman Alexie, or Michael Moore consider redrawing such lines so that center and margin, or self and other, do not remain fixed and divided. How linguistic borderlines within multilingual literature by Caribbean, Arab, and Asian Americans function. Can Anzaldúa's conception of borderlands be constructed through the matrix of language, dreams, music, and cultural memories in these American narratives? Course includes examining one's own identity. GER:DB-Hum, EC-AmerCul

*5 units, Aut (Duffey, C)*

**ANTHRO 185A. Race and Biomedicine**

(Same as ASNAMST 185A) Race, identity, culture, biology, and political power in biomedicine. Biological theories of racial ordering, sexuality and the medicalization of group difference. Sources include ethnography, film, and biomedical literature. Topics include colonial history and medicine, the politics of racial categorization in biomedical research, the protection of human subjects and research ethics, immigration health and citizenship, race-based models in health disparities research and policy, and recent developments in human genetic variation research.

*3-5 units, not given this year*

**GRADUATE COURSES IN ANTHROPOLOGY**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**ANTHRO 201. Introduction to Cultural and Social Anthropology**

(Same as ANTHRO 1) Crosscultural anthropological perspectives on human behavior, including cultural transmission, social organization, sex and gender, culture change, technology, war, ritual, and related topics. Case studies illustrating the principles of the cultural process. Films.

*5 units, Spr (Ferguson, J), Sum (Staff)*

**ANTHRO 202A. Ancient Civilizations: Complexity and Collapse**

(Same as ANTHRO 102A) How archaeology contributes to understanding prehistoric civilizations. How and why complex social institutions arose, and the conditions and processes behind their collapse. The development of monumental architecture, craft specialization, trade and exchange, and social stratification using examples from the archaeological record. (HEF II, III; DA-B)

*3-5 units, not given this year*

**ANTHRO 204A. Foraging for a Living**

(Same as ANTHRO 104A) As an economic mode of production, foraging has underwritten humanity for most of its existence. Drawing on archaeology, history, ethnography and new media, this class explores foraging from multiple angles ranging from early approaches in the social and biological sciences to neo-Marxist, neo-Darwinian and ecological perspectives. Topics include the expansion of humans across the planet 50,000 years ago, the emergence of diverse foraging practices in the late Quaternary, the marginalization of foraging economies following colonial invasions, contemporary foraging practices across the continents and foraging in urban environments including the promotion of foraging in modern culinary trends.

*5 units, Win (Coddling, B)*

**ANTHRO 205. Ancient Cities in the New World**

(Same as ANTHRO 105) Preindustrial urbanism as exemplified by prehispanic New World societies. Case studies: the central and southern highlands of Mesoamerica, and the Maya region. Comparative material from highland S. America.

*3-5 units, not given this year*

**ANTHRO 206. Human Origins**

(Same as ANTHRO 6, HUMBIO 6) The human fossil record from the first non-human primates in the late Cretaceous or early

Paleocene, 80-65 million years ago, to the anatomically modern people in the late Pleistocene, between 100,000 to 50,000 B.C.E. Emphasis is on broad evolutionary trends and the natural selective forces behind them.

*5 units, not given this year*

**ANTHRO 206A. Incas and their Ancestors: Peruvian Archaeology**

(Same as ANTHRO 106, ARCHLGY 102B) The development of high civilizations in Andean S. America from hunter-gatherer origins to the powerful, expansive Inca empire. The contrasting ecologies of coast, sierra, and jungle areas of early Peruvian societies from 12,000 to 2,000 B.C.E. The domestication of indigenous plants which provided the economic foundation for monumental cities, ceramics, and textiles. Cultural evolution, and why and how major transformations occurred. (HEF II, III; DA-B)

*3-5 units, not given this year*

**ANTHRO 209. Archaeology: World Cultural Heritage**

(Same as ANTHRO 109) Focus is on issues dealing with rights to land and the past on a global scale including conflicts and ethnic purges in the Middle East, the Balkans, Afghanistan, India, Australia, and the Americas. How should world cultural heritage be managed? Who defines what past and which sites and monuments should be saved and protected? Are existing international agreements adequate? How can tourism be balanced against indigenous rights and the protection of the past?

*5 units, not given this year*

**ANTHRO 210. Examining Ethnographies**

Eight or nine important ethnographies, including their construction, their impact, and their faults and virtues.

*5 units, not given this year*

**ANTHRO 210A. Neandertals and Modern Humans: Origin, Evolution, Interactions**

(Same as ANTHRO 110A) The expansion out of Africa of our species represents the last spectacular step in the course of Human Evolution. It resulted in the colonization of the whole planet and the replacement of archaic forms of humans in Eurasia. One way to investigate why *Homo sapiens* has been such a successful species is to compare its evolution with that of its closest relative, the Neandertals. Exploring the bio-cultural processes at work in the two lineages leads to examine some of the main issues in Paleoanthropology and the most recent methodological advances in the field.

*3 units, not given this year*

**ANTHRO 210B. Critical Theory and The Environment**

(Same as AMSTUD 210, MTL 210) Critical theoretical approaches (such as cultural studies, Marxism, postcolonial theory, cultural geography, feminism, and science studies) have generally been underutilized as methodologies for grappling with environmental situations, yet they hold much promise for addressing their complexity. This course asks: How does critical theory about the environment construe the current situation? What kinds of political or technological solutions do these theories call for or imply? The first half of the seminar introduces critical approaches and methodologies in relation to the environment. In the second section, we will use a variety of theoretical approaches to address Native American environmental politics, water, agriculture, toxics, and animals.

*3-5 units, Spr (Koelle, A)*

**ANTHRO 211. Archaeology of Sex, Sexuality, and Gender**

(Same as ANTHRO 111) How archaeologists study sex, sexuality, and gender through the material remains left behind by past cultures and communities. Theoretical and methodological issues; case studies from prehistoric and historic archaeology.

*5 units, not given this year*

**ANTHRO 212. Public Archaeology: Market Street Chinatown Archaeology Project**

(Same as ANTHRO 112, ASNAMST 112) This internship-style course centers on the practice and theory of historical archaeology research and interpretation through a focused study of San Jose's historic Chinese communities. The course includes classroom lectures, seminar discussion, laboratory analysis of historic artifacts, and participation in public archaeology events. Course themes include immigration, urbanization, material culture, landscape, transnational identities, race and ethnicity, gender,

cultural resource management, public history, and heritage politics. The course includes required lab sections, field trips, and public service. Transportation will be provided for off-site activities.

2-5 units, Aut (Voss, B), Win (Voss, B), Spr (Voss, B)

**ANTHRO 213. Faunal Analysis: Animal Remains for the Archaeologist**

(Same as ANTHRO 113, BIO 166, BIO 266) The analysis of fossil animal bones and shells to illuminate the behavior and ecology of prehistoric collectors, especially ancient humans. Theoretical and methodological issues. The identification, counting, and measuring of fossil bones and shells. Labs. Methods of numerical analysis.

5 units, not given this year

**ANTHRO 214. Prehistoric Stone Tools: Technology and Analysis**

(Same as ANTHRO 114) Archaeologists rely on an understanding of stone tools to trace much of what we know about prehistoric societies. How to make, illustrate, and analyze stone tools, revealing the method and theory intrinsic to these artifacts.

5 units, not given this year

**ANTHRO 216. Data Analysis for Quantitative Research**

(Same as ANTHRO 116) This course allows graduate and advanced undergraduate students in archaeology and anthropology to acquire practical skills in quantitative data analysis. Some familiarity with basic statistical methods is useful but not assumed; the structure of the course will be flexible enough to accommodate a range of student expertise and interests. Topics covered include: statistics and graphics in R; database design, resampling methods, diversity measures, contingency table analysis, and introductory methods in spatial analysis.

5 units, Spr (Robertson, I)

**ANTHRO 220A. Social Zooarchaeology & Animals within Prehistoric Social Worlds**

(Same as ANTHRO 120A, ARCHLGY 120, ARCHLGY 220) The elevated status of animals in prehistory derived from their position as sentient beings sharing many of the ontological qualities of people comparable life-cycles and behavioral traits in some cases, affection, the display of dominance hierarchies, and differing degrees of sociality while at the same time retaining clear biological and behavioral differences. The course will consider aspects of the social and ontological relations between people and animals in prehistory, particularly cosmologies and folk classifications, and the place of animals in social relations and identity formation. It is aimed to understand how the presence, qualities, materialities, and networks of animal life shaped human socialities as much as human agency created engagement with the 'animal estate'. Furthermore, it intends to define how to include animals as subjects in archaeological and anthropological studies taking non-human agency as a starting point. Focusing on case studies drawn from Eur

5 units, Aut (Marciniak, A)

**ANTHRO 221. Language and Prehistory**

(Same as ANTHRO 121) Language classification and its implications for human prehistory. The role of linguistic data in analyzing prehistoric populations, cultures, contact, and migrations. Comparison of linguistic and biological classifications. Reconstruction, proto-vocabularies, and culture. Archaeological decipherment and the origins and evolution of writing. Archaeological and genetic evidence for human migrations. (DA-A; HEF II,III)

3-5 units, not given this year

**ANTHRO 223. Readings in Linguistic Anthropology**

(Same as ANTHRO 123) One or two major related works on language in its cultural context. Works for 2007-08 involve attempts to correlate linguistic and non-linguistic data for analysis of prehistoric human contact and migrations. May be repeated for credit.

2 units, not given this year

**ANTHRO 224A. Politics, nationalism, heritage and archaeology in Central/Eastern Europe**

(Same as ANTHRO 124A, ARCHLGY 123, ARCHLGY 223) The current state of archaeology in central and eastern part of Europe reveals a multiplicity of regional intellectual traditions and social factors, interrelating with each other in many complex ways. The course will discuss intellectual panorama of archaeologies in this

part of the continent and examine the reaction to various socio-political, economic, intellectual, institutional and organizational conditions in its different parts that created a wide variety of local strategies within which archaeology has been practiced. As nationalism requires the elaboration of a real or invented remote past, the course will then consider how archaeological data have been manipulated for nationalist purposes, and discuss the relationship of archaeology to nation-building in Central and Eastern Europe. Contrastive conceptions of nationality and ethnicity are presented. The political uses of archaeology, involving mobilization and appropriation of archaeological and cultural heritage, are also rev

5 units, Aut (Marciniak, A)

**ANTHRO 225. Language and the Environment**

(Same as ANTHRO 125) Lecture course on vocabulary and grammar as keys to peoples; understanding and use of the environment. Ethnobotany, ethnobiology, and ethnosemantics in the analysis of the language of place, plants and animals, the earth, the body, and disease. Terminological gaps and gluts and what they imply. Language as a strategic resource in environmental management. Language contact and conflict in the modern global environment, with particular attention to the vocabularies of capitalism and property. Language extinction and its environmental implications. Anthropology concentration: CS, EE. No prerequisites.

3-4 units, Aut (Fox, J)

**ANTHRO 228. Indigenous Australia**

(Same as ANTHRO 28) The prehistory and ethnology of New Guinea and Australia. Regional climate, environment, and pre-European history. Ethnography of the contact period focusing on theoretical problems central to the development of anthropological theory. Contemporary sociopolitical issues. Films.

5 units, Spr (Bird, R)

**ANTHRO 230B. Introduction to GIS in Anthropology**

(Same as ANTHRO 130B) How GIS and spatial tools can be applied in social research. Case studies and student projects address questions of social and cultural relevance using real data sets, including the collection of geospatial data and building of spatial evidence. Analytical approaches and how they can shape a social and cultural interpretation of space and place.

5 units, not given this year

**ANTHRO 230D. Spatial Approaches to Social Science**

(Same as ANTHRO 130D, POLISCI 241S) This multidisciplinary course combines different approaches to how GIS and spatial tools can be applied in social science research. We take a collaborative, project oriented approach to bring together technical expertise and substantive applications from several social science disciplines. The course aims to integrate tools, methods, and current debates in social science research and will enable students to engage in critical spatial research and a multidisciplinary dialogue around geographic space.

5 units, Win (Rodden, J; Engel, C)

**ANTHRO 231. The Politics of Humanitarianism**

(Same as ANTHRO 131) Anthropological approaches to contemporary practices of humanitarian intervention. How social theory can inform the politics of humanitarianism, charity, and philanthropy. Focus is on Africa from the colonial era to the present.

5 units, not given this year

**ANTHRO 234. Object Lessons**

(Same as ANTHRO 134) Human-object relations in the processes of world making. Objectification and materiality through ethnography, archaeology, material culture studies, and cultural studies. Interpretive connotations around and beyond the object, the unstable terrain of interrelationships between sociality and materiality, and the cultural constitution of objects. Sources include: works by Marx, Hegel, and Mauss; classic Pacific ethnographies of exchange, circulation, alienability, and fetishism; and material culture studies.

5 units, Win (Staff)

**ANTHRO 235. Cultural Studies**

(Same as ANTHRO 135) Identity, community, and culture; their interactions and formation.

5 units, not given this year



**ANTHRO 235A. The Anthropology of Security**

(Same as ANTHRO 135A) This seminar begins by outlining the main theoretical and empirical challenges in the areas of surveillance studies and security studies. The seminar provides a space wherein students will be able to discuss these interdisciplinary areas and develop their own Anthropology-informed perspectives. The seminar then discusses the work of Anthropologists who through their ethnographic and theoretical work have helped developed and important and emergent area: *¿The Anthropology of Security¿*. Areas covered include, inter alia, national security, security and war, biometrics, gated-ness, and environmental and bio-security threats.

*3-5 units, not given this year*

**ANTHRO 237. The Politics of Humanitarianism**

(Same as ANTHRO 137) What does it mean to want to help, to organize humanitarian aid, in times of crisis? At first glance, the impulse to help issue generis a good one. Helping is surely preferable to indifference and inaction. This does not mean that humanitarian interventions entail no ethical or political stakes *¿* or that they are beyond engaged critique. We need to critique precisely that which we value, and to ask some hard questions, among them these: What are the differences among humanitarianism, charity, and philanthropy? What of social obligations and solidarities? How does the neoliberal world order currently create structural inequalities that ensure the reproduction of poverty and violence? How does the current order of things resemble or differ from the colonial world order? This course examines the history of humanitarian sensibilities and the emergence of organized action in the *¿*cause of humanity¿. In the early years of humanitarian intervention, political neutrality was a key principle;

*5 units, not given this year*

**ANTHRO 239. Ethnography of Africa**

(Same as ANTHRO 139) The politics of producing knowledge in and about Africa through the genre of ethnography, from the colonial era to the present. The politics of writing and the ethics of social imagination. Sources include novels juxtaposed to ethnographies.

*5 units, Win (Malkki, L)*

**ANTHRO 240A. Ethnographic Archaeologies**

(Same as ANTHRO 140A, ARCHLGY 137) How have ethnographic and archaeological methods been combined in anthropological research? What methodological and theoretical implications do these kinds of projects generate? Seminar topics will include ethnoarchaeology, ethnographies of archaeological practice, public archaeology and heritage ethics. Lecture and discussion.

*4-5 units, NEXTYEAR*

**ANTHRO 247. Nature, Culture, Heritage**

(Same as ANTHRO 147) Seminar. Shared histories of natural and cultural heritage and their subsequent trajectories into the present. How thought about archaeological sites and natural landscapes have undergone transformations due to factors including indigenous rights, green politics, and international tourism. The development of key ideas including conservation, wilderness, sustainability, indigenous knowledge, non-renewability and diversity. Case studies draw on cultural and natural sites from Africa, the Americas and Australia.

*5 units, Aut (Meskell, L)*

**ANTHRO 248. Health, Politics, and Culture of Modern China**

(Same as ANTHRO 148) One of the most generative regions for medical anthropology inquiry in recent years has been Asia. This seminar is designed to introduce upper division undergraduates and graduate students to the methodological hurdles, representational challenges, and intellectual rewards of investigating the intersections of health, politics, and culture in contemporary China.

*4-5 units, Aut (Kohrman, M)*

**ANTHRO 248A. Nomads of Eurasia: Culture in Transition**

(Same as ANTHRO 148A) Traditional peoples of Central and Inner Asia; their lifestyles and cultural history. Modern research approaches and recent fieldwork data published mainly in Russian and Central Asian languages. Audio-visual materials.

*5 units, Win (Kunanbaeva, A)*

**ANTHRO 251. Women, Fertility, and Work**

(Same as ANTHRO 151, HUMBIO 148W) How do choices relating to bearing, nursing, and raising children influence women's participation in the labor force? Cultural, demographic, and evolutionary explanations, using crosscultural case studies. Emphasis is on understanding fertility and work in light of the options available to women at particular times and places.

*5 units, not given this year*

**ANTHRO 253A. Japan's Minorities**

(Same as ANTHRO 153A) Cultural and social history of Japan since WWII. Falling birth rates, changing family structure, decreasing and then increasing divorce rates, coping with societal aging, expansion of higher education, solving new educational problems, increasing variability of work situation, introduction of foreign workers. Attention to the legacy of Tokugawa and pre-war Japan as antecedent to postwar developments.

*3-5 units, not given this year*

**ANTHRO 254A. Japan's Postwar Demographic And Social Changes**

(Same as ANTHRO 154A) Changing birth and death rates. Restructuring education and employment. Problems with seniors. Increasing foreign workers.

*3-5 units, Win (Staff)*

**ANTHRO 255. Research Methods in Ecological Anthropology**

(Same as ANTHRO 155) The course prepare students for the methodological and practical aspects of doing ecologically oriented, quantitative anthropological field research. The primary goal is to explore what it means to ask anthropological questions in a systematic way. We will focus on understanding what can constitute an interesting question, how to frame a question in way that facilitates investigation, and how to design methods to begin investigating a question. In turn, the course will provide a format to refine research projects in preparation for doing more extensive fieldwork.

*3-5 units, Spr (Bird, D)*

**ANTHRO 259. Conservation and Development Dilemmas in Latin America: Galapagos as a Microcosm**

(Same as ANTHRO 159) The course will examine conservation and development dilemmas as they affect countries in Central and South America, eventually focusing on the Galapagos for a detailed case study. The class will explore the resolution of key issues in Galapagos in conjunction with research supported by an Environmental Ventures Project (EVP) Grant from the Woods Institute.

*3-5 units, Spr (Staff)*

**ANTHRO 260. Social and Environmental Sustainability: The Costa Rican Case**

(Same as ANTHRO 160) Seminar focused on issues of tropical sustainability with a particular emphasis on the Osa Peninsula of Costa Rica. Offered in conjunction with the Osa Initiative in the Wood¿s Institute for the Environment, the course highlights issues of human development in the tropics, through such means as agricultural development, ecotourism, conservation efforts, private and indigenous reserves, and mining. The course will draw from diverse disciplines including anthropology, rural sociology, conservation biology, geosciences, history, political science, and journalism. In addition to weekly discussions, students will development a research paper throughout the term which will be presented to a panel of selected Wood¿s Faculty during the final week of the term.

*3-5 units, Aut (Durham, W; Hunt, C)*

**ANTHRO 261. Human Behavioral Ecology**

(Same as ANTHRO 161) Theory, method, and application in anthropology. How theory in behavioral ecology developed to understand animal behavior is applied to questions about human economic decision making in ecological and evolutionary contexts. Topics include decisions about foraging and subsistence, competition and cooperation, mating, and reproduction and parenting.

*3-5 units, Win (Bird, R)*

**ANTHRO 262. Indigenous Peoples and Environmental Problems**

(Same as ANTHRO 162) The social and cultural consequences of contemporary environmental problems. The impact of market



economies, development efforts, and conservation projects on indigenous peoples, emphasizing Latin America. The role of indigenous grass roots organizations in combating environmental destruction and degradation of homeland areas.

*3-5 units, not given this year*

**ANTHRO 263. Conservation and Evolutionary Ecology**

(Same as ANTHRO 163) Environmental degradation resulting from human behavior, and what can be done about it. Patterns of interaction between people and environments, and why they vary over time and space. Topics include adaptation and behavior, resource acquisition and utilization, conflicts of interest, collective action problems, conspicuous consumption, waste, land management, and public policy.

*5 units, not given this year*

**ANTHRO 266. Political Ecology of Tropical Land Use:**

**Conservation, Natural Resource Extraction, and Agribusiness**

(Same as ANTHRO 166) Seminar. The state, private sector, development agencies, and NGOs in development and conservation of tropical land use. Focus is on the socioeconomic and political drivers of resource extraction and agricultural production. Case studies used to examine the local-to-global context from many disciplines. Are maps and analyses used for gain, visibility, accountability, or contested terrain? How are power dynamics, land use history, state-private sector collusion, and neoliberal policies valued? What are the local and extra-local responses?

*3 units, Win (Curran, L)*

**ANTHRO 267. Signaling Theory**

(Same as ANTHRO 167) (Graduate students register for 267.) Why does the peacock have such a large elaborate tail? Why does conspicuous consumption serve to create markers of distinction? How does the pursuit of social capital generate prestige? Answers to these questions from convergent scholarship in social theory, economic theory, and evolutionary theory. The use of signaling theory to explain disparate social and material phenomena. Authors include Veblen, Bourdieu, and Zahavi. Prerequisite for undergraduates: consent of instructor.

*3 units, Spr (Bird, R)*

**ANTHRO 268A. Risky Environments: The Nature of Disaster**

(Same as ANTHRO 168A) This seminar explores topics including environmental movements and countercultures, human agency and geoenvironmental ecotourism, and indigenous perspectives of changing climates to query how humans view nature in terms of stability, instability, risk and disaster in the 21st century. Case studies draw upon a broad range of geographical regions including the Arctic, Iceland, Australia, and the Americas. Discussions will draw upon film portrayals and interviews with researchers in addition to readings.

*5 units, not given this year*

**ANTHRO 271. The Biology and Evolution of Language**

(Same as ANTHRO 171, HUMBIO 145L) Lecture course surveying the biology, linguistic functions, and evolution of the organs of speech and speech centers in the brain, language in animals and humans, the evolution of language itself, and the roles of innateness vs. culture in language. Suitable both for general education and as preparation for further studies in anthropology, biology, linguistics, medicine, psychology, and speech & language therapy. Anthropology concentration: CS, EE. No prerequisites.

*4-5 units, Win (Fox, J)*

**ANTHRO 272. Seminar on Cultural Evolution and Coevolution**

(Same as ANTHRO 172) Upper division/graduate seminar on recent approaches to the study of cultural evolution and coevolution. Critical evaluation of Darwinian and non-Darwinian theories, with special attention to the interplay of culture, genes, environment and society. Students will undertake projects of their own design to review, test, or improve current theoretical formulations. Prerequisite: a university-level course in evolution, ecology, or human behavioral biology.

*3-5 units, not given this year*

**ANTHRO 272A. Human Walking: Evolution Anatomy and Disease Human Locomotion and Musculoskeletal Pathology**

(Same as ANTHRO 172A) This course takes an in-depth look at the unique form of locomotion specific to our lineage: bipedality.

It will introduce the fossil evidence for when bipedality first arose and how locomotion has changed throughout human evolution. It will also examine the consequences of that change, presenting case studies of common musculoskeletal diseases that result from bipedality. Suggested Prerequisite: Introduction to Biological/Physical Anthropology, HUMBIO 2B, or ANTHRO 6, Human Origins.

*3-5 units, Win (Melillo, S)*

**ANTHRO 274. Beginnings of Social Complexity**

(Same as ANTHRO 174) Models and examples of the social evolution of stratification and political centralization in prehistoric human societies. Inferences from the archaeological record concerning the forces and mechanisms behind the rise and fall of complex societies, particularly in S. America. (HEF II; DA-B)

*5 units, not given this year*

**ANTHRO 275. Human Osteology**

(Same as ANTHRO 175, HUMBIO 180) The human skeleton. Focus is on identification of fragmentary human skeletal remains. Analytical methods include forensic techniques, archaeological analysis, paleopathology, and age/sex estimation. Students work independently in the laboratory with the skeletal collection.

*5 units, Spr (Klein, R; Coddling, B)*

**ANTHRO 277. Japanese Society and Culture**

(Same as ANTHRO 77) Focus is on power, identity, and the politics of knowledge production. How transnational interactions influence Japanese identity. How anthropological knowledge has contributed to understanding Japanese culture and society. Gender, race and class; contemporary ethnographies. Modernity and globalization. Cultural politics, domestic work, labor management, city planning, ad images, anime, martial art, fashion, theater, leisure, and tourism.

*5 units, not given this year*

**ANTHRO 277. Environmental Change and Emerging Infectious Diseases**

(Same as ANTHRO 177, HUMBIO 114) The changing epidemiological environment. How human-induced environmental changes, such as global warming, deforestation and land-use conversion, urbanization, international commerce, and human migration, are altering the ecology of infectious disease transmission, and promoting their re-emergence as a global public health threat. Case studies of malaria, cholera, hantavirus, plague, and HIV.

*3-5 units, Aut (Durham, W; Jones, J)*

**ANTHRO 281. Culture and Madness: Anthropological Approaches to Psychiatric Illness**

(Same as ANTHRO 181, HUMBIO 146) Interdisciplinary. Culture and social context on the identification, course, and outcome of psychiatric illness. What is known from psychiatry about the nature of illness as a biomedical process and from anthropology about the life course of illness within particular settings. Prerequisite: Human Biology core or equivalent or consent of instructor.

*3-5 units, Aut (Luhmann, T)*

**ANTHRO 282. Medical Anthropology**

(Same as ANTHRO 82) Emphasis is on how health, illness, and healing are understood, experienced, and constructed in social, cultural, and historical contexts. Topics: biopower and body politics, gender and reproductive technologies, illness experiences, medical diversity and social suffering, and the interface between medicine and science.

*5 units, Spr (Jain, S)*

**ANTHRO 293B. Master's Thesis Writing Seminar**

May be repeated for credit.

*2-4 units, Win (Staff)*

**ANTHRO 298B. Digital Methods in Archaeology**

(Same as ANTHRO 98B) This is a course on digital technologies in archaeology used for documentation, visualization, and analysis of archaeological spaces and objects. Emphasizes hands-on approaches to image manipulation, virtual reality, GIS, CAD, and photogrammetry modeling methods.

*3-5 units, not given this year*

**ANTHRO 299. Directed Individual Study**

Prerequisite: consent of instructor.

*1-10 units, Aut (Staff)*

**ANTHRO 300. Reading Theory Through Ethnography**

Required of and restricted to first-year ANTHRO Ph.D. students. Focus is on contemporary ethnography and related cultural and social theories generated by texts. Topics include agency, resistance, and identity formation, and discourse analysis. Prerequisite: consent of instructor.

*5 units, Aut (Ebron, P)*

**ANTHRO 301. History of Anthropological Theory, Culture and Society**

Required of Anthropology Ph.D. students. The history of cultural and social anthropology in relation to historical and national contexts and key theoretical and methodological issues as these inform contemporary theory and practices of the discipline. Enrollment limited to 15. Prerequisite: consent of instructor.

*5 units, Win (Staff)*

**ANTHRO 302. History of Anthropological Theory, Ecology and Environment**

Evolutionary and ecological theory from the 19th century to present. Theory and concepts from evolution and ecology, emphasizing anthropological applications. Evolutionary theories of human behavior, culture, and societies. Ecological theory behind carrying capacity, sustainable yield, and population growth. Emphasis is on tools of analysis and formulating research questions in anthropology today. Upper division undergrads require consent of instructor.

*5 units, Win (Bird, R; Curran, L)*

**ANTHRO 303. Introduction to Archaeological Theory**

The history of archaeological thought emphasizing recent debates. Evolutionary theories, behavioral archaeology, processual and cognitive archaeology, and approaches termed feminist and post-processual archaeology in the context of wider debate in adjacent disciplines. The application and integration of theory on archaeological problems and issues. Prerequisite: consent of instructor.

*5 units, Win (Hodder, I)*

**ANTHRO 304. Data Analysis for Quantitative Research**

Univariate, multivariate, and graphical methods used for analyzing quantitative data in anthropological research. Archaeological and paleobiological examples. Recommended: algebra. Prerequisite: consent of instructor.

*5 units, not given this year*

**ANTHRO 305. Research Methods in Ecological Anthropology**

The course prepare students for the methodological and practical aspects of doing ecologically oriented, quantitative anthropological field research. The primary goal is to explore what it means to ask anthropological questions in a systematic way. We will focus on understanding what can constitute an interesting question, how to frame a question in way that facilitates investigation, and how to design methods to begin investigating a question. In turn, the course will provide a format to refine research projects in preparation for doing more extensive fieldwork.

*5 units, not given this year*

**ANTHRO 306. Anthropological Research Methods**

Required of ANTHRO Ph.D. students; open to all graduate students. Research methods and modes of evidence building in ethnographic research. Enrollment limited to 10. Prerequisite: consent of instructor.

*5 units, Win (Staff)*

**ANTHRO 307. Archaeological Methods and Research Design**

Methodological aspects of field and laboratory practice from traditional archaeological methods to the latest interdisciplinary analytical techniques. The nature of archaeological data and inference; interpretive potential of these techniques. Prerequisite: consent of instructor.

*5 units, not given this year*

**ANTHRO 308. Proposal Writing Seminar**

Required of second-year Ph.D. students in the culture and society track. The conceptualization of dissertation research problems, the theories behind them, and the methods for exploring them. Participants draft a research prospectus suitable for a dissertation proposal and research grant applications. Limited enrollment. Prerequisite: consent of instructor.

*5 units, Spr (Hansen, T)*

**ANTHRO 309. Advanced Evolutionary Theory in Anthropological Sciences**

History of evolutionary theory from the 19th century to present, emphasizing anthropological applications. Theory and concept in evolutionary biology; evolutionary theories of culture; and interactions of genetic, social, and cultural evolution and their implications. Emphasis is on tools of analysis and the value of evolutionary thinking for formulating research questions in anthropology today. Prerequisite: graduate standing or consent of instructor. (HEF II, III)

*5 units, not given this year*

**ANTHRO 310C. Intersections**

Themes of materiality and visuality, aesthetic and other forms of cultural production, and the meanings of creativity and convention. Ethnographic and archaeological material and case studies from worldwide cultural contexts. Prerequisite: consent of instructor.

*5 units, not given this year*

**ANTHRO 310G. Introduction to Graduate Studies**

Required graduate seminar. The history of anthropological theory and key theoretical and methodological issues of the discipline. Prerequisite: consent of instructor.

*2 units, Aut (Ferguson, J)*

**ANTHRO 311. Ethnographic Writing**

For graduate students writing or planning to write a dissertation using ethnographic methods. The choices made by the authors of ethnographies in constructing an argument, using data and speaking to an audience of readers. Readings include chapters written by class members currently writing dissertations. Prerequisite: consent of instructor.

*3-5 units, not given this year*

**ANTHRO 311G. Introduction to Culture and Society Graduate Studies in Anthropology**

Required graduate seminar for CS track. The history of anthropological theory and key theoretical and methodological issues in cultural anthropology. Prerequisites: for 1st year PhD students in the cultural and society track or by permission of the instructor.

*2 units, Win (Ferguson, J), Spr (Ferguson, J)*

**ANTHRO 312. Writing Across Audiences: Styles and Methods**

This course examines the way anthropologists and others write to different audiences. What do you need to do communicate to a mainstream anthropology audience? How does that change when you write an editorial or place something in a popular venue? When you try to capture a non-anthropological medical audience? What methods might you consider adding to enable that cross-talk? We will examine a series of examples of people who have written across.

*5 units, Win (Luhmann, T)*

**ANTHRO 314. Policing the Family: Kinship and Society**

The study of kinship has wandered off anthropological syllabi just as it assumes ever greater significance within contemporary (often dystopic) political debates on the societies produced by different kinds of families. Firstly, the course will ask whether kinship structures are distinct structures of recognition that generate their own ambivalence, anxiety, and comfort. We will focus this through discussing the relationship of kinship to gender roles and ideologies. Secondly, it will locate how talking, thinking, doing and imagining how people are properly related to each other (as well as potential transgressions) are central to imaginations of the social itself. This will also initiate a larger debate on the nature of social change. Thirdly, the course will give students a precise and calibrated entrypoint into the debates around kinship from the perspective of three differing disciplines, social history, psychoanalysis, and anthropology.

*5 units, Aut (Thiranagama, S)*

**ANTHRO 319. South Asia: History, People, Politics**

The South Asian subcontinent (comprising of India, Pakistan, Bangladesh, Nepal, Bhutan and Sri Lanka) is one of the most diverse and densely populated regions in the world and increasingly prominent in new global political and cultural economies. South Asia has also provided the inspiration for cutting edge theories about the colonial state, postcolonial studies, democracy, popular culture, and religious conflict. The course will

provide an overview of major historical events and social trends in contemporary South Asia and focus on themes such as gender, religion, caste, migration and movement, new technologies, the urban and rural, the state, and new forms of consumption among others. Thus, the course will give students historically and theoretically informed perspectives on contemporary South Asia, as well as how to apply insights learned to larger debates within the political and social sciences.

5 units, Win (Thiranyagama, S)

#### **ANTHRO 320A. Race, Ethnicity, and Language**

(Same as EDUC 389X, LINGUIST 253) This seminar explores the linguistic construction of race and ethnicity across a wide variety of contexts and communities. Throughout the course, we will take a comparative perspective and highlight how different racial/ethnic formations participate in similar, yet different, ways of doing race through language, interaction and culture. Readings draw heavily from perspectives in (linguistic) anthropology and sociolinguistics.

3-4 units, Win (Alim, H)

#### **ANTHRO 321. Reading Marx, Reading Weber**

This advanced graduate seminar is devoted to a critical reading of selected writings by two nineteenth century social theorists who continue to shape anthropology and social analysis more broadly. Prerequisites: Graduate standing in Anthropology or permission of the instructor. Previous graduate level coursework in cultural or social anthropology, social theory or cultural studies is required. No auditing is permitted. Maximum enrollment 12.

5 units, not given this year

#### **ANTHRO 322. From Biopolitics to Necropolitics and Beyond**

Scholarship produced and informed by Michel Foucault. Focus is on the final period of Foucault's life; how his discussions of biopolitics, subjectification, governmentality, and death have served as touchstones for recent empirical research. Key interventions initially made under these rubrics; how anthropologists and others have applied, challenged, and extended them. Prerequisite: consent of instructor.

5 units, not given this year

#### **ANTHRO 323. Graduate Seminar in Economic Anthropology**

Classical and contemporary anthropological perspectives on topics such as money, markets and exchange; capitalist and non-capitalist modes of production; class and socio-economic differentiation; globalization and neoliberalism; and the social and cultural construction of the object, the economy.

5 units, Spr (Ferguson, J)

#### **ANTHRO 324. Political Anthropology**

An anthropological approach to politics through bringing anthropological ways of thinking and modes of analysis to bear on key presuppositions of modern Western political thought. Ideas of rights, the individual, society, liberty, democracy, equality, and solidarity; ethnographic accounts used to identify the limits of conventional analytical approaches and to document the forms of politics that such approaches either ignore or misunderstand. Prerequisite: consent of instructor.

5 units, not given this year

#### **ANTHRO 326. Postcolonial and Indigenous Archaeologies**

The role of postcolonial and Indigenous archaeologies as emergent disciplinary activities within contemporary society. Community based archaeologies; the roles of oral history, landscape, and memory; archaeology as political action; and history in archaeological projects. The emergence of Indigenous archaeology within N. America in relation to limitations imposed by processual or new archaeology; and NAGPRA, Kennewick, essentialism, and terminal narratives within this context. Prerequisite: consent of instructor.

5 units, not given this year

#### **ANTHRO 327. Language and Political Economy**

Theories of language: Saussure, Jakobson, Hymes, Marx, Foucault, Butler, and Derrida. The theorization of language in its linkages to power, social relations, and history. Prerequisites: Linguistics or Anthropology course work. Prerequisite: consent of instructor.

5 units, not given this year

#### **ANTHRO 331. The Anthropology of Technology**

Iconic discipline-building works of the last three decades; readings that lay out and intervene in contemporary debates. Prerequisite:

consent of instructor.

5 units, not given this year

#### **ANTHRO 331A. Ecology, Evolution, and Human Health**

(Same as ANTHRO 31) Ecology, Evolution, and Human Health Human ecology, environments, adaptation and plasticity, and their relationship to health and well-being considered in the broad comparative context. Topics include human population history, subsistence ecology, demography, reproductive decision making, urbanization, migration, infectious disease, the physiology of stress and the inflammatory response, social capital and social networks, nutrition, nutritional deficiencies, growth, and social inequalities. No prior course work in ecological or medical anthropology required.

3-5 units, not given this year

#### **ANTHRO 332. Transformative Design**

(Same as ENGR 231) Project-based. How interactive technologies can be designed to encourage behavioral transformation. Topics such as self-efficacy, social support, and mechanism of cultural change in domains such as weight-loss, energy conservation, or safe driving. Lab familiarizes students with hardware and software tools for interaction prototyping. Students teams create functional prototypes for self-selected problem domains. Prerequisite: consent of instructor. Design Institute class; see <http://dschool.stanford.edu>.

3-5 units, Win (Roth, B; Dryer, M; Shanks, M)

#### **ANTHRO 333A. The Cultural Politics of Ambiguity**

Contemporary conceptual approaches to understanding the politics and production of certainty, ambiguity, and doubt. The seemingly ambiguous nature of the science of industrial pollution and contamination exonerate corporate and government polluters from rising rates of cancer, while the science of liberal economic models seems to create no alternative to massive economic subsidies of the financial sector. How culpability, exoneration, transformative action, institutional stasis, and political rely on the production of certainty, ambiguity, and doubt. Prerequisite: consent of instructor.

5 units, not given this year

#### **ANTHRO 334. Trauma and Healing**

This course considers class and recent work on culture and psychiatry with an emphasis on trauma. We consider work on the main diagnostic categories like depression and schizophrenia, but also the work on dissociation, war combat, PTSD, and psychosis.

5 units, not given this year

#### **ANTHRO 334A. Introduction to Multispecies Theory in the Humanities and Social Sciences**

(Same as FRENGEN 334) This course will focus on such problems as: posthumanism and the emergence of non-anthropocentric human and social sciences, multispeciesism in the re-thinking of disciplines, redefinition of the concept of life in the human and social sciences by including non-human subjects, animals and plants as others, rethinking the category of the social as a collective of humans and non-humans, nonintentional agency (as well as understanding of vitalism and animism), animal holocaust, multispecies art and living organisms as media in art (bio-art), ethics of compassion and the problem of the dignity of the non-human (including recent interest in the dignity of plants).

5 units, Spr (Domanska, E)

#### **ANTHRO 336. Anthropology of Rights**

Ideas of rights at the center of contemporary politics around the world. An anthropological perspective on how rights are invoked, claimed, and translated into institutional policies in ethnographic cases. The limitations of liberal notions of rights and innovative forms of politics emerging within and against rights talk. Prerequisite: consent of instructor.

5 units, not given this year

#### **ANTHRO 337. The Politics of Humanitarianism**

What does it mean to want to help, to organize humanitarian aid, in times of crisis? At first glance, the impulse to help issues a good one. Helping is surely preferable to indifference and inaction. This does not mean that humanitarian interventions entail no ethical or political stakes or that they are beyond engaged critique. We need to critique precisely that which we value, and to ask some hard questions, among them these: What are the differences among humanitarianism, charity, and philanthropy? What of social obligations and solidarities? How does the

neoliberal world order currently create structural inequalities that ensure the reproduction of poverty and violence? How does the current order of things resemble or differ from the colonial world order? This course examines the history of humanitarian sensibilities and the emergence of organized action in the cause of humanity. In the early years of humanitarian intervention, political neutrality was a key principle;

*5 units, not given this year*

**ANTHRO 338. Anthropological Approaches to Religion**

*5 units, not given this year*

**ANTHRO 339. Anthropology of Religion**

This course presents classic and contemporary work on the anthropology of religion: Durkheim Elementary Forms of the Religious Life; Levy-Bruhl; Primitive Mentality; Douglas Purity and Danger; Evans Pritchard Nuer Religion; and recent ethnographies/scholarly work by Robbins, Keane, Keller, Boyer, Barrett, and others.

*5 units, not given this year*

**ANTHRO 340. Anthropology of the Imagination**

The course explores the use of imagination in religion and in healing. Both symbolic healing and religion depend upon the capacity to treat what must be imagined as real. How does social practice enable this capacity? What is the role of the imagined in human sociality? Depending on class interests, we will read a variety of classic and more recent work: Durkheim's Elementary Forms of the Religious life; Frazer's Golden Bough; Vygotsky Language and thought; Mary Watkins Invisible guests; Kohut Analysis of the self; and contemporary ethnographies by Mittermaier, McIntosh, Ashforth, work on trauma, and others.

*5 units, Aut (Luhrmann, T)*

**ANTHRO 343. Culture as Commodity**

Focus is on theories of commodification, interests in tourism, national cultures as marketable objects, and how identities are constituted through production and consumption. The formation of global style and taste. Prerequisite: consent of instructor.

*5 units, not given this year*

**ANTHRO 344. Graphic Medicine**

In this course students will study medical cultures through visual communication ranging from x-rays and PET scans to graphic novels. Course will also include literature on visual theory.

*5 units, not given this year*

**ANTHRO 344B. Graphic Medicine: Part 2**

In this course students will study medical cultures through visual communication ranging from x-rays and PET scans to graphic novels. Course will also include literature on visual theory.

*5 units, Spr (Jain, S)*

**ANTHRO 345. New Visions in Medical Anthropology**

Recent experimental histories of the field. Emphasis is on how, working within anthropology's classic format, the ethnographic monograph, authors have innovatively responded to the challenges of representing amorphous, unspoken, and often violent relationships between the body and social change. The authors' expository techniques, and how they engage and extend theoretical debate. How to assess works within medical anthropology and its allied fields. Prerequisite: consent of instructor.

*5 units, not given this year*

**ANTHRO 346A. Sexuality Studies in Anthropology**

Current research on sexuality from perspectives including paleoanthropology, archaeology, ethnography, and linguistic anthropology. Readings paired with case studies that explore theoretical and methodological issues. Prerequisite: consent of instructor.

*5 units, not given this year*

**ANTHRO 349. Anthropology of Capitalism**

Issues in cultural theory and methodology through research on people who have greater material and cultural resources than those usually studied by anthropologists. How ideas about ideology, hegemony, identity, power, and practice are altered in studying those considered to be agents of power rather than the subaltern. Topics: global capitalism, masculinity, white racial subjectivity. Enrollment limited to 20. Prerequisite: consent of instructor.

*5 units, not given this year*

**ANTHRO 352. Foucault: The Question of Method**

Foucault as methodological exemplar for historical and social research. Emphasis is on his historical studies of clinical medicine, prisons, and sexuality, and on applying his methods to empirical studies of topics such as colonialism, race, and liberal governmental rationality.

*5 units, not given this year*

**ANTHRO 353. Landscape**

This seminar offers an interdisciplinary approach to the study of landscape, noting the various processes and projects that have helped create them. Readings draw together a broad range of theoretical approaches that are attentive to human-non-human interactions and the overlapping and divergent spatial and temporal questions of the exchanges between landscapes and humans. The readings will also draw attention to representational and non-representational ways that material and symbolic aspects of landscapes help constitute the making of place. The aim of the seminar is to explore the various methodologies for what they offer for the study of place.

*5 units, Win (Ebron, P)*

**ANTHRO 355. Cities in Global Perspective**

Interdisciplinary approach to examining global cities. The concept of the global city, and the interdependent processes that help produce urban spaces. Situating the transformation of urban spaces within globalization and its differential effects; current explanatory frameworks that pay attention to multiple scales of spatial and economic articulation. Prerequisite: graduate standing.

*5 units, not given this year*

**ANTHRO 356. The Anthropology of Development**

Multidisciplinary. Topics vary annually. Areas include Africa, S. Asia, and Latin America. Prerequisite: consent of instructor.

*5 units, not given this year*

**ANTHRO 357. Other Minds: Puzzles in Psychiatric and Psychological Anthropology**

Problems in the way anthropologists explore other minds anthropologically and the ways in which anthropologists seek to understand the models of other minds held by the people observed. Topics include theory of mind, witchcraft, belief, empathy, psychosis, trauma, Freud, Vygotsky, and cognitive dissonance. Prerequisite: consent of instructor. Undergrads cannot take this class without permission of the instructor.

*5 units, not given this year*

**ANTHRO 362. Human Spatial Dynamics: Seminar in Communicating Contemporary Science**

This seminar is designed to bring together all students and faculty currently working on issues related to human use of land and spatially defined resources. The focus is to provide a forum for reporting on recent results and question development, providing students with vital skills in designing and communicating the results of research. Undergrads by permission of instructor.

*5 units, not given this year*

**ANTHRO 362A. Introduction to Human Evolution, Ecology, Genetics, and Culture**

Themes and topics of lasting heuristic value in the anthropological sciences. Combines the lecture content of 2A and 2B with a discussion section for graduate students. Must be taken in the Autumn Quarter of a student's first year in the graduate program.

*5 units, not given this year*

**ANTHRO 363. Demography and Life History Theory**

Problems in demography and theoretical population biology applied to human systems. Emphasis is on establishing relationships between models in theoretical population biology and empirical demographic methodology. Topics include philosophy of models and model building, population dynamics, stable population theory, species interactions in human ecology, models of infectious diseases and their control, cultural evolution. Prerequisites: HUMBIO 137 or consent of instructor.

*5 units, not given this year*

**ANTHRO 364. EcoGroup: Current Topics in Ecological, Evolutionary, and Environmental Anthropology**

Seminar; restricted to graduate students. Topics vary with instructor. How to ask appropriate questions, how to derive research hypotheses from theory, how to design methodologies for testing hypotheses, and how to present results by reading and

critiquing key contemporary papers in the field. Ph.D. students enrolling in this course to fulfill the department review course requirement must enroll in 5 units. Graduate students enrolling in this course to participate in a topical forum may enroll in 2 units. Course may be repeated for 2 units. Prerequisites: by consent of instructor.

*5 units, not given this year*

**ANTHRO 364A. EcoGroup: Problems in Ecological and Evolutionary Anthropology**

Seminar; restricted to graduate students. Topics vary with instructor. How to ask appropriate questions, how to derive research hypotheses from theory, how to design methodologies for testing hypotheses, and how to present results by reading and critiquing key contemporary papers in the field. Ph.D. students enrolling in this course to fulfill the department review course requirement must enroll in 5 units. Graduate students enrolling in this course to participate in a topical forum may enroll in 2 units. Course may be repeated for 2 units. Prerequisites: by consent of instructor.

*2-5 units, Aut (Jones, J)*

**ANTHRO 365. The Theory of the Modern Subject**

This course traces the emergence of a coherent theory of the modern subject through readings of philosophical works and social theory from 18th century to the 20th century.

*5 units, not given this year*

**ANTHRO 365B. Beyond the Bourgeois Self: Desire, Subjection, and the Limits of the Human**

The course seeks to provide an overview of the conceptual and historical development of modern, western ideas of personhood and subjectivity, as the subject as simultaneously constituted as an *ŷ* and subjected by the powers of disciplines, property regimes and cultural conventions. The readings are excerpts from key philosophical texts paired with commentaries that put the philosophical positions into a deeper historical context. Many of these commentaries trace how practical theories of *ŷ* or minor selves *ŷ* the subject people of the colonies, slaves and others *ŷ* were integral to the very development of ideas of the modern, autonomous and acting self in the western world. The first part of the course began with Descartes and ended in late nineteenth century, the era of high bourgeois culture and imperialism. This second part deals with significant elements of twentieth century thought along the same global lines

*5 units, Aut (Hansen, T)*

**ANTHRO 366. Paper Works**

This seminar will focus on the emerging body of literature on the materiality of the production, circulation, and mediation of paperwork as constitutive of modern forms of governance. We will discuss specific genres of paperworks; notes, memos, files, documents, as well as archives and other mnemonic technologies; both as cultural practices and reflexive objects, and examine how they produce modern social epistemologies of accountability, evidence, the fact, and truth in the fields of law, business, and public administration, as well as in civil society generally. Readings will include works by Max Weber, Bruno Latour, Jacques Derrida, Michel Foucault, Cornelia Vismann, Ann Stoler, and others.

*5 units, not given this year*

**ANTHRO 370. Advanced Theory and Method in Historical Archaeology**

Current debates about theory and method. Prerequisite: consent of instructor.

*5 units, not given this year*

**ANTHRO 371. Proposal Writing for Archaeologists**

The craft of writing research and grant proposals. Focus is on proposals for archaeological fieldwork and laboratory research. Students prepare their own research proposals. Restricted to and required of second-year doctoral students in the Department of Anthropology, Archaeology concentration. Others require consent of instructor.

*5 units, not given this year*

**ANTHRO 373. Things: An Archaeology of the Relationships Between Humans and Things**

This course examines a variety of approaches that claim to explore the relationships between humans and things. Some of the

approaches include Marx and material culture studies; Heidegger; cognitive and phenomenological; Actor Network Theory. But there is a need also to examine behavioral and ecological and Darwinian approaches. Many of these approaches do not adequately deal with the physicality of things as objects and there is a need to seek a way to incorporate such aspects of things into social theory.

*5 units, not given this year*

**ANTHRO 374. Archaeology of Colonialism/Postcolonialisms**

Advanced graduate seminar focused on the archaeology of colonial and postcolonial contexts, both prehistoric and historic. Emphasis on intersections between archaeological research and and subaltern, postcolonial, and transnational feminist/queer theory. Prerequisite: consent of instructor.

*5 units, Win (Voss, B)*

**ANTHRO 375. Archaeology and Globalism**

The emergence of archaeology as a discipline in the context of the rise of the nation state. Global economies and other issues have created a new context for archaeology. How are archaeology and heritage responding? The idea of world heritage. The impact of postcolonialism. The commodification of the past: the past as theme park, as travel tourism or nostalgia, as exotic and other. Conflict between uses of the past for identity and as theme park; between heritage and resource or play. The impact of the Goddess, New Age, and other movements. Archaeology and human rights issues including forensic archaeology. Prerequisite: consent of instructor.

*4-5 units, not given this year*

**ANTHRO 376. Archaeology: The Emergence of a Discipline**

This course explores the key thinkers and practitioners who have founded the discipline of archaeology. Reaching back into the nineteenth century, the course examines in depth the key figures, their preoccupations and projects that shaped the way that archaeology grew through the 20th and into the 21st century. Global in scope, the emphasis will be on field projects and practical problems that stimulated the intellectual development of archaeology as an independent discipline closely tied to geology, history, anthropology, and the natural sciences.

*5 units, Win (Hodder, I; Rick, J)*

**ANTHRO 380. Practice and Performance: Bourdieu, Butler, Giddens, de Certeau**

Poststructuralist theories of iteration and mimesis used by social scientists to negotiate the tension between social structure and social practice: Giddens's structuration theory; Bourdieu's practice theory; Butler's theories of gender performativity; and de Certeau's analysis of tactics and strategies. Ethnographic and archaeological case studies that employ methodologies inspired by these approaches. Intersections and contradictions between these theorists' work; their use in anthropological practice. Issues of gender, sexuality, and ethnicity. Prerequisite: consent of instructor.

*5 units, not given this year*

**ANTHRO 400. Dissertation Writers Seminar**

Required of fifth-year Ph.D. students returning from dissertation field research and in the process of writing dissertations and preparing for professional employment.

*1-3 units, Aut (Malkki, L), Win (Malkki, L), Spr (Malkki, L)*

**ANTHRO 401A. Qualifying Examination: Topic**

Required of second- and third-year Ph.D. students writing the qualifying paper or the qualifying written examination.

*2-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**ANTHRO 401B. Qualifying Examination: Area**

Required of second- and third-year Ph.D. students writing the qualifying paper or the qualifying written examination. May be repeated for credit one time.

*2-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**ANTHRO 440. Teaching Assistantship**

Supervised experience as assistant in one undergraduate course.

*3-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**ANTHRO 441. Master's Research Thesis**

Supervised work for terminal and coterminal master's students writing the master's project in the final quarter of the degree program.

*1-15 units, Win (Staff), Spr (Staff), Sum (Staff)*

**ANTHRO 442. Reading Group**

Graduate student reading group on a thematic topic of interest. Intended for first or second-year cohort PhD students. Sections: Liisa Malkki, Sylvia Yanagisako, Thomas Hansen, Paulla Ebron, and Miyako Inoue

2-5 units, Win (Staff)

**ANTHRO 444. Anthropology Colloquium: Graduate Seminar**

Department Colloquia Lecture Series. Lectures presented on a variety of anthropological topics. Enrollment is required and restricted to the Department of Anthropology Master's students and First and Second-year PhD students. May be repeated for credit.

1 unit, Aut (Curran, L), Win (Ferguson, J), Spr (Ferguson, J)

**ANTHRO 445. Anthropology Brown Bag Series**

Current topics and trends in cultural/social anthropology, archaeology, and environmental and ecological anthropology. Enrollment in this noon-time series is restricted to the Department of Anthropology Master's students and First and Second-year PhD students.

1 unit, Aut (Ferguson, J), Win (Ferguson, J), Spr (Ferguson, J)

**ANTHRO 446A. Method of Analysis Program in the Social Sciences**

(Same as COMM 310) Colloquium series. Creation and application of new methodological techniques for social science research. Presentations on methodologies of use for social scientists across departments at Stanford by guest speakers from Stanford and elsewhere. See <http://mapss.stanford.edu>.

1 unit, not given this year

**ANTHRO 450. Research Apprenticeship**

Supervised work on a research project with an individual faculty member. May be repeated for credit.

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**ANTHRO 451. Directed Individual Study**

Supervised work for a qualifying paper, examination, or project with an individual faculty member.

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**ANTHRO 452. Graduate Internship**

Provides graduate students with the opportunity to pursue their area of specialization in an institutional setting such as a laboratory, clinic, research institute, or government agency.

3-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**ANTHRO 801. TGR Project**

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**ANTHRO 802. TGR Dissertation**

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

## APPLIED PHYSICS (APPPHYS) COURSES

### UNDERGRADUATE COURSES IN APPLIED PHYSICS

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**APPPHYS 78Q. Tools of Nanotechnology**

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Topics include: current and future applications of nanotechnology, nanofabrication tools, nanoscale characterization and manipulation tools, scanning probe microscopy (SPM), Stanford nanotechnology research examples, hands-on activities, research lab tours. Prerequisite: high school physics. GER:DB-EngrAppSci

3 units, Aut (Beetz, T)

**APPPHYS 79N. Energy Options for the 21st Century**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Choices for meeting the future energy needs of the U.S. and the world. Basic physics of energy sources, technologies that might be employed, and related public policy issues. Trade-offs and societal impacts of different energy sources. Policy options for making rational choices for a sustainable world energy economy. GER:DB-EngrAppSci

3 units, Aut (Fox, J; Geballe, T)

**APPPHYS 192. Introductory Biophysics**

(Same as APPPHYS 292) For advanced undergraduates or beginning graduate students. Quantitative models used in molecular biophysics. The relation of structure to function. Chemical equilibria, cooperativity, and control: elementary statistical mechanics, affinity plots, allostery, models of hemoglobin-oxygen binding, bacterial chemotaxis. Macromolecular conformations: polymer chain models, protein folding, taxonomy of globular proteins, general principles of sequence selection. Chemical kinetics. Multiple barriers: CO-myoglobin kinetics, ion diffusion through channels and ion selectivity, spectroscopy of ion channels-acetylcholine receptor. Supramolecular kinetics: conversion of chemical energy to mechanical force, myosin and kinesin, actin polymers. Nerve impulse propagation: membrane potentials, voltage sensitive ion gates, Hodgkin-Huxley equations, propagation of the nerve impulse.

3 units, alternate years, not given this year

### GRADUATE COURSES IN APPLIED PHYSICS

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**APPPHYS 201. Electrons and Photons**

Applied Physics Core course appropriate for graduate students and advanced undergraduate students with prior knowledge of elementary quantum mechanics, electricity and magnetism, and special relativity. Interaction of electrons with intense electromagnetic fields from microwaves to x-ray, including electron accelerators, x-ray lasers and synchrotron light sources, attosecond laser-atom interactions, and x-ray matter interactions. Mechanisms of radiation, free-electron lasing, and advanced techniques for generating ultrashort brilliant pulses. Characterization of electronic properties of advanced materials, prospects for single-molecule structure determination using x-ray lasers, and imaging attosecond molecular dynamics.

3 units, Spr (Bucksbaum, P; Chao, A; Galayda, J; Reis, D; Shen, Z)

**APPPHYS 202. Quantum Probability and Quantum Information**

Applied Physics Core course appropriate for graduate students and advanced undergraduate students with prior knowledge of elementary quantum mechanics, basic probability, and linear algebra. Quantum probability as a generalization of classical probability theory, with implications for information theory and computer science. Generalized quantum measurement theory, conditional expectation, and quantum noise theory with an emphasis on communications and precision measurements. Classical versus quantum correlations, entanglement and Bell's theorem. Introduction to quantum information processing including algorithms, error correction and communication protocols.

3 units, Win (Mabuchi, H; Yamamoto, Y)

**APPPHYS 203. Atoms, Fields and Photons**

Applied Physics Core course appropriate for graduate students and advanced undergraduate students with prior knowledge of elementary quantum mechanics, electricity and magnetism, and ordinary differential equations. Structure of single- and multi-electron atoms; electron correlation, atom-photon and atom-atom entanglement; fundamentals of laser spectroscopy and coherent control. Phenomenology and quantitative modeling of atoms in strong fields, with modern applications. Introduction to quantum optical theory of atom-photon interactions, including quantum trajectory theory.

3 units, Spr (Bucksbaum, P; Mabuchi, H)

**APPPHYS 207. Laboratory Electronics**

Lecture/lab emphasizing analog and digital electronics for lab research. RC and diode circuits. Transistors. Feedback and operational amplifiers. Active filters and circuits. Pulsed circuits, voltage regulators, and power circuits. Precision circuits, low-noise measurement, and noise reduction techniques. Circuit simulation tools. Analog signal processing techniques and modulation/demodulation. Principles of synchronous detection and

applications of lock-in amplifiers. Common laboratory measurements and techniques illustrated via topical applications. Limited enrollment. Prerequisites: undergraduate device and circuit exposure.

3 units, Win (Fox, J)

#### APPPHYS 208. Laboratory Electronics

Lecture/lab emphasizing analog and digital electronics for lab research. Continuation of APPPHYS 207 with emphasis on applications of digital techniques. Combinatorial and synchronous digital circuits. Design using programmable logic. Analog/digital conversion. Microprocessors and real time programming, concepts and methods of digital signal processing techniques. Current lab interface protocols. Techniques commonly used for lab measurements. Development of student lab projects during the last three weeks. Limited enrollment. Prerequisites: undergraduate device and circuit exposure. Recommended: previous enrollment in APPPHYS 207.

3 units, Spr (Fox, J), alternate years, not given next year

#### APPPHYS 216. X-Ray and VUV Physics

Research and classical concepts in photon science. Photon-electron interactions; x-ray absorption and Compton scattering. X-ray spectroscopy; EXAFS, SEXAFS, edge structure, magnetic circular dichroism, and linear dichroism. Photoemission spectroscopy and many-electron effects: angle-resolved and integrated photoemission, resonance photoemission, spin-polarized photoemission. Photoelectron diffraction and holography. X-ray interactions with condensed matter: diffraction and scattering. Photon sources: synchrotron, wigglers, and undulators. Photon and electron detectors and analyzers. Prerequisite: familiarity with quantum mechanics.

3 units, Win (Reis, D; Shen, Z), alternate years, not given next year

#### APPPHYS 217. Estimation and Control Methods for Applied Physics

Recursive filtering, parameter estimation, and feedback control methods based on linear and nonlinear state-space modeling. Topics in: dynamical systems theory; practical overview of stochastic differential equations; model reduction; and tradeoffs among performance, complexity, and robustness. Numerical implementations in MATLAB. Contemporary applications in systems biology and quantum precision measurement. Prerequisites: linear algebra and ordinary differential equations.

3 units, alternate years, not given this year

#### APPPHYS 219. Solid State Physics and the Energy Challenge

Technology issues for a secure energy future; role of solid state physics in energy technologies. Topics include the physics principles behind future technologies related to solar energy and solar cells, solid state lighting, superconductivity, solid state fuel cells and batteries, electrical energy storage, materials under extreme condition, nanomaterials.

3 units, alternate years, not given this year

#### APPPHYS 223. Stochastic and Nonlinear Dynamics

(Same as BIO 223) Theoretical analysis of dynamical processes: dynamical systems, stochastic processes, and spatiotemporal dynamics. Motivations and applications from biology and physics. Emphasis is on methods including qualitative approaches, asymptotics, and multiple scale analysis. Prerequisites: ordinary and partial differential equations, complex analysis, and probability or statistical physics.

3 units, alternate years, not given this year

#### APPPHYS 223B. Nonlinear Dynamics: This Side of Chaos

Linear dynamics, periodic systems, Hamiltonian motion and phase space. The physics of nonlinear motion: thinking in phase space. Perturbation theory, periodic orbits, resonances, stability and instability. Integrability and symplectic integration. The KAM theorem and renormalization description of the transition to chaos. Dissipation and bifurcation. Application of methods to nanoscience, lasers and accelerators, condensed matter physics and biophysics. Prerequisites: differential equations and classical mechanics.

3 units, Win (Ruth, R), alternate years, not given next year

#### APPPHYS 227. Quantum Device Physics of Atomic and Semiconductor Systems

Concepts and constituent technologies of quantum information

systems. Quantum cryptography: single photon and entangled photon-pair-based quantum key distributions, quantum teleportation, quantum repeater. Quantum computer: Deutsch-Josza algorithm, Grover algorithm, Shor algorithm, quantum simulation, quantum circuits. Quantum hardware: atomic physics, nuclear magnetic resonance, spintronics and quantum optics.

3 units, alternate years, not given this year

#### APPPHYS 232. Advanced Imaging Lab in Biophysics

(Same as BIO 132, BIO 232, BIOPHYS 232, MCP 232) Laboratory and lectures. Advanced microscopy and imaging, emphasizing hands-on experience with state-of-the-art techniques. Students construct and operate working apparatus. Topics include microscope optics, Koehler illumination, contrast-generating mechanisms (bright/dark field, fluorescence, phase contrast, differential interference contrast), and resolution limits. Laboratory topics vary by year, but include single-molecule fluorescence, fluorescence resonance energy transfer, confocal microscopy, two-photon microscopy, and optical trapping. Limited enrollment. Recommended: basic physics, Biology core or equivalent, and consent of instructor.

4 units, Spr (Block, S; Smith, S; Stearns, T; Schnitzer, M)

#### APPPHYS 236. Biology by the Numbers: Evolution

(Same as BIOC 236) Topics in biology from a quantitative perspective. Subjects vary. 2011-12 focus: evolution, from basic principles of evolutionary dynamics to fundamental quantitative questions that are far from being answered; from early life, metabolic processes, and molding of earth by microbes to spread of human epidemics; from analysis of genomes and molecular phylogenies to aspects of multi-cellular development. Prerequisites: Familiarity with ordinary differential equations and probability. Biology background not required.

3 units, Spr (Fisher, D), alternate years, not given next year

#### APPPHYS 270. Magnetism and Long Range Order in Solids

Cooperative effects in solids. Topics include the origin of magnetism in solids, crystal electric field effects and anisotropy, exchange, phase transitions and long-range order, ferromagnetism, antiferromagnetism, metamagnetism, density waves and superconductivity. Emphasis is on archetypal materials. Prerequisite: PHYSICS 172 or MATSCI 209, or equivalent introductory condensed matter physics course.

3 units, alternate years, not given this year

#### APPPHYS 272. Solid State Physics

(Same as PHYSICS 172) Introduction to the properties of solids. Crystal structures and bonding in materials. Momentum-space analysis and diffraction probes. Lattice dynamics, phonon theory and measurements, thermal properties. Electronic structure theory, classical and quantum; free, nearly-free, and tight-binding limits. Electron dynamics and basic transport properties; quantum oscillations. Properties and applications of semiconductors. Reduced-dimensional systems. Undergraduates should register for PHYSICS 172 and graduate students for APPPHYS 272. Prerequisites: PHYSICS 170 and 171, or equivalents.

3 units, Spr (Manoharan, H; Hwang, H)

#### APPPHYS 273. Solid State Physics II

Introduction to the many-body aspects of crystalline solids. Second quantization of phonons, anharmonic effects, polaritons, and scattering theory. Second quantization of Fermi fields. Electrons in the Hartree-Fock and random phase approximation; electron screening and plasmons. Magnetic exchange interactions. Electron-phonon interaction in ionic/covalent semiconductors and metals; effective attractive electron-electron interactions, Cooper pairing, and BCS description of the superconducting state. Prerequisite: 272 or PHYSICS 172.

3 units, Win (Hwang, H)

#### APPPHYS 280. Phenomenology of Superconductors

Phenomenology of superconductivity viewed as a macroscopic quantum phenomenon. Topics include the superconducting pair wave function, London and Ginzburg-Landau theories, the Josephson effect, type I type II superconductivity, and the response of superconductors to currents, magnetic fields, and RF electromagnetic radiation. Introduction to thermal fluctuation effects in superconductors and quantum superconductivity.

3 units, alternate years, not given this year



**APPPHYS 290. Directed Studies in Applied Physics**

Special studies under the direction of a faculty member for which academic credit may properly be allowed. May include lab work or directed reading.

*1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**APPPHYS 291. Practical Training**

Opportunity for practical training in industrial labs. Arranged by student with research adviser's approval. Summary of activities required.

*3 units, Sum (Staff)*

**APPPHYS 292. Introductory Biophysics**

(Same as APPPHYS 192) For advanced undergraduates or beginning graduate students. Quantitative models used in molecular biophysics. The relation of structure to function. Chemical equilibria, cooperativity, and control: elementary statistical mechanics, affinity plots, allostery, models of hemoglobin-oxygen binding, bacterial chemotaxis. Macromolecular conformations: polymer chain models, protein folding, taxonomy of globular proteins, general principles of sequence selection. Chemical kinetics. Multiple barriers: CO-myoglobin kinetics, ion diffusion through channels and ion selectivity, spectroscopy of ion channels-acetylcholine receptor. Supramolecular kinetics: conversion of chemical energy to mechanical force, myosin and kinesin, actin polymers. Nerve impulse propagation: membrane potentials, voltage sensitive ion gates, Hodgkin-Huxley equations, propagation of the nerve impulse.

*3 units, alternate years, not given this year*

**APPPHYS 293. Theoretical Neuroscience**

Introduction to fundamental theoretical ideas that provide conceptual insights into how networks of neurons cooperatively mediate important brain functions. Topics include basic mathematical models of single neurons, neuronal computation through feedforward and recurrent network dynamics, principles of associative memory, applications of information theory to early sensory systems, correlations and neural population coding, network plasticity and the self-organization of stimulus selectivity, and supervised and unsupervised learning through multiple mechanisms of synaptic plasticity. Emphasis on developing mathematical and computational skills to analyze complex neural systems. Prerequisites: calculus, linear algebra, and basic probability theory, or consent of instructor.

*3 units, Spr (Ganguli, S)*

**APPPHYS 294. Cellular Biophysics**

(Same as BIO 294) Physical biology of dynamical and mechanical processes in cells. Emphasis is on qualitative understanding of biological functions through quantitative analysis and simple mathematical models. Sensory transduction, signaling, adaptation, switches, molecular motors, actin and microtubules, motility, and circadian clocks. Prerequisites: differential equations and introductory statistical mechanics.

*3 units, alternate years, not given this year*

**APPPHYS 302. Experimental Techniques in Condensed Matter Physics**

Cryogenics; low signal measurements and noise analysis; data collection and analysis; examples of current experiments. Prerequisites: PHYSICS 170, 171, and 172, or equivalents.

*3 units, alternate years, not given this year*

**APPPHYS 304. Lasers Laboratory**

Theory and practice. Theoretical and descriptive background for lab experiments, detectors and noise, and lasers (helium neon, beams and resonators, argon ion, cw dye, titanium sapphire, semiconductor diode, and the Nd:YAG). Measurements of laser threshold, gain, saturation, and output power levels. Laser transverse and axial modes, linewidth and tuning, Q-switching and modelocking. Limited enrollment. Prerequisites: EE 231 and 232, or consent of instructor.

*3 units, Win (Fejer, M)*

**APPPHYS 305. Nonlinear Optics Laboratory**

Laser interaction with matter. Laser devices provide radiation to explore the linear and nonlinear properties of matter. Experiments on modulation, harmonic generation, parametric oscillators, modelocking, stimulated Raman and Brillouin scattering, coherent anti-Stokes scattering, other four-wave mixing interactions such as

wavefront conjugation and optical bistability. Optical pumping and spectroscopy of atomic and molecular species. Limited enrollment. Prerequisites: 304, EE 231 and 232, or consent of instructor.

*3 units, Spr (Lev, B)*

**APPPHYS 315. Methods in Computational Biology**

Methods of bioinformatics and biomolecular modeling from the standpoint of biophysical chemistry. Methods of genome analysis; cluster analysis, phylogenetic trees, microarrays; protein, RNA and DNA structure and dynamics, structural and functional homology; protein-protein interactions and cellular networks; molecular dynamics methods using massively parallel algorithms.

*3 units, alternate years, not given this year*

**APPPHYS 324. Introduction to Accelerator Physics**

Physics of particle beams in linear and circular accelerators. Transverse beam dynamics, acceleration, longitudinal beam dynamics, synchrotron radiation, free electron lasers, collective instabilities and nonlinear effects. Topics of current research in accelerator physics. Selected laboratory measurements at SLAC to augment the lecture material.

*3 units, alternate years, not given this year*

**APPPHYS 345. Advanced Numerical Methods for Data Analysis and Simulation**

Gaussian and unit sphere quadrature, singular value decomposition and principal component analysis, Krylov methods, non-linear fitting and super-resolution, independent component analysis, 3d reconstruction, shrink-wrap, hidden Markov methods, support vector machines, simulated annealing, molecular dynamics and parallel tempering, Markov state methods, Monte Carlo methods for constrained systems.

*3 units, Aut (Doniach, S), alternate years, not given next year*

**APPPHYS 387. Quantum Optics and Measurements**

Basic concerns and fundamental postulates in quantum theory of measurements. Quantum non-demolition measurements, nonlinear measurements and continuous measurements. Non-local quantum correlation and Bell's inequality. Generation, detection, and application of single photons and entangled photon-pairs. Reservoir theory of an open dissipative system. Laser phase transition versus BCS transition in microcavities.

*3 units, alternate years, not given this year*

**APPPHYS 389. Bose-Einstein Condensation and Lasers**

Topics include comparison of physics of Bose-Einstein Condensation (BEC) to physics of lasers, system differences and similarities between the quantum statistical properties of BEC and of lasers, BEC of non-interacting particles, Bogoliubov theory of interacting BEC and Gross-Pitaevskii equation, superfluidity and quantized vortices, quantum theory of laser, quantum noise and coherence functions, quantum correlation and squeezing.

*3 units, alternate years, not given this year*

**APPPHYS 390. Dissertation Research**

*1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**APPPHYS 392. Topics in Molecular Biophysics**

Concepts from statistical mechanics applied to contemporary molecular biology: allosteric transitions; protein folding; molecular recognition; actin polymers and gels; molecular motors; lipids and membrane proteins; ion channels. Some of the basic models used to quantitate fundamental biomolecular functions. Prerequisites: elementary statistical mechanics and chemical kinetics.

*3 units, Spr (Doniach, S), alternate years, not given next year*

**APPPHYS 470. Condensed Matter Seminar**

Current research and literature; offered by faculty, students, and outside specialists. May be repeated for credit.

*1 unit, Aut (Fisher, I), Win (Fisher, I), Spr (Fisher, I)*

**APPPHYS 483. Optics and Electronics Seminar**

Current research topics in lasers, quantum electronics, optics, and photonics by faculty, students, and invited outside speakers. May be repeated for credit.

*1 unit, Aut (Fejer, M), Win (Kahn, J), Spr (Ellerbee, A)*

**APPPHYS 802. TGR Dissertation**

*0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*



# ARCHAEOLOGY (ARCHLGY) COURSES

## UNDERGRADUATE COURSES IN ARCHAEOLOGY

Primarily for undergraduates; graduate students may enroll with consent of adviser.

### **ARCHLGY 1. Introduction to Prehistoric Archeology**

(Same as ANTHRO 3) Aims, methods, and data in the study of human society's development from early hunters through late prehistoric civilizations. Archaeological sites and remains characteristic of the stages of cultural development for selected geographic areas, emphasizing methods of data collection and analysis appropriate to each. GER:DB-SocSci, EC-GlobalCom

*3-5 units, Aut (Rick, J)*

### **ARCHLGY 12. Peopling of the Globe: Changing Patterns of Land Use and Consumption Over the Last 50,000 Years**

(Same as ANTHRO 18, EARTHSYS 21, HUMBIO 182) Fossil, genetic and archaeological evidence suggest that modern humans began to disperse out of Africa about 50,000 years ago. Subsequently, humans have colonized every major landmass on earth. This class introduces students to the data and issues regarding human dispersal, migration and colonization of continents and islands around the world. We explore problems related to the timing and cause of colonizing events, and investigate questions about changing patterns of land use, demography and consumption. Students are introduced to critical relationships between prehistoric population changes and our contemporary environmental crisis. GER:DB-SocSci

*3-5 units, Aut (Bird, D)*

### **ARCHLGY 55. Introduction to Archaeobotany**

(Same as ANTHRO 55A) The aim of this course is to provide a short introduction to archaeobotany. An overview of types of archaeobotanical remains will include an examination of macrobotanical remains (seeds, charcoal), microfossil remains (starch, pollen, phytoliths) and molecular remains (aDNA, isotopes). The ways in which various types of plant remains have been used will be discussed through case studies. Major debates that archaeobotanical research has shed light on, including the origins of agriculture and issues around domestication will also be examined. Some practical work will allow students to gain familiarity with botanical nomenclature and some archaeobotanical protocols and plant identification techniques. Students will look at microfossil residues from local grinding slabs and write a short paper on the residues recovered. They will also look at seed remains from either Chinese or local flotation samples using microscopes in the lab.

*5 units, not given this year*

### **ARCHLGY 64. Cultural Heritage and Human Rights**

(Same as ARCHLGY 164) This interdisciplinary research workshop will critically engage the issue of the growing currency of human rights discourse within cultural heritage. Epistemological and practical areas of tension between rights discourse and cultural discourse will be surveyed within the context of current global challenges facing heritage practice, conservation and archaeology. Topics will include the inequities of cultural recognition between North-South globalizations, questions of cultural property and rights, the role of tourism, and the impact of environmental conservation discourse on cultural rights.

*1 unit, Aut (Weiss, L)*

### **ARCHLGY 70. The Intersections of Global Heritage, Conservation, and the Environment**

Conceptual and theoretical approaches to examine the intersections between cultural and natural heritage from an interdisciplinary perspective. We ask: What is heritage? How are natural and cultural heritages interpreted, managed, and defined? Do heritage managers privilege nature and conservation over cultural heritage? This course uses archaeological data, ethnographic methods, and archival analysis to examine case studies representing key issues including conservation, indigenous rights, cultural landscapes, heritage in conflict, international heritage policy, and the use of

expert knowledge in heritage contexts

*3-5 units, Win (Staff)*

### **ARCHLGY 99A. Historical Archaeology in the Archive, Lab, and Underground: Methods**

The practice of historical archaeology through methodologies including archival research, oral history, material culture analysis, and archaeological excavation. Students use these methods to analyze the history and archaeology of a local park, the Thornewood Open Space Preserve.

*5 units, not given this year*

### **ARCHLGY 102. Archaeological Methods**

(Same as ANTHRO 91A) Methodological issues related to the investigation of archaeological sites and objects. Aims and techniques of archaeologists including: location and excavation of sites; dating of places and objects; analysis of artifacts and technology and the study of ancient people, plants, and animals. How these methods are employed to answer the discipline's larger research questions.

*5 units, Spr (Staff)*

### **ARCHLGY 102B. Incas and their Ancestors: Peruvian Archaeology**

(Same as ANTHRO 106, ANTHRO 206A) The development of high civilizations in Andean S. America from hunter-gatherer origins to the powerful, expansive Inca empire. The contrasting ecologies of coast, sierra, and jungle areas of early Peruvian societies from 12,000 to 2,000 B.C.E. The domestication of indigenous plants which provided the economic foundation for monumental cities, ceramics, and textiles. Cultural evolution, and why and how major transformations occurred. (HEF II, III; DA-B) GER:DB-SocSci, EC-GlobalCom

*3-5 units, not given this year*

### **ARCHLGY 103. History of Archaeological Thought**

(Same as ANTHRO 90A) Introduction to the history of archaeology and the forms that the discipline takes today, emphasizing developments and debates over the past five decades. Historical overview of culture, historical, processual and post-processual archaeology, and topics that illustrate the differences and similarities in these theoretical approaches.

*5 units, Aut (Meskell, L)*

### **ARCHLGY 104C. The Archaeology of Ancient China**

(Same as ARCHLGY 304C) Early China from the perspective of material remains unearthed from archaeological sites; the development of Chinese culture from early hominid occupation nearly 2 million years ago through the development of agriculture in the Neolithic period and complex society in the Bronze Age to the political unification of China under the Qin Dynasty. Continuity of Chinese culture from past to present, history of Chinese archaeology, relationships between archaeology and politics, and food in early China.

*5 units, not given this year*

### **ARCHLGY 106A. Museums and Collections**

(Same as ARCHLGY 306A) Practical, theoretical, and ethical issues which face museums and collections. Practical collections-based work, museum visits, and display research. The roles of the museum in contemporary society. Students develop their own exhibition and engage with the issues surrounding the preservation of material culture.

*5 units, Spr (Newble, L)*

### **ARCHLGY 107A. Archaeology as a Profession**

(Same as ANTHRO 101A) Academic, contract, government, field, laboratory, museum, and heritage aspects of the profession.

*5 units, Aut (Voss, B)*

### **ARCHLGY 111. Emergence of Chinese Civilization from Caves to Palaces**

(Same as CHINGEN 141, CHINGEN 241) Introduces processes of cultural evolution from the Paleolithic to the Three Dynasties in China. By examining archaeological remains, ancient inscriptions, and traditional texts, four major topics will be discussed: origins of modern humans, beginnings of agriculture, development of social stratification, and emergence of states and urbanism. GER:DB-Hum

*3-4 units, Aut (Liu, L)*

**ARCHLGY 117. Ceramics: Art and Science**

(Same as CLASSART 114) From clay to culture. Design, technology, manufacture, and consumption of ceramics. Guest lecturers, site visits, and hands-on studio work.

3-5 units, Spr (Shanks, M)

**ARCHLGY 120. Social Zooarchaeology & Animals within Prehistoric Social Worlds**

(Same as ANTHRO 120A, ANTHRO 220A, ARCHLGY 220) The elevated status of animals in prehistory derived from their position as sentient beings sharing many of the ontological qualities of people comparable life-cycles and behavioral traits in some cases, affection, the display of dominance hierarchies, and differing degrees of sociality while at the same time retaining clear biological and behavioral differences. The course will consider aspects of the social and ontological relations between people and animals in prehistory, particularly cosmologies and folk classifications, and the place of animals in social relations and identity formation. It is aimed to understand how the presence, qualities, materialities, and networks of animal life shaped human socialities as much as human agency created engagement with the 'animal estate'. Furthermore, it intends to define how to include animals as subjects in archaeological and anthropological studies taking non-human agency as a starting point. Focusing on case studies drawn from Eur

5 units, Aut (Marciniak, A)

**ARCHLGY 123. Politics, nationalism, heritage and archaeology in Central/Eastern Europe**

(Same as ANTHRO 124A, ANTHRO 224A, ARCHLGY 223) The current state of archaeology in central and eastern part of Europe reveals a multiplicity of regional intellectual traditions and social factors, interrelating with each other in many complex ways. The course will discuss intellectual panorama of archaeologies in this part of the continent and examine the reaction to various socio-political, economic, intellectual, institutional and organizational conditions in its different parts that created a wide variety of local strategies within which archaeology has been practiced. As nationalism requires the elaboration of a real or invented remote past, the course will then consider how archaeological data have been manipulated for nationalist purposes, and discuss the relationship of archaeology to nation-building in Central and Eastern Europe. Contrastive conceptions of nationality and ethnicity are presented. The political uses of archaeology, involving mobilization and appropriation of archaeological and cultural heritage, are also rev

5 units, Aut (Marciniak, A)

**ARCHLGY 132. The Anthropology of Heritage: Concepts, Contexts and Critique**

(Same as ARCHLGY 232) This seminar will explore foundational concepts currently employed within heritage practice and debates. Readings will examine the historically formative context of colonial-era and nationalist discourses on stewardship and culture, as well as postcolonial reformulations of such concepts as cultural property, cultural recognition and public history. The seminar will engage the question of the relationship between foundational concepts and the current cosmopolitan and internationalist vision for heritage, probing the enduring dynamics of North-South divides in heritage development and archaeological practice.

3-5 units, Win (Weiss, L)

**ARCHLGY 137. Ethnographic Archaeologies**

(Same as ANTHRO 140A, ANTHRO 240A) How have ethnographic and archaeological methods been combined in anthropological research? What methodological and theoretical implications do these kinds of projects generate? Seminar topics will include ethnoarchaeology, ethnographies of archaeological practice, public archaeology and heritage ethics. Lecture and discussion.

4-5 units, NEXTYEAR

**ARCHLGY 139. The Aegean in the Neolithic and Bronze Age**

(Same as ARCHLGY 239) This course provides a survey of Aegean prehistory (7th-2nd millennium BC), focusing on traditions that were picked up or renegotiated, instead of taking a standpoint that evaluates phenomena as steps leading up to a 'state-like' palatial society. It will draw on the region's wealth of data, and will be set within a theoretically informed, problem-oriented framework, aiming to introduce students to current

interpretations and debates, mainly through discussion of specific case-studies.

3-5 units, Win (Staff)

**ARCHLGY 190. Archaeology Directed Reading/Independent Study**

1-5 units, Aut (Staff), Win (Staff), Spr (Staff)

**ARCHLGY 195. Independent Study/Research**

Students conducting independent study and or research with archaeology faculty members.

1-5 units, Aut (Staff), Win (Staff), Spr (Staff)

**ARCHLGY 199. HONORS INDEPENDENT STUDY**

Independent study with honors faculty adviser.

5 units, Win (Staff), Spr (Staff)

**ARCHLGY 201. Art and Archaeology of Korea**

(Same as KORGEN 170, KORGEN 270) Introduction to art and archaeology of Korean peninsula and adjacent continental northeast Asia from Bronze Age to early twentieth century. Topics include archaeology of the proto-Three Kingdoms period, state formation and Sinicization, introduction of Buddhism and its development to the Unified Silla period, the sophisticated tastes of the Koryo aristocrats, and the literati culture of Choson.

3-5 units, Win (Kim, M)

**GRADUATE COURSES IN ARCHAEOLOGY**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**ARCHLGY 164. Cultural Heritage and Human Rights**

(Same as ARCHLGY 64) This interdisciplinary research workshop will critically engage the issue of the growing currency of human rights discourse within cultural heritage. Epistemological and practical areas of tension between rights discourse and cultural discourse will be surveyed within the context of current global challenges facing heritage practice, conservation and archaeology. Topics will include the inequities of cultural recognition between North-South globalizations, questions of cultural property and rights, the role of tourism, and the impact of environmental conservation discourse on cultural rights.

1 unit, Aut (Weiss, L)

**ARCHLGY 220. Social Zooarchaeology & Animals within Prehistoric Social Worlds**

(Same as ANTHRO 120A, ANTHRO 220A, ARCHLGY 120) The elevated status of animals in prehistory derived from their position as sentient beings sharing many of the ontological qualities of people comparable life-cycles and behavioral traits in some cases, affection, the display of dominance hierarchies, and differing degrees of sociality while at the same time retaining clear biological and behavioral differences. The course will consider aspects of the social and ontological relations between people and animals in prehistory, particularly cosmologies and folk classifications, and the place of animals in social relations and identity formation. It is aimed to understand how the presence, qualities, materialities, and networks of animal life shaped human socialities as much as human agency created engagement with the 'animal estate'. Furthermore, it intends to define how to include animals as subjects in archaeological and anthropological studies taking non-human agency as a starting point. Focusing on case studies drawn from Eur

5 units, Aut (Marciniak, A)

**ARCHLGY 223. Politics, nationalism, heritage and archaeology in Central/Eastern Europe**

(Same as ANTHRO 124A, ANTHRO 224A, ARCHLGY 123) The current state of archaeology in central and eastern part of Europe reveals a multiplicity of regional intellectual traditions and social factors, interrelating with each other in many complex ways. The course will discuss intellectual panorama of archaeologies in this part of the continent and examine the reaction to various socio-political, economic, intellectual, institutional and organizational conditions in its different parts that created a wide variety of local strategies within which archaeology has been practiced. As nationalism requires the elaboration of a real or invented remote past, the course will then consider how archaeological data have been manipulated for nationalist purposes, and discuss the

relationship of archaeology to nation-building in Central and Eastern Europe. Contrastive conceptions of nationality and ethnicity are presented. The political uses of archaeology, involving mobilization and appropriation of archaeological and cultural heritage, are also rev

5 units, Aut (Marciniak, A)

**ARCHLGY 232. The Anthropology of Heritage: Concepts, Contexts and Critique**

(Same as ARCHLGY 132) This seminar will explore foundational concepts currently employed within heritage practice and debates. Readings will examine the historically formative context of colonial-era and nationalist discourses on stewardship and culture, as well as postcolonial reformulations of such concepts as cultural property, cultural recognition and public history. The seminar will engage the question of the relationship between foundational concepts and the current cosmopolitan and internationalist vision for heritage, probing the enduring dynamics of North-South divides in heritage development and archaeological practice.

3-5 units, Win (Weiss, L)

**ARCHLGY 239. The Aegean in the Neolithic and Bronze Age**

(Same as ARCHLGY 139) This course provides a survey of Aegean prehistory (7th-2nd millennium BC), focusing on traditions that were picked up or renegotiated, instead of taking a standpoint that evaluates phenomena as steps leading up to a 'state-like' palatial society. It will draw on the region's wealth of data, and will be set within a theoretically informed, problem-oriented framework, aiming to introduce students to current interpretations and debates, mainly through discussion of specific case-studies.

3-5 units, Win (Staff)

**ARCHLGY 299. INDEPENDENT STUDY/RESEARCH**  
INDEPENDENT STUDY/RESEARCH

1-5 units, Win (Staff), Spr (Staff)

**ARCHLGY 304C. The Archaeology of Ancient China**

(Same as ARCHLGY 104C) Early China from the perspective of material remains unearthed from archaeological sites; the development of Chinese culture from early hominid occupation nearly 2 million years ago through the development of agriculture in the Neolithic period and complex society in the Bronze Age to the political unification of China under the Qin Dynasty. Continuity of Chinese culture from past to present, history of Chinese archaeology, relationships between archaeology and politics, and food in early China.

5 units, not given this year

**ARCHLGY 306A. Museums and Collections**

(Same as ARCHLGY 106A) Practical, theoretical, and ethical issues which face museums and collections. Practical collections-based work, museum visits, and display research. The roles of the museum in contemporary society. Students develop their own exhibition and engage with the issues surrounding the preservation of material culture.

5 units, Spr (Newble, L)

## ART HISTORY (ARTHIST) COURSES

### UNDERGRADUATE COURSES IN ART HISTORY

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**ARTHIST 1. Introduction to the Visual Arts**

Multicultural rather than historical approach. WIM GER:DB-Hum, WIM

5 units, Aut (Lee, P)

**ARTHIST 2. Asian Art and Culture**

(Same as JAPANGEN 60) The religious and philosophical ideas and social attitudes of India, China, and Japan and how they are expressed in architecture, painting, woodblock prints, sculpture, and in such forms as garden design and urban planning. GER:DB-Hum, EC-GlobalCom

5 units, Win (Vinograd, R)

**ARTHIST 3. Introduction to the History of Architecture**

From antiquity to the 20th century, mostly Western with some non-Western topics. Buildings and general principles relevant to the study of architecture. GER:DB-Hum

5 units, alternate years, not given this year

**ARTHIST 6. Art & Art History's Greatest Hits**

This course is taught jointly by distinguished faculty in Art & Art History, each of whom presents two lectures on a favored object of study, ranging from examples of Kongo graphic writing to Russian avant-garde film. Students thus encounter a wide range of expertise and are invited to explore major issues that structure the interpretation of great works of art and visual culture from diverse periods and different geographical origins. Participants will gain exposure to a variety of interpretive strategies and historical perspectives through focused lectures as well as opportunities for up-close examination of original objects in campus collections. Writing assignments will develop skills in close description and visual analysis, culminating in a research paper devoted to a single work of the student's choice.

4 units, Spr (de Wit, N)

**ARTHIST 99A. Student Guides at the Cantor Center for the Visual Arts**

Open to all Stanford students. Public speaking, inquiry methods, group dynamics, theme development, and art-related vocabulary. Introduction to museum administration; art registration, preparation and installation; rights and reproduction of images; exhibition planning; and art storage, conservation, and security. Students research, prepare, and present discussions on art works of their choice.

1 unit, Aut (Young, P)

**ARTHIST 101. Archaic Greek Art**

(Same as ARTHIST 301, CLASSART 101, CLASSART 201) The development of Greek art and culture from protogeometric beginnings to the Persian Wars, 1000-480 B.C.E. The genesis of a native Greek style; the orientaling phase during which contact with the Near East and Egypt transformed Greek art; and the synthesis of East and West in the 6th century B.C.E. GER:DB-Hum

4 units, Aut (Maxmin, J)

**ARTHIST 102. Empire and Aftermath: Greek Art from the Parthenon to Praxiteles**

(Same as ARTHIST 302, CLASSART 102) The course explores the art and architecture of the Athenian Empire in the age of Pericles, and then considers the effects of civil war and plague on Greek art and society in the later 5th and early 4th centuries. GER:DB-Hum

4 units, Win (Maxmin, J)

**ARTHIST 105. Introduction to Medieval Art**

(Same as ARTHIST 305) Chronological survey of Byzantine, Islamic, and Western Medieval art and architecture from the early Christian period to the Gothic age. Broad art-historical developments and more detailed examinations of individual monuments and works of art. Topics include devotional art, court and monastic culture, relics and the cult of saints, pilgrimage and crusades, and the rise of cities and cathedrals. GER:DB-Hum

4 units, not given this year

**ARTHIST 106A. Art of Pilgrimage and Crusade**

(Same as ARTHIST 306A) Focus is on the artistic production of Mediterranean 12th-13th centuries exploring the phenomena of pilgrimage and Crusade. The rise of the Normans; the establishment of the pilgrimage to Santiago de Compostella as part of the Reconquista of Spain; the Crusader capture of Jerusalem in 1099 and the subsequent formation of Crusader states in the eastern Mediterranean; the rise of the Ayyubids and the emergence of the Italian city-state trade. The interconnection between the rise of narrative and conquest; the emergence of monumental sculpture; and the clash between tactile and optical visuality.

4 units, not given this year

**ARTHIST 107A. St. Petersburg, a Cultural Biography: Architecture, Urban Planning, the Arts**

(Same as REES 207A) The most premeditated city in the whole world, according to Dostoevsky; created in 1703 by Peter the Great as a counterpoise to Moscow and old Russian culture; planned as a

rational, west-European-appearing capital city of the Russian Empire. St. Petersburg's history through works of its artists, architects, urban planners, writers, and composers. GER:DB-Hum, DB-Hum

*4 units, Spr (Kollmann, J)*

**ARTHIST 108. Virginité and Power: Mary in the Middle Ages** (Same as ARTHIST 308) The most influential female figure in Christianity whose state cult was connected with the idea of empire. The production and control of images and relics of the Virgin and the development of urban processions and court ceremonies through which political power was legitimized in papal Rome, Byzantium, Carolingian and Ottonian Germany, Tuscany, Gothic France, and Russia. GER:DB-Hum

*4 units, not given this year*

**ARTHIST 108A. Medieval Islamic Art and Architecture from 7th century Arabia to the Conquest of Cairo in 1517**

(Same as ARTHIST 308A) The course provides an introduction to the arts of the Islamic world in the Middle Ages, in both its Western and Eastern areas. The artistic material is presented in correlation to religion, philosophy and political history. We examine the many forms, styles and modes of visual expression that contributed to a great diversity of artistic production within the complex set of different competitive centers of cultures, all united through the one and same faith in the holy text of the Qur'an. We focus on the most representative artworks of the periods, dynasties and countries covered in the course.

*4 units, Win (Staff)*

**ARTHIST 108B. Islamic Art & Architecture: 15th-19th century**

(Same as ARTHIST 308B) An introduction to the arts and visual culture of the Islamic world in the pre-modern and modern period. The course examines case studies of sites and objects highly representative of these dynasties and the modes of plastic expression they developed. History of the art of the book is an important topic in this period.

*4 units, Spr (Staff)*

**ARTHIST 111. Introduction to Italian Renaissance, 1420-1580**

(Same as ARTHIST 311) New techniques of pictorial illusionism and the influence of the humanist revival of antiquity in the reformulation of the pictorial arts in 15th-century Italy. How different Italian regions developed characteristic artistic cultures through mutual interaction and competition. GER:DB-Hum

*4 units, not given this year*

**ARTHIST 113. Science, Technology and Art: The Worlds of Leonardo da Vinci**

(Same as ARTHIST 113A, HISTORY 31, HISTORY 131) (Same as HISTORY 31. History majors and others taking 5 units, register for 131.) What did Leonardo actually know? How did he acquire that knowledge? Explores Leonardo's interests and accomplishments in such fields as painting, architecture, engineering, physics, mathematics, geology, anatomy, and physiology, and more generally the nature of Renaissance science, art, and technology. Considers the relationship between the society of fifteenth century Italy and the work of the man from Vinci: why did this world produce a Leonardo? How might we use him to understand creativity, innovation, and invention in the Renaissance and beyond? What was his legacy and how did he become a myth? Designed both for students interested in the history of science, medicine, and technology and for students interested in the history and art of Renaissance Italy. GER:DB-Hum

*3-5 units, not given this year*

**ARTHIST 113A. Science, Technology and Art: The Worlds of Leonardo da Vinci**

(Same as ARTHIST 113, HISTORY 31, HISTORY 131) (Same as HISTORY 31. History majors and others taking 5 units, register for 131.) What did Leonardo actually know? How did he acquire that knowledge? Explores Leonardo's interests and accomplishments in such fields as painting, architecture, engineering, physics, mathematics, geology, anatomy, and physiology, and more generally the nature of Renaissance science, art, and technology. Considers the relationship between the society of fifteenth century Italy and the work of the man from Vinci: why did this world produce a Leonardo? How might we use him to understand creativity, innovation, and invention in the Renaissance

and beyond? What was his legacy and how did he become a myth? Designed both for students interested in the history of science, medicine, and technology and for students interested in the history and art of Renaissance Italy. GER:DB-Hum

*3-5 units, not given this year*

**ARTHIST 114. Vision and Emblem: Netherlandish Painting from Van Eyck to Brueghel**

(Same as ARTHIST 314) How 15th-century pictorial illusionism transformed the devotional image and portraiture, calling for a new kind of engagement with the image on the part of the beholder. How 16th-century humanist knowledge influenced the creation of new pictorial subjects and representational forms. The reflection of religious crises triggered by the Reformation in art. GER:DB-Hum

*4 units, not given this year*

**ARTHIST 117. Picturing the Papacy: Renaissance to Neoclassicism**

(Same as ARTHIST 317) Campaigns of renovations aimed at restoring Rome to its former legendary splendor. The use of art and architecture to glorify the papacy and negotiate attacks on the institution. Art and papal nepotism from the 15th to 18th century. GER:DB-Hum

*4 units, not given this year*

**ARTHIST 118. Titian, Veronese, Tintoretto**

(Same as ARTHIST 318) The course addresses the ways in which Venetian painters of the sixteenth century redefined paradigms of color, disegno, and invention. Themes to be examined include civic piety, new kinds of mythological painting, the intersection between naturalism and eroticism, and the relationship between art and rituals of church and statecraft.

*4 units, not given this year*

**ARTHIST 120. Art and Culture of Northern Europe in the 17th Century**

(Same as ARTHIST 320) Painting and graphic arts by artists in Flanders and Holland from 1600 to 1680, a period of political and religious strife. Historical context; their relationship to developments in the rest of Europe and contributions to the problem of representation. Preferences for particular genres such as portraits, landscapes, and scenes of everyday life; the general problem of realism as manifested in the works studied. GER:DB-Hum

*4 units, not given this year*

**ARTHIST 121. 18th-Century Art in Europe, ca 1660-1780**

(Same as ARTHIST 321) Major developments in painting across Europe including the High Baroque illusionism of Bernini, the founding of the French Academy, and the revival of antiquity during the 1760s, with parallel developments in Venice, Naples, Madrid, Bavaria, and London. Shifts in themes and styles amidst the emergence of new viewing publics. Artists: the Tiepolos, Giordano, Batoni, and Mengs; Ricci, Pellegrini, and Thornhill; Watteau and Boucher; Chardin and Longhi; Reynolds and West; Hogarth and Greuze; Vien, Fragonard, and the first works by David. Additional discussion for graduate students. GER:DB-Hum

*4 units, not given this year*

**ARTHIST 122. The Age of Revolution**

(Same as ARTHIST 322) Painting in Europe during the French Revolution and the Napoleonic conquest. As political events altered social formations, practices in the visual arts were similarly affected by shifts in patronage, public, and the social function of image making. An attempt to align ruptures in the tradition of representation with the unfolding historical situation. The first manifestations of a romantic alternative to the canons of classical beauty and stylistic restraint. GER:DB-Hum

*4 units, not given this year*

**ARTHIST 124. The Age of Naturalism, ca 1830-1874**

(Same as ARTHIST 324) The origins, development, and triumph of naturalist painting in Europe. The creative tensions that emerged between traditional forms of history painting and the challenge of modern subjects drawn from contemporary life. Emphasis is on the development of open-air painting as an alternative to traditional studio practice, and to the rise of new imaging technologies, such as lithography and photography, as popular alternatives to the hand-wrought character and elitist appeal of high art. GER:DB-Hum

4 units, Aut (Marrinan, M)

**ARTHIST 125. American Art, 1865-1945**

(Same as ARTHIST 325) American art from the end of the Civil War through WWII. Focus is on what paintings, sculptures, photographs, and popular imagery reveal about their historical moment. Topics include: James Abbott McNeill Whistler; Thomas Eakins; John Singer Sargent; Thomas Dewing; post-war reconciliation and race; incorporation and the anti-modern impulse; turn-of-the-century gender anxiety; American impressionism; Robert Henri and the Ash Can school; Alfred Stieglitz and his circle; inter-war transatlantic exchange and the development of an American modernism; the Harlem Renaissance; Thomas Hart Benton and regionalism; and the effect of both war and the New Deal on American art.

4 units, not given this year

**ARTHIST 126. Post-Naturalist Painting**

(Same as ARTHIST 326) How conceptual models from language, literature, new technologies, and scientific theory affected picture making following the collapse of the radical naturalism of the 1860s and 1870s. Bracketed in France by the first Impressionist exhibition (1874) and the first public acclamation of major canvases by Matisse and Picasso (1905), the related developments in England, Germany, Belgium, and Austria. Additional weekly discussion for graduate students. Recommended: some prior experience with 19th-century art. GER:DB-Hum

4 units, Spr (Marrinan, M)

**ARTHIST 132. American Art and Culture, 1528-1860**

(Same as AMSTUD 132, ARTHIST 332) The visual arts and literature of the U.S. from the beginnings of European exploration to the Civil War. Focus is on questions of power and its relation to culture from early Spanish exploration to the rise of the middle classes. Cabeza de Vaca, Benjamin Franklin, John Singleton Copley, Phillis Wheatley, Charles Willson Peale, Emerson, Hudson River School, American Genre painters, Melville, Hawthorne and others. GER:DB-Hum

4 units, Win (Wolf, B)

**ARTHIST 142. Architecture Since 1900**

(Same as ARTHIST 342) The development of competing versions of modern and postmodern architecture and design in Europe and America, from the early 20th century to the present. Recommended: 141. GER:DB-Hum

4 units, Aut (Beischer, T)

**ARTHIST 143A. American Architecture**

(Same as ARTHIST 343A) A historically based understanding of what defines American architecture. What makes American architecture American, beginning with indigenous structures of pre-Columbian America. Materials, structure, and form in the changing American context. How these ideas are being transformed in today's globalized world. GER:DB-Hum

4 units, Spr (Beischer, T)

**ARTHIST 147. The Visual Culture of Modernism and its Discontents, ca. 1850-1925**

(Same as ARTHIST 347) Focus is on the visual arts and related fields in Europe (especially France but also Russia and Germany) during the late 19th and early 20th centuries. Beginning with Paris in the period of Haussmann, Baudelaire and Manet, modernism in art and visual culture presents a compelling dream of utopian possibilities that involved multifaceted and often contradictory approaches to the changes brought about by industrialization, urbanization, and the rise of mass culture. GER:DB-Hum

4 units, not given this year

**ARTHIST 150S. Modern Art in Europe, 1850-1945.**

Lectures and discussions build familiarity with notions of modernity, modernism, and the avant-garde. Focus on visual analysis and critical methodologies. Movements examined in detail include Impressionism, Art Nouveau, Futurism, Cubism, Dada, Constructivism, the Bauhaus, and Surrealism.

4 units, Sum (Staff)

**ARTHIST 153A. American Art, 1900-1945**

(Same as ARTHIST 353A) Painting, sculpture, photography, and design. Focus is on the emergence of diverse cultural forms in the search for a modern, American form of artistic expression. Topics include: Robert Henri and the Ash Can school; the Armory Show and the influence of European modernism; Marcel Duchamp and

plumbing; futurism, cubism, and the machine aesthetic; Stuart Davis and jazz; Dorothea Lange and documentary photography; Alfred Stieglitz and his Seven Americans; Thomas Hart Benton and regionalism; the arts of the WPA; and the role of artists in wartime propaganda. GER:DB-Hum

4 units, not given this year

**ARTHIST 155. American Art Since 1945**

(Same as ARTHIST 355) Major figures, movements, and concepts of American art with examples from Europe from WW II to the present. Topics: the ideology and aesthetics of high modernism, the relationship between art and popular culture, the death of painting, the question of postmodernism. Artists: Pollock, Newman, Stella, Johns, Warhol, Andre, Rainer, Smithson, Hesse, Serra, Kruger, Sherman. GER:DB-Hum

4 units, not given this year

**ARTHIST 158A. History of Photography**

(Same as ARTHIST 358A) From its invention in 1839 to the present. Emphasis is on the evolution of photography as a fine art. Photographs as a universal democratic art form to record familial events and express personal creativity. Development of photography as it relates to other art forms, journalism, architecture, portraiture, landscape, documentation, time, and personal expression. The technology of photography; photographic techniques. GER:DB-Hum

4 units, Win (Dawson, R)

**ARTHIST 159B. How Photographs Exist**

(Same as ARTHIST 359B) Photographs as things, and the lives they lead: How the materiality of photographs affects their place in everyday life; what has changed and what hasn't in the transition to digital technologies. Physical forms from radio photographs and Viewmaster discs to compression algorithms and the rebirth of instant films; social placements from family slideshows and flea markets to social media, server farms, and Musumeci vs. Department of Homeland Security. Includes direct examination of materials in university repositories. Individual and collaborative projects.

4 units, not given this year

**ARTHIST 160A. Twentieth-Century African American Art**

(Same as ARTHIST 360A) Paintings, sculptures, photography, and mixed media works. Styles, cultural and social histories, patronage, and critical reception. The problems of studying the production of artists of color as a separate field; alternatives to the category of African American art; and the outlook for new critical methodologies. GER:DB-Hum

4 units, not given this year

**ARTHIST 161. American Art 1900-1945**

(Same as ARTHIST 361) Course surveys US artistic production and aesthetic developments from the turn of the century until the end of World War II. Roughly chronological in scope, it eschews any single tendency or medium in order to elaborate the disjunctive formation of modernism in America. Painting and photography figure simultaneously; abstraction in its various guises, artists' films, the Armory Show, formations of race and gender, Black Mountain and MoMA all move through intransigent debates that pit social commitment against the pursuit of an ethos of autonomy.

4 units, not given this year

**ARTHIST 162A. Spectacle & Revolution: European Art c.1968**

(Same as ARTHIST 362A) Focus is on art and artists contemporary to the radical student movements of the 1960s, which exploded postwar tensions between traditional societies and new mass cultures. Topics include artists Joseph Beuys, VALIE EXPORT, and Gerhard Richter, and movements Fluxus, Situationism, Nouveau Realisme, and Arte povera. Course is reading intensive. Readings include Guy Debord, Umberto Eco, Pierre Restany, and many artists' writings. Prerequisites: AH1

4 units, not given this year

**ARTHIST 170. The Cinematic Century**

(Same as ARTHIST 370, FILMSTUD 170) Few contemporary institutions and forms of representation have had a greater impact on the world than film. This class examines film history through institutions and practices as well as in formal developments in the medium in an international context but with an underlying interest in explaining the international forces that shaped Hollywood's rise.

Through screenings of both documentary and fiction film, this class will suggest that the century just past be understood through the primary lens of the way cinema shaped its course.

*4 units, Spr (Staff)*

**ARTHIST 173. Issues in Contemporary Art**

(Same as ARTHIST 373) Major figures, themes, and movements of contemporary art from the 80s to the present. Readings on the neo-avant garde; postmodernism; art and identity politics; new media and technology; globalization and participatory aesthetics. Prerequisite: ARTHIST 155, or equivalent with consent of instructor. GER:DB-Hum

*4 units, not given this year*

**ARTHIST 176. Feminism and Contemporary Art**

(Same as ARTHIST 376) (Same as ARTHIST 176) The impact of second wave feminism on art making and art historical practice in the 70s, and its reiteration and transformation in contemporary feminist work. Topics: sexism and art history, feminist studio programs in the 70s, essentialism and self-representation, themes of domesticity, the body in feminist art making, bad girls, the exclusion of women of color and lesbians from the art historical mainstream, notions of performativity. GER:DB-Hum

*4 units, not given this year*

**ARTHIST 182. Arts of China, 900-1500: Cultures in Competition**

(Same as ARTHIST 382) The era from the Five Dynasties and Song to the mid-Ming period was marked by competition in cultural arenas such as between Chinese and formerly nomadic regimes, or between official court art modes and scholar-official and literati groups. Topics include: innovations in architectural and ceramic technologies; developments in landscape painting and theory; the proliferation of art texts and discourses; the rise of educated artists; official arts and ideologies of the Song, Liao, Jin, Yuan, and Ming regimes; new roles for women as patrons and cultural participants; and Chan and popular Buddhist imagery. GER:DB-Hum, EC-GlobalCom

*4 units, not given this year*

**ARTHIST 185. Art in China's Modern Era**

(Same as ARTHIST 385) From the late Ming period (ca. 1600) to early 20th century Chinese arts. Topics include: urban arts and print culture; commodification of art; painting theories; self portrayals; art sponsorship, collecting, and ideological programs at the Qing imperial court; media and modernity in Shanghai; art and politics in early 20th century China. GER:DB-Hum

*4 units, not given this year*

**ARTHIST 185B. Contemporary Chinese Art: Sites and Strategies**

(Same as ARTHIST 385B) Issues and developments in contemporary Chinese art over the past two decades. Questions of personal and national identity, politics and history, globalization and mass culture, consumerism and urban transformation, and the body, sexuality, and gender, as represented in formats including painting, photography, and installation and multimedia art. Museum visits. GER:DB-Hum, EC-GlobalCom

*4 units, not given this year*

**ARTHIST 186. Theme and Style in Japanese Art**

(Same as ARTHIST 386, JAPANGEN 186, JAPANGEN 286) Monuments in traditional Japanese architecture, sculpture, garden design, painting, prints, and pots, through the 19th century. Chronological framework emphasizes the role of these objects play in visualizing the ideals of the society they represent. GER:DB-Hum

*4 units, Aut (Takeuchi, M)*

**ARTHIST 187. Arts of War and Peace: Late Medieval and Early Modern Japan, 1500-1868**

(Same as ARTHIST 387, JAPANGEN 185) Narratives of conflict, pacification, orthodoxy, nostalgia, and novelty through visual culture during the change of episteme from late medieval to early modern, 16th through early 19th centuries. The rhetorical messages of castles, teahouses, gardens, ceramics, paintings, and prints; the influence of Dutch and Chinese visuality; transformation in the roles of art and artist; tensions between the old and the new leading to the modernization of Japan. GER:DB-Hum, EC-GlobalCom

*4 units, not given this year*

**ARTHIST 188A. The History of Modern and Contemporary Japanese and Chinese Architecture and Urbanism**

(Same as ARTHIST 388A) The recent rapid urbanization and architectural transformation of Asia; focus is on the architecture of Japan and China since the mid-19th century. History of forms, theories, and styles that serve as the foundation for today's buildings and cityscapes. How Eastern and Western ideas of modernism have merged or diverged and how these forces continue to shape the future of Japanese and Chinese architecture and urban form. GER:DB-Hum

*4 units, not given this year*

**ARTHIST 190. African Art and Writing Traditions**

(Same as ARTHIST 390) Classic African graphic writings south of the Sahara in historical and social context. What makes an African graphic writing system, and how they are used as visual art, and as markers of identity, religion, and moral philosophy. Civilizations include Mali, Asante, Yoruba, Ejagham, and Kongo.

*4 units, Win (Martinez-Ruiz, B)*

**ARTHIST 191. Afro-Atlantic Religion, Art, and Philosophy**

(Same as ARTHIST 391) Afro-American graphic writing and other forms of visual communication including ancient rupestrian art and rock painting in Africa, and present-day forms in the Americas. The diversity of daily life, religion, social organization, politics, and culture with African origin in the diaspora. Focus is on major contemporary Afro-Atlantic religions including: Palo Monte and Abakua in Cuba; Gaga in the Dominican Republic; Revival, Obeah, and Kumina in Jamaica; Vodun in Haiti; and Candomble and Macumba in Brazil.

*4 units, not given this year*

**ARTHIST 192. Introduction to African Art**

(Same as ARTHIST 392) Form, space, media, medium, and visual expression in African art. Rock art to contemporary art production. Majors works and art expression in terms of function and historical context. GER:DB-Hum

*4 units, Aut (Martinez-Ruiz, B)*

**ARTHIST 194. Iconography of African Art**

(Same as ARTHIST 394) African art from 25,000 years ago to the present emphasizing social, historical, and ideological concerns in visual systems and traditions and aesthetic form. Critical grounding in anthropology and cultural studies. GER:DB-Hum

*4 units, not given this year*

**ARTHIST 195. Introduction to Black Atlantic Visual Traditions**

(Same as ARTHIST 395) African cultural expression in the Americas. How politics, religion, and culture influence the art of the Black Atlantic. Focus is on the period when cultures were brought from Africa to the Americas through the slave trade and came into contact and conflict with western colonial powers. GER:DB-Hum

*4 units, not given this year*

**ARTHIST 196. African Visual Art & Graphic Communication in the Americas**

(Same as AFRICAAM 196, ARTHIST 396, CSRE 186) The class addresses the modes of visual expression used among the Bakongo people in Central Africa and their descendants in Cuba, Haiti, and Brazil and argues that together these constitute identifiable graphic writing systems. After providing a brief overview of the forms of graphic expression in use within Kongo and Kongo Atlantic cultures, the class focuses on the most central of the traditional cosmograms, Dikenga. By mapping the meanings and forms of Dikenga, the essay attempts to demonstrate its continuity throughout the Kongo diaspora. Finally, the class highlights the rich cosmology, cosmogony, and moral philosophy that have consistently informed the use and meaning of Dikenga in its central role in religious narratives, moral philosophy and religious education among the Bakongo in Atlantic world. GER:DB-Hum

*4 units, not given this year*

**ARTHIST 203. Greek Art In and Out of Context**

(Same as CLASSART 109) The cultural contexts in which art served religious, political, commercial, athletic, sympotic, and erotic needs of Greek life.

*4-5 units, Aut (Maxmin, J)*

**ARTHIST 204A. Appropriations of Greek Art**

(Same as CLASSART 110) Upper division seminar. The history of

the appropriation of Greek art by Rome, the Renaissance, Lord Elgin, and Manet. Enrollment limited to 6. Prerequisite: ARTHIST 102 or consent of instructor.

4-5 units, Spr (Maxmin, J)

**ARTHIST 206. Virginité and Power: Mary in the Middle Ages**

The most influential female figure in Christianity whose state cult was connected with the idea of empire. The production and control of images and relics of the Virgin and the development of urban processions and court ceremonies through which political power was legitimized in papal Rome, Byzantium, Carolingian and Ottonian Germany, Tuscany, Gothic France, and Russia.

5 units, not given this year

**ARTHIST 208A. Visuality, Representation, and Material Culture in Islam**

An in depth examination of artworks from the Islamic world; a focus on particularly complex individual pieces or artistic productions that raise aesthetic and interpretative issues. The course skillfully implements the fundamental practice of art appreciation, e.g. how to look at art, learn from it and propose an explanation of it. An interdisciplinary method is used, in particular the comparison between the arts of Islam and other cultural areas. A variety of cases and media are explored and discussed.

5 units, Win (Staff)

**ARTHIST 210. The Renaissance Nude**

Seminar explores the origins and significance of the nude female and male figure in Italian Renaissance art. It was during this period the body became a vehicle for the display of artistic skill and a site for religious experience. Through class readings, discussions and presentations, the topics include an exploration of primary sources and modern theoretical literature, the role of antiquity and its influence on the human body (naturalism, classicism, realism), the parallel tradition in the North, and the Renaissance artist's prominent interest in the nude.

5 units, Win (Consavari, E)

**ARTHIST 211. Art and the Domestic Interior in Early Modern Italy**

A display of sumptuous opulence, called the virtue of Magnificence, was in high demand in the Renaissance. The seminar considers the material culture of specific residences and examines how particular objects reflect, shape, and mediate the values of Renaissance private lives and relationships within the domestic interior. Topics explored are the primary sources and modern theoretical literature on Renaissance possessions as they relate to the material culture depicted in paintings, such as luxurious textiles, Turkish carpets, precious gems, medals, as well as ceramic, marble and bronze artifacts.

5 units, Spr (Consavari, E)

**ARTHIST 213. Renaissance Print Culture: From Durer to Goltzius**

Prints became vehicles for the spreading of artistic inventions as well as political and religious propaganda during the societal upheavals of the 16th century. How the new medium of reproducible images changed attitudes towards visuality. Prints as self-reflective performances of virtuosity. Class taught at the Cantor Arts Center. GER:DB-Hum

5 units, not given this year

**ARTHIST 235A. Art and the Machine Age**

Artistic and intellectual responses to modernization. Topics include: artistic uses of the machine as a metaphor for nature, the body, and sexuality; adaptation of mechanical technologies to art making; appreciation of machines as works of art; and how changing technologies in the industrial sphere impacted the artist's role in the cultural sphere. The place of the machine in architecture; historical role of industrial design; machine-themed museum exhibitions; and works by Fernand Léger, Le Corbusier, Rube Goldberg, Charles Sheeler, Charlie Chaplin, Raymond Loewy, and George Gershwin.

5 units, not given this year

**ARTHIST 240. Sister Arts: Image and Text in America**

(Same as AMSTUD 240) Seminar focuses equally on painting and literature in American history. Classes meet twice per week: one session devoted to a literary text, and the other to a visual artifact. The course is organized topically, placing text and images into dialogue with each other, asking for example, how Glen Ligon's

contemporary reworking of nineteenth century runaway slave posters relates to Toni Morrison's *Beloved*, or how Melville's story of urban life, *Bartleby the Scrivener*, alludes to Hudson River School painting. GER:DB-Hum

5 units, not given this year

**ARTHIST 241. THE MODERNITY OF INGRES**

During his lifetime, and for most of his posthumous critical fame, Jean-Auguste-Dominique Ingres was described as the staunch defender of "classical" values (meaning conservative forms of art), and so remained rather uninteresting to many modernist viewers. But in light of new forms of inquiry in the History of Art - including issues of gender and identity formation, psychoanalytic interpretations, constructs of attention or perception, globalized sensitivity to race and culture - the career of Ingres seems ripe for review. How does Ingres's emulation of Raphael compare to the appropriations of post-modernist artists? How might his obsessions with exotic subjects be read from our post-colonial perspectives? How should we analyze his constructs of the feminine within our understanding of gender and power? How might our interest in identity formation enrich a reading of his many portraits? This seminar proposes a series of thematic incursions into the work of Ingres with the aim of *redis*

5 units, Spr (Marrinan, M)

**ARTHIST 242. Henri Matisse**

Themes, methods, and media in the production of Matisse, the familiar yet enigmatic 20th-century master. The phases of his career; critical responses to his work. Research project and presentation. Recommended: reading knowledge of French.

5 units, not given this year

**ARTHIST 245. Art, Business & the Law**

This course examines the intersection of art, business, and the law from a number of different angles, focusing on issues that impact our understanding of works of art and their circulation in the modern and contemporary periods. Topics range from individual case studies (e.g., Leonardo da Vinci; Richard Serra) to the consolidation of the art market, and include cultural heritage issues, problems of censorship, and conceptions of authorship and intellectual property.

5 units, Spr (de Wit, N)

**ARTHIST 253. American Wonders**

(Same as AMSTUD 253) Seminar on American art, literature and culture of the nineteenth century organized around the exhibition, "The Great American Hall of Wonders," on view at the Smithsonian American Art Museum. Taking our cue from the exhibition, course focuses on three topics from the world of nature and three from technology, all serving as "cultural lightning rods" during the period: the buffalo, the Giant Sequoia, Niagara Falls, the clock, the gun and the railroad. The class travels to Washington, D.C. to view the exhibition during an extended weekend.

5 units, Aut (Wolf, B)

**ARTHIST 256A. Critical Race Art History**

Primer for the comparative study of the representation of race in Western art. Whiteness, a construction that has been dependent upon blackness and alterity from its beginnings. Stereotyped ethnicities, nationalities, and territories, such as the Red Indian, the Jew, and Orientalism. Style as an image making strategy shaped by patronage and reception.

5 units, not given this year

**ARTHIST 259. The Fifties: Abstract Expressionism to Beat Culture**

Abstract expressionism and beat culture as the two dominant models of art making in the U.S. in the 50s, conventionally if not exclusively associated with cultural production in New York and San Francisco. Compares and contrasts existential, ideological, and formal valences relative to the backdrop of postwar American affluence, and the Cold War and its rhetorics of individual freedom and expression. The politics and criticism of abstract expressionism and its relation to the New York Intellectuals in the 30s versus beat culture and the emergence of the counterculture in the 60s.

5 units, not given this year

**ARTHIST 260Q. Art, War and Politics in the Modern Period**

(S.Sem) Stanford Introductory Seminar. Considers the pivotal



relationship between war, politics and the visual arts from the beginnings of the French Revolution in 1789 to the end of the Vietnam War in 1975, exploring how iconic works of modernism have both shaped and reflected public discourse on war, whether in support of such campaigns or in opposition to them. Topics: the power of visual representation to capture the trauma of the battlefield; propaganda and the art of persuasion; how developments in modern art are implicated in the evolution of modern warfare and vice-versa. Case studies include: Francisco de Goya's wrenching portrayal of the Napoleonic Wars, The Third of May (1808); Pablo Picasso's monument to the murderous bombing of a Basque town during the Spanish Civil War, Guernica (1937); and the surprising history of Abstract Expressionism, the CIA and the cold war. Sophomore seminar; enrollment restricted and by application only. GER:DB-Hum

3 units, Win (Lee, P)

**ARTHIST 282A. Imagining the Imperial: Images of the Court in Late Ming Dynasty Public Culture**

Themes of palace and court life popular in vernacular painting, print illustrated books, and fiction. Dimensions of the imperial palace and court in late Ming public imaginary, including strategies of historical displacement, disguised political critique, commerce in imperial objects, the taste for scandal, and mythologies of court life.

5 units, not given this year

**ARTHIST 287. Pictures of the Floating World: Images from Japanese Popular Culture**

(Same as JAPANLIT 287) Printed objects produced during the Edo period (1600-1868), including the Ukiyo-e (pictures of the floating world) and lesser-studied genres such as printed books (ehon) and popular broadsheets (kawaraban). How a society constructs itself through images. The borders of the acceptable and censorship; theatricality, spectacle, and slippage; the construction of play, set in conflict against the dominant neo-Confucian ideology of fixed social roles. Prerequisites: 2, 186, 187, 188. GER:DB-Hum

5 units, not given this year

**ARTHIST 287A. The Japanese Tea Ceremony: The History, Aesthetics, and Politics Behind a National Pastime**

(Same as JAPANGEN 287A) The tea ceremony, a premodern multimedia phenomenon, integrates architecture, garden design, ceramics, painting, calligraphy, and treasured objects into a choreographed ritual wherein host, objects, and guests perform roles on a tiny stage. Aesthetic, philosophical, and political dimensions. The evolution of tea taste including its inception in Zen monasteries, use for social control during the 16th century, the development of a class of tea connoisseurs, and 20th-century manipulation by the emerging industrialist class.

5 units, Spr (Takeuchi, M)

**ARTHIST 290. Mapping Africa: Cartography and Architecture**

Visual forms of spatial representation of Africa and implications for understanding the cultures they depict. Examples include early Renaissance cartography and written accounts by explorers, travelers, geographers, and missionaries. African concepts of design, meaning in architecture, and spatial solutions. Case studies of African models.

5 units, not given this year

**ARTHIST 292. African Art and Museum Display**

African art and its intersection with art concepts, museum politics, art display, and colonialism. African art collections in major institutions around the world. Methodologies. Final class exhibition using art from the Cantor Arts Center collection.

5 units, Aut (Martinez-Ruiz, B)

**ARTHIST 292A. Researching Africa: Problem and Theory in African Art**

5 units, not given this year

**ARTHIST 293. Latino American Avant Garde**

(Same as CHICANST 293) African contribution to modern art practices in Latino America. Mexico, Brazil, and Cuba as models. Cultural and historical context. GER:DB-Hum

5 units, not given this year

**ARTHIST 296. Junior Seminar: Methods & Historiography of**

**Art History**

Historiography and methodology.

5 units, Aut (Vinograd, R)

**ARTHIST 297. Honors Thesis Writing**

May be repeated for credit.

1-5 units, Aut (Staff), Win (Staff), Spr (Staff)

**ARTHIST 298. Individual Work: Art History**

For approved independent research with individual faculty members. Letter grades only.

1-15 units, Aut (Staff), Win (Staff), Spr (Staff)

**GRADUATE COURSES IN ART HISTORY**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**ARTHIST 200C. Reception and Literacy in Roman Art**

(Same as CLASSART 322) Beyond a focus on artists and patrons: how Roman art was seen and understood by its contemporary viewers. Themes include memory, performance, gender, replication, and constructions of space. Goal is to draft a differentiated model of viewing and literacy, with attention to collective experience, hierarchy, access, and subversion.

5 units, Win (Trimble, J)

**ARTHIST 232Q. Place: Making Space Now**

(S,Sem) (Same as CEE 32Q) Stanford Introductory Seminar. This seminar argues that architects are ultimately placemakers, and questions what that means in the contemporary world. Part I investigates the meaning of the word place. Additional background for understanding contemporary place making will include a critique of the history of modern place-making through an examination of modern form. Part II examines two traditional notions of place by scale: from home to the city. What elements give these conceptions of space a sense of place? To answer this question, themes such as memory, mapping, and boundary, among others, will be investigated. Part III presents challenges to the traditional notions of place discussed in Part II. Topics addressed include: What does it mean to be out of place? What sense of place does a nomad have, and how is this represented? What are the non-places and how can architects design for these spaces? Part IV addresses the need to re-conceptualize contemporary s

3 units, Spr (Barton, J; Beischer, T)

**ARTHIST 295. Visual Arts Internship**

Professional experience in a field related to the Visual Arts for six to ten weeks. Internships may include work for galleries, museums, art centers, and art publications. Students arrange the internship, provide a confirmation letter from the hosting institution, and must receive consent from the faculty coordinator to enroll in units. To supplement the internship students maintain a journal and write a research paper related to the experience and their area of academic interest. Evaluations from the student and the supervisor are submitted at the end of the internship. Restricted to declared majors and minors. May be repeated for credit.

1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**ARTHIST 301. Archaic Greek Art**

(Same as ARTHIST 101, CLASSART 101, CLASSART 201) The development of Greek art and culture from protogeometric beginnings to the Persian Wars, 1000-480 B.C.E. The genesis of a native Greek style; the orientalizing phase during which contact with the Near East and Egypt transformed Greek art; and the synthesis of East and West in the 6th century B.C.E.

4 units, Aut (Maxmin, J)

**ARTHIST 302. Empire and Aftermath: Greek Art from the Parthenon to Praxiteles**

(Same as ARTHIST 102, CLASSART 102) The course explores the art and architecture of the Athenian Empire in the age of Pericles, and then considers the effects of civil war and plague on Greek art and society in the later 5th and early 4th centuries.

4 units, Win (Maxmin, J)

**ARTHIST 305. Introduction to Medieval Art**

(Same as ARTHIST 105) Chronological survey of Byzantine, Islamic, and Western Medieval art and architecture from the early Christian period to the Gothic age. Broad art-historical developments and more detailed examinations of individual monuments and works of art. Topics include devotional art, court



and monastic culture, relics and the cult of saints, pilgrimage and crusades, and the rise of cities and cathedrals.

*4 units, not given this year*

**ARTHIST 306A. Art of Pilgrimage and Crusade**

(Same as ARTHIST 106A) Focus is on the artistic production of Mediterranean 12th-13th centuries exploring the phenomena of pilgrimage and Crusade. The rise of the Normans; the establishment of the pilgrimage to Santiago de Compostella as part of the Reconquista of Spain; the Crusader capture of Jerusalem in 1099 and the subsequent formation of Crusader states in the eastern Mediterranean; the rise of the Ayyubids and the emergence of the Italian city-state trade. The interconnection between the rise of narrative and conquest; the emergence of monumental sculpture; and the clash between tactile and optical visually.

*4 units, not given this year*

**ARTHIST 308. Virginity and Power: Mary in the Middle Ages**

(Same as ARTHIST 108) The most influential female figure in Christianity whose state cult was connected with the idea of empire. The production and control of images and relics of the Virgin and the development of urban processions and court ceremonies though which political power was legitimized in papal Rome, Byzantium, Carolingian and Ottonian Germany, Tuscany, Gothic France, and Russia.

*4 units, not given this year*

**ARTHIST 308A. Medieval Islamic Art and Architecture from 7th century Arabia to the Conquest of Cairo in 1517**

(Same as ARTHIST 108A) The course provides an introduction to the arts of the Islamic world in the Middle Ages, in both its Western and Eastern areas. The artistic material is presented in correlation to religion, philosophy and political history. We examine the many forms, styles and modes of visual expression that contributed to a great diversity of artistic production within the complex set of different competitive centers of cultures, all united through the one and same faith in the holy text of the Qur'an. We focus on the most representative artworks of the periods, dynasties and countries covered in the course.

*4 units, Win (Staff)*

**ARTHIST 308B. Islamic Art & Architecture: 15th-19th century**

(Same as ARTHIST 108B) An introduction to the arts and visual culture of the Islamic world in the pre-modern and modern period. The course examines case studies of sites and objects highly representative of these dynasties and the modes of plastic expression they developed. History of the art of the book is an important topic in this period.

*4 units, Spr (Staff)*

**ARTHIST 311. Introduction to Italian Renaissance, 1420-1580**

(Same as ARTHIST 111) New techniques of pictorial illusionism and the influence of the humanist revival of antiquity in the reformulation of the pictorial arts in 15th-century Italy. How different Italian regions developed characteristic artistic cultures through mutual interaction and competition.

*4 units, not given this year*

**ARTHIST 314. Vision and Emblem: Netherlandish Painting from Van Eyck to Brueghel**

(Same as ARTHIST 114) How 15th-century pictorial illusionism transformed the devotional image and portraiture, calling for a new kind of engagement with the image on the part of the beholder. How 16th-century humanist knowledge influenced the creation of new pictorial subjects and representational forms. The reflection of religious crises triggered by the Reformation in art. GER:DB-Hum

*4 units, not given this year*

**ARTHIST 317. Picturing the Papacy: Renaissance to Neoclassicism**

(Same as ARTHIST 117) Campaigns of renovations aimed at restoring Rome to its former legendary splendor. The use of art and architecture to glorify the papacy and negotiate attacks on the institution. Art and papal nepotism from the 15th to 18th century.

*4 units, not given this year*

**ARTHIST 318. Titian, Veronese, Tintoretto**

(Same as ARTHIST 118) The course addresses the ways in which Venetian painters of the sixteenth century redefined paradigms of color, disegno, and invention. Themes to be examined include civic piety, new kinds of mythological painting, the intersection

between naturalism and eroticism, and the relationship between art and rituals of church and statecraft.

*4 units, not given this year*

**ARTHIST 320. Art and Culture of Northern Europe in the 17th Century**

(Same as ARTHIST 120) Painting and graphic arts by artists in Flanders and Holland from 1600 to 1680, a period of political and religious strife. Historical context; their relationship to developments in the rest of Europe and contributions to the problem of representation. Preferences for particular genres such as portraits, landscapes, and scenes of everyday life; the general problem of realism as manifested in the works studied.

*4 units, not given this year*

**ARTHIST 321. 18th-Century Art in Europe, ca 1660-1780**

(Same as ARTHIST 121) Major developments in painting across Europe including the High Baroque illusionism of Bernini, the founding of the French Academy, and the revival of antiquity during the 1760s, with parallel developments in Venice, Naples, Madrid, Bavaria, and London. Shifts in themes and styles amidst the emergence of new viewing publics. Artists: the Tiepolos, Giordano, Batoni, and Mengs; Ricci, Pellegrini, and Thornhill; Watteau and Boucher; Chardin and Longhi; Reynolds and West; Hogarth and Greuze; Vien, Fragonard, and the first works by David. Additional discussion for graduate students.

*4 units, not given this year*

**ARTHIST 322. The Age of Revolution**

(Same as ARTHIST 122) Painting in Europe during the French Revolution and the Napoleonic conquest. As political events altered social formations, practices in the visual arts were similarly affected by shifts in patronage, public, and the social function of image making. An attempt to align ruptures in the tradition of representation with the unfolding historical situation. The first manifestations of a romantic alternative to the canons of classical beauty and stylistic restraint.

*4 units, not given this year*

**ARTHIST 324. The Age of Naturalism, ca 1830-1874**

(Same as ARTHIST 124) The origins, development, and triumph of naturalist painting in Europe. The creative tensions that emerged between traditional forms of history painting and the challenge of modern subjects drawn from contemporary life. Emphasis is on the development of open-air painting as an alternative to traditional studio practice, and to the rise of new imaging technologies, such as lithography and photography, as popular alternatives to the hand-wrought character and elitist appeal of high art.

*4 units, Aut (Marrinan, M)*

**ARTHIST 325. American Art, 1865-1945**

(Same as ARTHIST 125) American art from the end of the Civil War through WWII. Focus is on what paintings, sculptures, photographs, and popular imagery reveal about their historical moment. Topics include: James Abbott McNeill Whistler; Thomas Eakins; John Singer Sargent; Thomas Dewing; post-war reconciliation and race; incorporation and the anti-modern impulse; turn-of-the-century gender anxiety; American impressionism; Robert Henri and the Ash Can school; Alfred Stieglitz and his circle; inter-war transatlantic exchange and the development of an American modernism; the Harlem Renaissance; Thomas Hart Benton and regionalism; and the effect of both war and the New Deal on American art.

*4 units, not given this year*

**ARTHIST 326. Post-Naturalist Painting**

(Same as ARTHIST 126) How conceptual models from language, literature, new technologies, and scientific theory affected picture making following the collapse of the radical naturalism of the 1860s and 1870s. Bracketed in France by the first Impressionist exhibition (1874) and the first public acclamation of major canvases by Matisse and Picasso (1905), the related developments in England, Germany, Belgium, and Austria. Additional weekly discussion for graduate students. Recommended: some prior experience with 19th-century art.

*4 units, Spr (Marrinan, M)*

**ARTHIST 332. American Art and Culture, 1528-1860**

(Same as AMSTUD 132, ARTHIST 132) The visual arts and literature of the U.S. from the beginnings of European exploration to the Civil War. Focus is on questions of power and its relation to

culture from early Spanish exploration to the rise of the middle classes. Cabeza de Vaca, Benjamin Franklin, John Singleton Copley, Phillis Wheatley, Charles Willson Peale, Emerson, Hudson River School, American Genre painters, Melville, Hawthorne and others.

*4 units, Win (Wolf, B)*

**ARTHIST 342. Architecture Since 1900**

(Same as ARTHIST 142) The development of competing versions of modern and postmodern architecture and design in Europe and America, from the early 20th century to the present. Recommended: 141.

*4 units, Aut (Beischer, T)*

**ARTHIST 343A. American Architecture**

(Same as ARTHIST 143A) A historically based understanding of what defines American architecture. What makes American architecture American, beginning with indigenous structures of pre-Columbian America. Materials, structure, and form in the changing American context. How these ideas are being transformed in today's globalized world.

*4 units, Spr (Beischer, T)*

**ARTHIST 347. The Visual Culture of Modernism and its Discontents, ca. 1850-1925**

(Same as ARTHIST 147) Focus is on the visual arts and related fields in Europe (especially France but also Russia and Germany) during the late 19th and early 20th centuries. Beginning with Paris in the period of Haussmann, Baudelaire and Manet, modernism in art and visual culture presents a compelling dream of utopian possibilities that involved multifaceted and often contradictory approaches to the changes brought about by industrialization, urbanization, and the rise of mass culture.

*4 units, not given this year*

**ARTHIST 353A. American Art, 1900-1945**

(Same as ARTHIST 153A) Painting, sculpture, photography, and design. Focus is on the emergence of diverse cultural forms in the search for a modern, American form of artistic expression. Topics include: Robert Henri and the Ash Can school; the Armory Show and the influence of European modernism; Marcel Duchamp and plumbing; futurism, cubism, and the machine aesthetic; Stuart Davis and jazz; Dorothea Lange and documentary photography; Alfred Stieglitz and his Seven Americans; Thomas Hart Benton and regionalism; the arts of the WPA; and the role of artists in wartime propaganda.

*4 units, not given this year*

**ARTHIST 355. American Art Since 1945**

(Same as ARTHIST 155) Major figures, movements, and concepts of American art with examples from Europe from WW II to the present. Topics: the ideology and aesthetics of high modernism, the relationship between art and popular culture, the death of painting, the question of postmodernism. Artists: Pollock, Newman, Stella, Johns, Warhol, Andre, Rainer, Smithson, Hesse, Serra, Kruger, Sherman.

*4 units, not given this year*

**ARTHIST 358A. History of Photography**

(Same as ARTHIST 158A) From its invention in 1839 to the present. Emphasis is on the evolution of photography as a fine art. Photographs as a universal democratic art form to record familial events and express personal creativity. Development of photography as it relates to other art forms, journalism, architecture, portraiture, landscape, documentation, time, and personal expression. The technology of photography; photographic techniques.

*4 units, Win (Dawson, R)*

**ARTHIST 359B. How Photographs Exist**

(Same as ARTHIST 159B) Photographs as things, and the lives they lead: How the materiality of photographs affects their place in everyday life; what has changed and what hasn't in the transition to digital technologies. Physical forms from radio photographs and Viewmaster discs to compression algorithms and the rebirth of instant films; social placements from family slideshows and flea markets to social media, server farms, and Musumeci vs. Department of Homeland Security. Includes direct examination of materials in university repositories. Individual and collaborative projects.

*4 units, not given this year*

**ARTHIST 360A. Twentieth-Century African American Art**

(Same as ARTHIST 160A) Paintings, sculptures, photography, and mixed media works. Styles, cultural and social histories, patronage, and critical reception. The problems of studying the production of artists of color as a separate field; alternatives to the category of African American art; and the outlook for new critical methodologies.

*4 units, not given this year*

**ARTHIST 361. American Art 1900-1945**

(Same as ARTHIST 161) Course surveys US artistic production and aesthetic developments from the turn of the century until the end of World War II. Roughly chronological in scope, it eschews any single tendency or medium in order to elaborate the disjunctive formation of modernism in America. Painting and photography figure simultaneously; abstraction in its various guises, artists' films, the Armory Show, formations of race and gender, Black Mountain and MoMA all move through intransigent debates that pit social commitment against the pursuit of an ethos of autonomy.

*4 units, not given this year*

**ARTHIST 362A. Spectacle & Revolution: European Art c.1968**

(Same as ARTHIST 162A) Focus is on art and artists contemporary to the radical student movements of the 1960s, which exploded postwar tensions between traditional societies and new mass cultures. Topics include artists Joseph Beuys, VALIE EXPORT, and Gerhard Richter, and movements Fluxus, Situationism, Nouveau Realisme, and Arte povera. Course is reading intensive. Readings include Guy Debord, Umberto Eco, Pierre Restany, and many artists' writings. Prerequisites: AH1

*4 units, not given this year*

**ARTHIST 370. The Cinematic Century**

(Same as ARTHIST 170, FILMSTUD 170) Few contemporary institutions and forms of representation have had a greater impact on the world than film. This class examines film history through institutions and practices as well as in formal developments in the medium in an international context but with an underlying interest in explaining the international forces that shaped Hollywood's rise. Through screenings of both documentary and fiction film, this class will suggest that the century just past be understood through the primary lens of the way cinema shaped its course.

*4 units, Spr (Staff)*

**ARTHIST 373. Issues in Contemporary Art**

(Same as ARTHIST 173) Major figures, themes, and movements of contemporary art from the 80s to the present. Readings on the neo-avant garde; postmodernism; art and identity politics; new media and technology; globalization and participatory aesthetics. Prerequisite: ARTHIST 155, or equivalent with consent of instructor.

*4 units, not given this year*

**ARTHIST 376. Feminism and Contemporary Art**

(Same as ARTHIST 176) (Same as ARTHIST 176) The impact of second wave feminism on art making and art historical practice in the 70s, and its reiteration and transformation in contemporary feminist work. Topics: sexism and art history, feminist studio programs in the 70s, essentialism and self-representation, themes of domesticity, the body in feminist art making, bad girls, the exclusion of women of color and lesbians from the art historical mainstream, notions of performativity.

*4 units, not given this year*

**ARTHIST 382. Arts of China, 900-1500: Cultures in Competition**

(Same as ARTHIST 182) The era from the Five Dynasties and Song to the mid-Ming period was marked by competition in cultural arenas such as between Chinese and formerly nomadic regimes, or between official court art modes and scholar-official and literati groups. Topics include: innovations in architectural and ceramic technologies; developments in landscape painting and theory; the proliferation of art texts and discourses; the rise of educated artists; official arts and ideologies of the Song, Liao, Jin, Yuan, and Ming regimes; new roles for women as patrons and cultural participants; and Chan and popular Buddhist imagery.

*4 units, not given this year*

**ARTHIST 385. Art in China's Modern Era**

(Same as ARTHIST 185) From the late Ming period (ca. 1600) to

early 20th century Chinese arts. Topics include: urban arts and print culture; commodification of art; painting theories; self portrayals; art sponsorship, collecting, and ideological programs at the Qing imperial court; media and modernity in Shanghai; art and politics in early 20th century China.

*4 units, not given this year*

**ARTHIST 385B. Contemporary Chinese Art: Sites and Strategies**

(Same as ARTHIST 185B) Issues and developments in contemporary Chinese art over the past two decades. Questions of personal and national identity, politics and history, globalization and mass culture, consumerism and urban transformation, and the body, sexuality, and gender, as represented in formats including painting, photography, and installation and multimedia art. Museum visits.

*4 units, not given this year*

**ARTHIST 386. Theme and Style in Japanese Art**

(Same as ARTHIST 186, JAPANGEN 186, JAPANGEN 286) Monuments in traditional Japanese architecture, sculpture, garden design, painting, prints, and pots, through the 19th century. Chronological framework emphasizes the role of these objects play in visualizing the ideals of the society they represent.

*4 units, Aut (Takeuchi, M)*

**ARTHIST 387. Arts of War and Peace: Late Medieval and Early Modern Japan, 1500-1868**

(Same as ARTHIST 187, JAPANGEN 185) Narratives of conflict, pacification, orthodoxy, nostalgia, and novelty through visual culture during the change of episteme from late medieval to early modern, 16th through early 19th centuries. The rhetorical messages of castles, teahouses, gardens, ceramics, paintings, and prints; the influence of Dutch and Chinese visuality; transformation in the roles of art and artist; tensions between the old and the new leading to the modernization of Japan.

*4 units, not given this year*

**ARTHIST 388A. The History of Modern and Contemporary Japanese and Chinese Architecture and Urbanism**

(Same as ARTHIST 188A) The recent rapid urbanization and architectural transformation of Asia; focus is on the architecture of Japan and China since the mid-19th century. History of forms, theories, and styles that serve as the foundation for today's buildings and cityscapes. How Eastern and Western ideas of modernism have merged or diverged and how these forces continue to shape the future of Japanese and Chinese architecture and urban form.

*4 units, not given this year*

**ARTHIST 390. African Art and Writing Traditions**

(Same as ARTHIST 190) Classic African graphic writings south of the Sahara in historical and social context. What makes an African graphic writing system, and how they are used as visual art, and as markers of identity, religion, and moral philosophy. Civilizations include Mali, Asante, Yoruba, Ejagham, and Kongo.

*4 units, Win (Martinez-Ruiz, B)*

**ARTHIST 391. Afro-Atlantic Religion, Art, and Philosophy**

(Same as ARTHIST 191) Afro-American graphic writing and other forms of visual communication including ancient rupestrian art and rock painting in Africa, and present-day forms in the Americas. The diversity of daily life, religion, social organization, politics, and culture with African origin in the diaspora. Focus is on major contemporary Afro-Atlantic religions including: Palo Monte and Abakua in Cuba; Gaga in the Dominican Republic; Revival, Obeah, and Kumina in Jamaica; Vodun in Haiti; and Candomble and Macumba in Brazil.

*4 units, not given this year*

**ARTHIST 392. Introduction to African Art**

(Same as ARTHIST 192) Form, space, media, medium, and visual expression in African art. Rock art to contemporary art production. Majors works and art expression in terms of function and historical context.

*4 units, Aut (Martinez-Ruiz, B)*

**ARTHIST 394. Iconography of African Art**

(Same as ARTHIST 194) African art from 25,000 years ago to the present emphasizing social, historical, and ideological concerns in visual systems and traditions and aesthetic form. Critical grounding in anthropology and cultural studies.

*4 units, not given this year*

**ARTHIST 395. Introduction to Black Atlantic Visual Traditions**

(Same as ARTHIST 195) African cultural expression in the Americas. How politics, religion, and culture influence the art of the Black Atlantic. Focus is on the period when cultures were brought from Africa to the Americas through the slave trade and came into contact and conflict with western colonial powers.

*4 units, not given this year*

**ARTHIST 396. African Visual Art & Graphic Communication in the Americas**

(Same as AFRICAAM 196, ARTHIST 196, CSRE 186) The class addresses the modes of visual expression used among the Bakongo people in Central Africa and their descendants in Cuba, Haiti, and Brazil and argues that together these constitute identifiable graphic writing systems. After providing a brief overview of the forms of graphic expression in use within Kongo and Kongo Atlantic cultures, the class focuses on the most central of the traditional cosmograms, Dikenga. By mapping the meanings and forms of Dikenga, the essay attempts to demonstrate its continuity throughout the Kongo diaspora. Finally, the class highlights the rich cosmology, cosmogony, and moral philosophy that have consistently informed the use and meaning of Dikenga in its central role in religious narratives, moral philosophy and religious education among the Bakongo in Atlantic world.

*4 units, not given this year*

**ARTHIST 409. Iconoclasm**

Iconoclasm, iconophobia, and aniconism as markers of cultural transformation of the Mediterranean in the 7th-9th centuries. The identity crisis in the region as the Arabs established the Umayyad caliphate, conquering the Holy Land, Egypt, and Spain. The West consolidated around the Carolingians versus the East split between the Byzantines and the Arabs. How each of these three empires emerged from the ashes of late antique culture and carved an identity out of a common cultural foundation.

*5 units, not given this year*

**ARTHIST 410. Aesthetics of the Icon**

How medieval objects were experienced through sight, touch, sound, smell, and taste; how this multisensory richness has been reduced to visual studies of medieval art. Focus is on the Byzantine icon to restore its synaesthetic power; how its performance is tied to culturally-specific modes of seeing. Byzantine liturgy, prayer, epigrams, and literary genres of description such as ekphrasis.

*5 units, not given this year*

**ARTHIST 410A. Art and Theory in Islam: Visual Concepts and Aesthetic Paradigms**

The course takes a critical assessment of visual concepts and aesthetic paradigms, such as geometry, ornament iconoclasm, figurative representation, writing/calligraphy, beauty, through the study of representative works of Islamic art and architecture. Also takes an initial theoretical and methodological framework for the study of these concepts and paradigms, and an application of theories to case studies.

*5 units, Spr (Staff)*

**ARTHIST 412. Problems in Italian Mannerism**

Questions of the bella maniera, anti-classicism, and center and periphery in mannerist art in light of developments in scholarship from the 70s to the present. Authors include Arasse, Cropper, Cole, Nova, Summers, and Vickers.

*5 units, not given this year*

**ARTHIST 413. Michelangelo**

Michelangelo's long career in light of recent scholarship. Topics include the status of the cult image, the paragon between poetry and the pictorial arts, painting and questions of literary genre, and Counter Reformation reactions to his art.

*5 units, not given this year*

**ARTHIST 414. Italian Mannerism**

Questions of the bella maniera, anti-classicism, and center and periphery in mannerist art in light of developments in scholarship from the 70s to the present. Authors include Arasse, Cropper, Cole, Nova, Summers, and Vickers.

*5 units, not given this year*

**ARTHIST 428. Eakins and Vermeer**

Questions of gender, visuality, and power in two major realist painters of the 17th and 19th centuries. How Vermeer and Eakins confronted and sometimes evaded the central historical issues of their day: modernization, class, sexuality, nationality, and the status of the artist.

*5 units, not given this year*

**ARTHIST 431. Landscape and Power**

This seminar explores American landscape art from its origins in Hudson River School painting to the Land Art movement of the late twentieth century. Images of nature are read as narratives of individual and national identity. Topics include gender and the landscape; nation building and the frontier; politics and parks; the landscape as anti-art; poetry and the environment. Students will work with images from the superb collection of American landscape art at the de Young Museum in Golden Gate Park.

*5 units, not given this year*

**ARTHIST 440. Stranger than Truth**

Taught jointly by Professor Nancy J. Troy and Cantor Arts Center Curator Hilarie Faberman, this graduate seminar explores questions of illusionism and the real in modern and contemporary art. Earlier periods are explored as important sources of inspiration and/or resistance. Students will be encouraged to pursue research projects ranging from theoretical or critical issues to individual works of art or groups of objects in anticipation of a Cantor exhibition entitled, *Stranger than Truth: Trompe l'oeil Imagery from Picasso to the Present*, planned for 2013. Those with interests in earlier periods and/or diverse artistic practices are welcome.

*5 units, Win (de Wit, N; Faberman, H)*

**ARTHIST 442. Looking at Violence**

Violence in the media and its effects upon viewers, especially the young, is an issue of national concern that has produced legislation for the ratings of movies, television shows, and computer/video games. Parental control software makes it possible to program cable boxes and computers to censor what broadcasts or websites are accessible to children. These are political and technical fixes to a perceived social problem. They do not ask why one is drawn to watch violence in the first place, nor why certain kinds of violent imagery is compelling. Debates about how such measures should be implemented usually proceed from the given that images of violence are subjectspecific, with little or no consideration of their formal qualities or visual protocols. This seminar assumes that the tools and categories of visual analysis specific to the History of Art might enrich our thinking about the attraction and impact of violence across media and across time. The seminar proposes to situate its to

*5 units, Aut (Marrinan, M)*

**ARTHIST 444. Photograph, Document, Archive**

Debates over the ontological status of the photograph as document from the 19th century to the present; archival conceptions of photographic meaning. Problems of realism, indexicality, positivism, tourism, social commentary, power, and subjectivity. Protagonists: Frith, Atget, Hine, Sander, Rodchenko, Siskind, Lange, Bernd and Hilla Becher, Richter, Rosler, Sekula. Readings: Warburg, Kracauer, Benjamin, Brik, Tret'akov, Sontag, Barthes, Buchloh, Tagg, Nesbit, Armstrong, Stimson, Nickel, Kelsey.

*5 units, not given this year*

**ARTHIST 447. THE HISTORIOGRAPHY OF CUBISM**

Students are introduced to historiography and method in the history of art through a consideration of the multiple constructions of French Cubism as a complex of styles, a set of theoretical problems, and a historical phenomenon. Exploration of how some important issues raised by the art of Picasso and Braque as well as Léger, Delaunay, Gleizes, Metzinger, Villon, and other major (and not so major) figures of early 20th century modernism have been debated by art historians over the past 75 years, since the publication of Alfred Barr's *Cubism and Abstract Art* in 1936. Open to undergraduates with permission of the instructor.

*5 units, not given this year*

**ARTHIST 457. Art in Public Spaces: Berlin 1980-2000**

(Same as GERGEN 257) Before and after the re-unification a great number of artistic projects reflect the problems of political memorial culture in Germany. The seminar will deal with art

works in public spaces, mostly in Berlin, by German and international artists, from 'drop sculptures' and the decoration programs of Federal buildings up to the Holocaust Memorial.

*3-5 units, not given this year*

**ARTHIST 459. The Visual World of Moby Dick**

Course pairs weekly readings of *Moby-Dick* with parallel discussions of the culture--especially the visual culture--that the readings allude to. Focusing on painting, sculpture and vernacular art, we recreate the visual environment that undergirds Melville's epic, from tavern signs and scrimshaw to images of slavery, the landscape, and everyday life in America. In addition to *Moby-Dick* and several short stories by Melville, we study: nineteenth-century landscape and genre painting; slavery and race in antebellum society; commerce, industry and early globalism; gender and class; Emerson, Poe and Dickinson.

*5 units, Spr (Wolf, B)*

**ARTHIST 460. Introduction to Visual Studies: Methods and Debates**

Over the last two decades, visual studies has gained wide currency as a topic of research and teaching. Scholars from disciplines as diverse as art history, American studies, literature, anthropology, film and media studies, history and gender studies have focused attention on both the cultural and historical specificity of vision and on the ever-widening array of images and objects available for viewing. This graduate seminar provides a critical introduction to the history, methods and central debates within the emergent field. How have scholars and critics taken up, or in some cases dismissed, visual studies and to what ends? What are the possibilities and limits of the interdisciplinary models on offer? The course explores these questions through a sustained engagement with selected texts and images about vision, visuality and visual objects.

*5 units, Spr (Staff)*

**ARTHIST 470. Globalization and the Visual Arts**

Enrollment restricted to graduate students. Globalization as the most important paradigm for the production, circulation, and reception of contemporary art since the 1990s. The expanding terrain of the art world; biennial culture; new economies of scale and the art market along with its critique in the discourses of empire and multitudes. Debates on the thematics of hybridity; post-Fordism; the flat world and capital flows; exteriority and site specificity; and new models of collectivism in recent art.

*5 units, not given this year*

**ARTHIST 475. Media Cultures of the Cold War**

(Same as COMM 386) The intersection of politics, aesthetics, and new media technologies in the U.S. between the end of WW II and the fall of the Berlin Wall. Topics include the aesthetics of thinking the unthinkable in the wake of the atom bomb; abstract expressionism and 'modern man' discourse; game theory, cybernetics, and new models of art making; the rise of television, intermedia, and the counterculture; and the continuing influence of the early cold war on contemporary media aesthetics. Readings from primary and secondary sources in art history, communication, and critical theory.

*3-5 units, Spr (Turner, P; Lee, P)*

**ARTHIST 476. Postmodernism and the Visual Arts**

Enrollment restricted to graduate students. The debates on postmodernism as a cultural dominant (Jameson) emerging in the criticism of the last half of the twentieth century. Theories of periodization and historicity; authorship, appropriation; allegory and narrative; simulation; difference; late capitalism and the postindustrial society; and cybercultures relative to the art of the 1970s-80s. Special attention paid to the culture wars and the importance of postmodernism for contemporary discussions of neoliberalism. Authors include Barthes, Baudrillard, Crimp, Foster, Foucault, Jameson, Habermas, Harvey, Krauss, Lyotard, Owens.

*5 units, not given this year*

**ARTHIST 480. Cultures & Politics of Collecting in Late Ming Dynasty China**

Studies of the literature, representation, and political environments for collecting in late Ming dynasty China (ca. 1550-1644).

*5 units, Aut (Vinograd, R)*

**ARTHIST 481. Colloquium on Song and Yuan Dynasty**

**Painting Studies**

In-depth discussion and analysis of recent art historical studies, exhibitions, and conferences on Chinese painting and related arts of the Song and Yuan eras (10th-14th c.). Topics will include: approaches to Five Dynasties painting; archaeological discoveries and Liao painting; political implications of painting in the late 11th century; recent studies of cultural patronage and production at the Huizong court; court women as art sponsors in the Song era; court painting and urban culture in Southern Song Lin'an (Hangzhou); Jin and late Song literati painting; Buddhist painting in the Ningbo region; Song-Yuan Daoist painting; art patronage and collecting at the Yuan court; historiographic, connoisseurial, and authenticity issues. Open to graduate students, and undergraduates with permission of the instructor.

5 units, not given this year

**ARTHIST 482. Chinese Art of the 1970's and 1980's**

Departing from the Maoist ideology of Cultural Revolution era art, Chinese art of the 1970's and '80's culminated in the '85 New Wave movement, and paved the way for the 1990s and beyond. Investigating art world events against the background of economic liberalization and emerging globalization. Topics include changing official art directives, agendas of art schools and institutions, the emergence of amateur and professional artists, the upsurge in art publications and the boom of artist groups and exhibitions, the definition of a new literati painting by ink painters, and trans-media experiments by avant-gardists. The post-socialist cultural fever in philosophy, literature, music, theater, and film after 1976 examined as the backdrop for artistic activities. Open to graduate students, and undergraduates with permission of the instructor.

5 units, not given this year

**ARTHIST 482B. Imagining the Imperial: Images of the Court in Late Ming Dynasty Public Culture Part II**

Exploration in representations of palace and court life in Ming period vernacular painting, illustrated books, and fiction. Topics include the status of the court in the Ming public imaginary, strategies of historical displacement, disguised political critique, commerce in imperial objects, and scandals, rumors and myths surrounding court life

5 units, not given this year

**ARTHIST 483. Shanghai Visual Culture: Contested Modernities**

Held in conjunction with Modern Ink Painters exhibition at the Cantor Center and the Shanghai Visual Culture exhibition at the Asian Art Museum of San Francisco. Aspects of late 19th- and early 20th-century Shanghai visual culture and its historiography. Topics include the interplay and competition of ink painting with new media such as lithography, photography, illustrated periodicals, and film; images of gendered modernity, from courtesan to new woman; situating the national and the cosmopolitan; the cultural politics of painting; art institutions, education, and exhibitions. Museum visits; and individual or group research projects. Open to undergraduates with consent of instructor.

5 units, not given this year

**ARTHIST 485. The Situation of the Artist in Traditional Japan**

(Same as JAPANGEN 220) Topics may include: workshop production such as that of the Kano and Tosa families; the meaning of the signature on objects including ceramics and tea wares; the folk arts movement; craft guilds; ghost painters in China; individualism versus product standardization; and the role of lineage. How works of art were commissioned; institutions supporting artists; how makers purveyed their goods; how artists were recognized by society; the relationship between patrons, desires and artists, modes of production.

5 units, not given this year

**ARTHIST 486. Connoisseurship & Research Methods in Chinese Painting**

addresses problems of attribution, dating, and authenticity in Chinese painting and calligraphy studies. Related issues of style analysis, technical studies, documentation, catalogues and other art literature are considered within the larger context of collecting history.

5 units, not given this year

**ARTHIST 488. Chinese Painting of the Yuan-Ming Transition Era**

Studies of political environments, social and patronage networks, and textual production.

5 units, Win (Vinograd, R)

**ARTHIST 494. Caribbean and Latin American Art**

Visual culture from 1505 to 1889 and its relation to current debates on cultural identity, hybridity, syncretism, and creolization. Examination of paintings, travel books and printmaking by artists including De Bry, Belisario, Rugendas, Debret, and Landaluze. Close visual analysis of works at the Cantor Arts Center and the Green Library at Stanford University.

5 units, Win (Martinez-Ruiz, B)

**ARTHIST 502. Methods and Historiography of Art History**

Restricted to graduate students. From the origins of the discipline in 19th-century Germany to recent debates on visual studies. Iconology, formalism, semiotics, psychoanalysis, and Marxist and feminist approaches to the work of art. Limited enrollment.

5 units, Aut (Lee, P)

**ARTHIST 507. Medieval Image Theory**

The Middle Ages saw the development of a theoretical framework on visual representation in response to charges of idolatry. The defenders of religious images drew on the dogma of Incarnation; as the Virgin gave human flesh to the Logos/Christ, the image offered a material manifestation of the divine. Focus is on the change in perception and staging of the image. Early in the period, the icon or relic expressed the presence of the sacred; later in the period, visual representation was designed to trigger an emotional response that led the viewer to a union with the divine.

5 units, not given this year

**ARTHIST 600. Art History Bibliography and Library****Methods**

1 unit, Aut (Blank, P)

**ARTHIST 610. Teaching Praxis**

1-5 units, Aut (Staff), Win (Staff), Spr (Staff)

**ARTHIST 620. Area Core Examination Preparation**

For Art History Ph.D. candidates. Prerequisite: consent of instructor.

5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**ARTHIST 640. Dissertation Proposal Preparation (Staff)**

5 units, Aut (Staff), Win (Staff), Spr (Staff, 1), Sum (Staff)

**ARTHIST 650. Dissertation Research (Staff)**

5 units, Aut (Staff, 1), Win (Staff), Spr (Staff, 1), Sum (Staff)

**ARTHIST 660. Independent Study**

For graduate students only. Approved independent research projects with individual faculty members.

1-15 units, Aut (Staff, 1), Win (Staff), Spr (Staff, 1), Sum (Staff)

**ARTHIST 660E. Extended Seminar**

May be repeated for credit. (Staff)

4 units, Aut (Staff), Win (Staff), Spr (Staff)

**ARTHIST 670. Dissertation Seminar**

For graduate students writing and researching dissertations and dissertation proposals. How to define research projects, write grant proposals, and organize book-length projects.

3-5 units, not given this year

**ARTHIST 802. TGR Dissertation**

0 units, Aut (Staff), Win (Staff), Spr (Staff, 1), Sum (Staff)

## ART STUDIO (ARTSTUDI) COURSES

### UNDERGRADUATE COURSES IN ART STUDIO

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**ARTSTUDI 4. Technology for Artists: Website Design and**

**Portfolio Construction**

A crash-course in website design and development, in which students create a high-quality digital portfolio and learn hands-on technology skills. Students work with the Adobe Creative Suite Dreamweaver, Photoshop and affiliated technologies. Students learn basic design and coding skills (HTML and CSS), trends and strategies in design and digital representation, and create a personal portfolio website. Aimed at students (undergraduate or graduate) in any visual, written, or performing art. Limited enrollment. Apply online by March 1, 2011 at <http://tfa.stanford.edu>

2 units, not given this year

**ARTSTUDI 4SI. Beginner Ceramics**

Student Initiated Course - Introduction to Ceramics. Students learn basic hand-building and wheel techniques using stoneware clay, including how to throw cups, mugs, bowls, plates, and a lidded vessel. Class held in the Stanford Ceramics Studio (Elliot Program Center). \$50 lab fee covers clay, glaze, tools, and firing costs. All levels of experience welcome. Register on Axxess (limit 10 students). Please check <http://ceramics.stanford.edu> for any updates.

1-2 units, Aut (Lanas, M; Kaneshiro, L)

**ARTSTUDI 10AX. Filmmaking**

Production skills and project development in documentary filmmaking. The fundamentals of filmmaking using digital video production techniques focused on documentary storytelling. Shooting in mini-DV format and editing with Final Cut Pro software, students actualize their ideas in an audiovisual medium from conceptualization through post-production and exhibition.

2 units, not given this year

**ARTSTUDI 11. Introduction to Figure Drawing**

Working from the live, nude model, emphasis is on accurate representation, understanding of basic anatomy, and the use of perceptual skills. All levels of experience, non-majors and majors welcome.

2 units, Aut (Deas, Y)

**ARTSTUDI 11AX. Digital Art and Design in Practice**

Hands-on exploration of art and design using digital tools. Overview of contemporary digital art and design including fine art, graphic design, film, and animation. Analysis of new work in these areas and visits to Bay Area production and artist studios. Demos will focus on 2D and time-based techniques, but students interested in procedural or 3D computer graphic are welcome. Students will complete a multi-part visual project to be included in a final exhibit.

2 units, Aut (Staff)

**ARTSTUDI 12AX. Drawing Intensive: Revisiting Nature**

As increasing technological advances can further separate us from direct impressions of nature, this class is designed to reconnect and enhance our relationship to the natural world and our surrounding environment. To do this we will develop visual skills and critical thinking through careful observation and classical drawing techniques. Inspired by Stanford's natural and manicured landscapes, students will enjoy the great outdoors while learning elements of perspective, composition, light, and form. Students will learn about master landscape artists, investigate the built and natural environment of the campus, and experiment with various drawing techniques, mediums, and styles.

2 units, not given this year

**ARTSTUDI 13. PAINTING WITH ACRYLICS**

Introductory methods to painting with acrylics. Acrylic is a versatile medium with a faster drying time than oil. Thus, the process of layering, glazing, and building is accelerated. In addition to establishing a basic understanding of working with paint, the course emphasizes the agency of the individual to realize their ideas in visual terms. Students are encouraged to create work that is both unique and relative to painting's lineage. The instructor guides and promotes an active look at painters throughout history. All students are welcome.

2 units, Win (Chapman, A)

**ARTSTUDI 14. Experimental Drawing**

Discover and develop a unique partnership between drawing and perception, observation, intuition and experience by exploring ways of looking and mark making. Draw life around you as you

see it, using figure models, landscapes, unique still lives and your own sources. Have the freedom to create imaginative, realistic, fantasy, and dream like works. Experiment with abstract forms, study the relationship of mark making and drawing mediums through mood and style. Work across scales and become familiar with a variety of materials: charcoal, pen and inks, brushes, pencils, watercolor, markers, acrylics, collage, gesso, gels as well as found objects. Learn to see and draw in new ways while experimenting freely. All students are welcome.

2 units, Spr (Pinkusevich, Y)

**ARTSTUDI 17. Introduction to Photography as Art**

An introduction to the art of photography, covering technical basics and darkroom techniques with traditional black and white materials. With an emphasis on aesthetics and subject matter, course investigates both historical and contemporary photography as it relates to personal artistic development. 35mm camera required. No prior photographic experience necessary.

2 units, Win (Katseff, A)

**ARTSTUDI 130. Interactive Art: Making it with Arduino**

Students use electronics and software to create kinetic and interactive elements in artwork. No prior knowledge of electronics or software is required. Students learn to program the Arduino, a small easy-to-use microprocessor control unit ( see <http://www.arduino.cc/> ). Learn to connect various sensors such as light, motion, sound and touch and use them to control software. Learn to interface actuators like motors, lights and solenoids to create movement. Learn to connect the Arduino to theMAX/MSP/Jitter programming environment to create media-intensive video and audio environments. Explore the social dimensions of electronic art. (lower level)

4 units, Spr (DeMarinis, P)

**ARTSTUDI 131. Sound Art I**

Acoustic, digital and analog approaches to sound art. Familiarization with techniques of listening, recording, digital processing and production. Required listening and readings in the history and contemporary practice of sound art. (lower level)

4 units, Aut (DeMarinis, P)

**ARTSTUDI 138. Sound and Image**

Practices that combine audio and visual media. Topics include synesthesias, visual music, film soundtracks, and immersive multimedia practices that combine sound, music, still and moving images, projections, and performance. (lower level)

4 units, not given this year

**ARTSTUDI 140. Drawing I**

Functional anatomy and perspective as they apply to problems of drawing the form in space. Individual and group instruction as students work from still life set-ups, nature, and the model. Emphasis is on the development of critical skills and perceptual drawing techniques for those with little or no previous experience with pastels, inks, charcoal, conte, and pencil. Lectures alternate with studio work. (lower level)

4 units, Aut (Chagoya, E), Win (Bean, K), Spr (Bean, K)

**ARTSTUDI 145. Painting I**

Introduction to techniques, materials, and vocabulary in oil painting. Still life, landscape, and figure used as subject matter. Emphasis is on painting and drawing from life. (lower level)

4 units, Aut (Xie, X), Win (Bean, K), Spr (Bean, K)

**ARTSTUDI 147. Artist's Book**

Explores contemporary aesthetic interpretations of the book as an art object while invigorating traditional artistic practices of the art of the book. Through the medium of drawing, collage, and mixed media students produce their own artist's book. The course familiarizes students with bookbinding and the various techniques used, as well as exploring the narrative, text and image, and the book as a sculptural object.

4 units, Win (Ebtakar, A)

**ARTSTUDI 147S. Painting and Drawing**

4 units, Sum (Staff)

**ARTSTUDI 148. Monotype**

Introduction to printmaking using monotype, a graphic art medium used by such artists as Blake, Degas, Gauguin, and Pendergast. May be repeated for credit. Prerequisite: 140. (lower level)

4 units, Win (Chagoya, E)

**ARTSTUDI 148A. Lithography**

The classic technique of printing from limestones. Techniques to draw an image on the stone, etch and fix the image on the stone, and print it in numbered editions. Students work on a variety of stone sizes. Field trips to local publishers of lithography or lithography exhibitions. (lower level)

4 units, Spr (Kain, K)

**ARTSTUDI 148B. Introduction to Printmaking Techniques**

Techniques such as monotype, monoprint, photocopy transfers, linocut and woodcut, intaglio etching. Demonstrations of these techniques. Field trips to local print collections or print exhibitions. (lower level)

4 units, Aut (Kain, K)

**ARTSTUDI 149A. Printmaking Relief**

Various relief printmaking techniques explored with concentrated work in the processes of woodcut, linoleum cut and other related relief approaches. Students are exposed to contemporary practices in printmaking through visits to museums, print workshops, publishers, artists' studios, and other venues.

4 units, not given this year

**ARTSTUDI 151. Sculpture I**

Traditional and non-traditional approaches to sculpture production through working with materials including wood, metal, and plaster. Conceptual and technical skills, and safe and appropriate use of tools and materials. Impact of material and technique upon form and content; the physical and expressive possibilities of diverse materials. Historical and contemporary forming methods provide a theoretical basis for studio work. Field trips; guest lecturers.

4 units, Aut (Arcega, M), Win (Arcega, M)

**ARTSTUDI 153. Ecology of Materials**

Studio-based sculpture course. Materials used in sculpture and environmental concerns surrounding them. Artists concerned with environmental impact and the interconnection of art with other fields. The impact of material and technique upon form and content; understanding the physical and expressive possibilities of diverse materials. Conceptual and technical considerations. Group discussions, critiques, readings, video presentations, a field trip to a local artist-in-residence program, and visiting lecturers. (lower level)

4 units, not given this year

**ARTSTUDI 154. Kinetic Sculpture**

This course was developed in conjunction with Lively Arts and SICA to bring students in closer dialogue with artists working interdisciplinary on collaborative projects. Students will work with visiting artist Trimpin, a MacArthur Genius, in the design and construction of collaborative kinetic projects. The kinetic sculptures created in class will be used for Trimpin's installation and performance work *The Gurs Zyklus* (The Gurs Cycle), a world premiere, at Memorial Auditorium in May. Students use both the Sculpture Lab facilities and the PRL. Engineers, Sculptors, Artists, Majors and Non-majors are welcome. (lower level)

4 units, not given this year

**ARTSTUDI 155. Social Sculpture**

Collect real time data via sensors to create artistic interventions. Focus is on art in the public sphere, in the landscape with references to cultural or social context. Articulation of artistic concepts is through site specific work and public interventions. Quick prototypes of sensors are created through *Cycling74's* (MAX/MSP/Jitter) visual programming environment.

4 units, not given this year

**ARTSTUDI 160. Design I : Fundamental Visual Language**

Formal elements of visual expression (color, composition, space, and process) through hands-on projects. Two- and three-dimensional media. Emphasis is on originality and inventiveness. Content is realized abstractly. Centered in design; relevant to visual art study and any student seeking to develop visual perception. (lower level)

3-4 units, Aut (Edmark, J), Win (Edmark, J), Spr (Edelman, J)

**ARTSTUDI 161. Catalysts for Design**

Nature and science as sources of design inspiration. Projects in natural pattern formation, biological growth and form, Fibonacci numbers and the golden section, planar and spatial symmetry, mechanics, chaos, and fractals. Emphasis is on importance of creative synthesis to the design process. Projects take the form of

physical constructions as opposed to renderings or computer models. Field trips. (lower level)

3-4 units, not given this year

**ARTSTUDI 166. Design in Motion**

Design areas for which movement and transformation are essential. Experimentation with mechanical means such as linking, hinging, inflating, and rotating. Projects in lighting, automata, tools and utensils, chain reactions, toys and games, festival props, and quasi-architecture emphasize the creation of works in which motion is a significant agent for aesthetic gratification. No experience in mechanical engineering required. (lower level)

3-4 units, not given this year

**ARTSTUDI 167. Introduction to Animation**

Projects in animation techniques including flipbook, cutout/collage, stop-motion such as claymation, pixilation, and puppet animation, rotoscoping, and time-lapse. Films. Computers used as post-production tools, but course does not cover computer-generated animation. (lower level)

3-4 units, not given this year

**ARTSTUDI 169. Professional Design Exploration**

Six to eight mature projects are stimulated by weekly field trips into significant areas of design activity or need. (upper level)

4 units, not given this year

**ARTSTUDI 170. Introduction to Photography**

Critical, theoretical, and practical aspects of creative photography through camera and lab techniques. Field work. Cantor Art Center and Art Gallery exhibitions. 35mm camera required. (lower level)

4 units, Aut (Felzmann, L), Win (Felzmann, L), Spr (Felzmann, L), Sum (Staff)

**ARTSTUDI 177. Video Art I**

Students create experimental video works. Conceptual, formal, and performance-based approaches to the medium. The history of video art since the 70s and its influences including experimental film, television, minimalism, conceptual art, and performance and electronic art. Topics: camera technique, lighting, sound design, found footage, cinematic conventions, and nonlinear digital editing. (lower level)

4 units, Aut (Barber, J)

**ARTSTUDI 178. Art and Electronics**

Analog electronics and their use in art. Basic circuits for creating mobile, illuminated, and responsive works of art. Topics: soldering; construction of basic circuits; elementary electronics theory; and contemporary electronic art. (lower level)

4 units, Win (Wight, G)

**ARTSTUDI 179. Digital Art I**

Contemporary electronic art focusing on digital media. Students create works exploring two- and three-dimensional, and time-based uses of the computer in fine art. History and theoretical underpinnings. Common discourse and informative resources for material and inspiration. Topics: imaging and sound software, web art, and rethinking the computer as interface and object. (lower level)

4 units, Aut (Wight, G), Spr (Barber, J)

**ARTSTUDI 180. Color**

Hands-on study of color to develop color sensitivity and the ability to manipulate color to exploit its expressive potential. Guided experimentation and observation. Topics include color relativity, color and light, color mixing, color harmony, and color and content. (lower level)

3-4 units, not given this year

**ARTSTUDI 184A. Along the Track of the Yellowstone****Hotspot: Fusion of Art and Science**

(Same as BIO 122) The 20-million-year-old track of the Yellowstone hotspot through western North America, using the field setting to investigate ecology, evolution, and geology through an aesthetic and documentary media lens. Students create: experiential ways to learn about the natural world; a scientific yet personal intimacy about how ecosystems work and how they change; and ways to convey their observations to the public. Required trip to Yellowstone National Park.

4 units, not given this year

**ARTSTUDI 230. Interdisciplinary Art Survey**

The diversity of artistic concepts and strategies; artists who use the



different media taught in the department's studio program such as painting, drawing, video and digital art, printmaking, photography, and sculpture. Field trips to local museums and collections, artists studios, and libraries. Student research. Priority to Art Studio majors and minors. (upper level)

*4 units, Win (Holberton, R)*

#### **ARTSTUDI 239. INTERMEDIA WORKSHOP**

(Same as MUSIC 155, MUSIC 255) Students develop and produce intermedia works. Musical and visual approaches to the conceptualisation and shaping of time-based art. Exploration of sound and image relationship. Study of a wide spectrum of audiovisual practices including experimental animation, video art, dance, performance, non-narrative forms, interactive art and installation art. Focus on works that use music/sound and image as equal partners. Limited enrollment. Prerequisites: consent of instructors, and one of FILMPROD 114, ARTSTUDI 131, 138, 167, 177, 179, or MUSIC 123, or equivalent.

*3-4 units, Win (DeMarinis, P; Kapuscinski, J)*

#### **ARTSTUDI 240. Drawing II**

Intermediate/advanced. Observation, invention, and construction. Development of conceptual and material strategies, with attention to process and purpose. May be repeated for credit. Prerequisite: 140 or consent of instructor. (upper level)

*4 units, Spr (Staff)*

#### **ARTSTUDI 245. Painting II**

Symbolic, narrative, and representational self-portraits. Introduction to the pictorial strategies, painting methods, and psychological imperatives of Dürer, Rembrandt, Cézanne, Kahlo, Beckmann, Schiele, and Munch. Students paint from life, memory, reproductions, and objects of personal significance to create a world in which they describe themselves. May be repeated for credit. Prerequisites: 140, 145, or consent of instructor. (upper level)

*4 units, Win (Xie, X), Spr (Chagoya, E)*

#### **ARTSTUDI 246. Individual Work: Drawing and Painting**

Prerequisites: two quarters of painting or drawing and consent of instructor.

*1-15 units, Aut (Staff), Win (Staff), Spr (Staff)*

#### **ARTSTUDI 247. Collage**

The generative principles of this characteristic 20th-century art form. Along with assemblage (its three dimensional equivalent) and montage (its counterpart in photography, film, and video), collage introduced crucial aesthetic issues of the modern and postmodern eras. Typically, collage creates an expressive visual language through juxtaposition and displacement, and through materiality, difference, and event. Issues of location (where it happens), object (what it is), process (how it is realized), and purpose (why it is). Prerequisites: 140, 145, or consent of instructor. (upper level)

*4 units, not given this year*

#### **ARTSTUDI 249. Advanced Undergraduate Seminar**

Capstone experience for majors in Studio Art. Interdisciplinary. Methods of research, crossmedia critiques, and strategies for staging and presenting work. Guest artists from the Bay Area. (upper level)

*3-4 units, Spr (Bell, C)*

#### **ARTSTUDI 250. Individual Work: Sculpture**

May be repeated for credit.

*1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

#### **ARTSTUDI 252. Sculpture II**

Builds upon 151. Installation and non-studio pieces. Impact of material and technique upon form and content; the physical and expressive possibilities of diverse materials. Historical and contemporary forming methods provide a theoretical basis for the studio work. Field trips; guest lecturers. (upper level)

*4 units, not given this year*

#### **ARTSTUDI 260. Design II: The Bridge**

The historical spectrum of design including practical and ritual. The values and conceptual orientation of visual fundamentals. Two- and three-dimensional projects grouped to relate design theory to application, balancing imaginative and responsible thinking. Prerequisite: ARTSTUDI 60. Corequisite: ME 203 (upper level)

*3-4 units, Win (Edmark, J), Spr (Edmark, J)*

#### **ARTSTUDI 261. Individual Work: Design**

May be repeated for credit.

*1-15 units, Aut (Staff), Win (Staff), Spr (Staff)*

#### **ARTSTUDI 262. The Chair**

Students design and fabricate a highly refined chair. The process is informed and supported by historical reference, anthropometrics, form studies, user testing, material investigations, and workshops in fiberglass molding, wood steam-bending, plywood forming, metal tube bending, TIG & MIG welding, upholstery & sewing. Prerequisites: ARSTUDI 160 and ME 203, or consent of instructor. (upper level)

*4 units, Spr (Edmark, J)*

#### **ARTSTUDI 263. Paper**

Beyond conventional use of paper as a foundation for mark making to its potential as a medium in its own right. Students experiment with papers to develop facility with techniques of folding, scoring, curling, cutting, tearing, piercing, embossing, layering, and binding to create three-dimensional forms, patterned/textured surfaces, reliefs, interactive dynamic structures such as pop-ups, containers, and book forms. (upper level)

*3-4 units, Aut (Edmark, J)*

#### **ARTSTUDI 265. Design for Exploration**

A collaboration with the Exploratorium in San Francisco. Students investigate and experiment with all aspects of the creation of interactive museum exhibits. On-site exhibit floor sessions and prototyping workshops. Lectures from museum staff on exhibit design. Students design and construct exhibits for temporary placement on the floor of the Exploratorium. Prerequisites: ME 203 or consent of instructor. (upper level)

*3-4 units, not given this year*

#### **ARTSTUDI 268. Design Synthesis**

Mature semi-elective problems in composite and multimedia design areas. May be repeated for credit. Prerequisites: two design courses above 160. (upper level)

*4-6 units, not given this year*

#### **ARTSTUDI 269. Advanced Creative Studies**

Seminar based on elective design projects in areas of individual specialization. May be repeated for credit. Prerequisite: consent of instructor. (upper level)

*1-15 units, not given this year*

#### **ARTSTUDI 270. Advanced Photography Seminar**

Student continues with own work, showing it in weekly seminar critiques. May be repeated for credit. (upper level)

*1-5 units, Win (Leivick, J), Spr (Leivick, J)*

#### **ARTSTUDI 271. The View Camera: Its Uses and Techniques**

For students of photography who wish to gain greater control and refine skills in image making. 4x5 view cameras provided. Enrollment limited to 8. (upper level)

*4 units, Win (Leivick, J)*

#### **ARTSTUDI 272. Alternative Processes**

Priority to advanced students. Technical procedures and the uses of primitive and hand-made photographic emulsions. Enrollment limited to 10. Prerequisites: 70, 170, 270, or consent of instructor. (upper level)

*4 units, Spr (Leivick, J)*

#### **ARTSTUDI 272. Individual Work: Photography**

Student continues with own work, showing it in weekly seminar critiques. May be repeated for credit.

*1-5 units, Aut (Staff), Win (Staff), Spr (Staff)*

#### **ARTSTUDI 273. Individual Work: Digital Media**

May be repeated for credit.

*1-15 units, Aut (Staff), Win (Staff), Spr (Staff)*

#### **ARTSTUDI 274. Individual Work: Digital Art**

May be repeated for credit.

*1-15 units, Aut (Staff), Win (Staff), Spr (Staff)*

#### **ARTSTUDI 275. Introduction to Digital Photography and Visual Images**

Students use Adobe Lightroom to organize and edit images, manipulate and correct digital files, print photographs, create slide shows, and post to the Internet. How to use digital technology to concentrate on visual thinking rather than darkroom techniques.



(upper level)

4 units, Aut (Dawson, R), Spr (Dawson, R)

### ARTSTUDI 276. The Photographic Book

Grouping and sequencing photographic images to produce a coherent body of work with a thematic structure. (lower level)

4 units, Spr (Felzmann, L)

### ARTSTUDI 277. Projects in Photography

Students pursue a topic of their own definition. Further exploration of darkroom and other printing techniques; contemporary theory and criticism. (lower level)

4 units, Aut (Felzmann, L), Win (Felzmann, L)

### ARTSTUDI 277A. Video Art II

Advanced. Video, criticism, and contemporary media theory investigating the time image. Students create experimental video works, addressing the integration of video with traditional art media such as sculpture and painting. Nonlinearity made possible by Internet and DVD-based video. Prerequisite: 177 or consent of instructor. (upper level)

4 units, not given this year

### ARTSTUDI 279A. Digital Art II

Advanced. Interactive art works using multimedia scripting software. Experimental interfaces, computer installation work, and mobile technologies. Contemporary media art theory and practice. (upper level)

4 units, not given this year

### ARTSTUDI 284. Art and Biology

The relationship between biology and art. Rather than how art has assisted the biological sciences as in medical illustration, focus is on how biology has influenced art making practice. New technologies and experimental directions, historical shifts in artists' relationship to the living world, the effects of research methods on the development of theory, and changing conceptions of biology and life. Projects address these themes and others that emerge from class discussions and presentations. (upper level)

4 units, Spr (Wight, G)

### ARTSTUDI 285. Topics in Media Studies: Street Media

Literal and figurative meanings of street and how they provide potential to media technologies and invite innovative forms of artistic practice. Contemporary art as the juncture where street movements and new media collide. Small projects. (upper level)

4 units, not given this year

## GRADUATE COURSES IN ART STUDIO

Primarily for graduate students; undergraduates may enroll with consent of instructor.

### ARTSTUDI 310A. Directed Reading: Studio

1-15 units, Aut (Staff)

### ARTSTUDI 310B. Directed Reading: Studio

1-15 units, Win (Staff)

### ARTSTUDI 310C. Directed Reading: Studio

1-15 units, Spr (Staff)

### ARTSTUDI 342. MFA Project: Studio

Two weekly seminars, studio practice, and individual tutorials. Object seminar: student work is critiqued on issues of identity, presentation, and the development of coherent critical language. Concept seminar: modes of conceptualization to broaden the base of cognitive and generative processes. May be repeated for credit.

1-15 units, Aut (DeMarinis, P), Win (Chagoya, E), Spr (Xie, X)

### ARTSTUDI 360A. Master's Project: Design

Students enroll concurrently in ME 316. Over the course of the year, students create and present two master's theses involving the synthesis of aesthetics and technological concerns in the service of human need and possibility.

2-4 units, Aut (Franceschini, A; McDougall, M)

### ARTSTUDI 360B. Master's Project: Design

Students enroll concurrently in ME 316. Over the course of the year, students create and present two master's theses involving the synthesis of aesthetics and technological concerns in the service of human need and possibility.

2-4 units, Win (Franceschini, A)

### ARTSTUDI 360C. Master's Project: Design

Students enroll concurrently in ME 316. Over the course of the year, students create and present two master's theses involving the synthesis of aesthetics and technological concerns in the service of human need and possibility.

2-4 units, Spr (Franceschini, A)

### ARTSTUDI 801. TGR Project

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

## ASIAN AMERICAN STUDIES (ASNAMST) COURSES

### UNDERGRADUATE COURSES IN ASIAN AMERICAN STUDIES

Primarily for undergraduates; graduate students may enroll with consent of adviser.

### ASNAMST 59. Introduction to Asian American History

(Same as HISTORY 59) (Same as HISTORY 159. History majors and others taking 5 units, register for 159.) The historical experience of people of Asian ancestry in the U.S. Immigration, labor, community formation, family, culture and identity, and contemporary social and political controversies. Readings: interpretative texts, primary material, and historical fiction. GER:DB-SocSci, EC-AmerCul

3 units, Aut (Chang, G)

### ASNAMST 74N. Race and Ethnicity in Contemporary

#### American Fiction: Boundaries and Border Crossings

(Same as ENGLISH 74N) The question of place and locality in studies of identity and racial formation. Goal is to engage and examine texts with a critical eye both toward the social contexts represented and to the imaginative aesthetic techniques that American writers of color offer to bring their fictional worlds to life. Theme of border hopping and boundary crossing in works by authors including Charles Johnson, Toni Morrison, Alejandro Morales, Julie Otsuka, Stephen Graham Jones, and Lan Samantha Chang. GER:DB-Hum

3 units, not given this year

### ASNAMST 100C. EAST House Seminar: Current Issues and Debates in Education

(Same as EDUC 100C) Education and Society Theme (EAST) House seminar. In fall quarter, faculty from around the University discuss the latest issues and research related to education. In winter quarter, current issues in international and comparative education, particularly in developing countries, are explored. In the spring, the seminar revolves around race and ethnicity, political activism, and higher education. Through an examination of these topics, students are able to share and develop their varied interests in educational research, policy, and practice.

1 unit, Spr (Wotipka, C)

### ASNAMST 112. Public Archaeology: Market Street Chinatown Archaeology Project

(Same as ANTHRO 112, ANTHRO 212) This internship-style course centers on the practice and theory of historical archaeology research and interpretation through a focused study of San Jose's historic Chinese communities. The course includes classroom lectures, seminar discussion, laboratory analysis of historic artifacts, and participation in public archaeology events. Course themes include immigration, urbanization, material culture, landscape, transnational identities, race and ethnicity, gender, cultural resource management, public history, and heritage politics. The course includes required lab sections, field trips, and public service. Transportation will be provided for off-site activities.

2-5 units, Aut (Voss, B), Win (Voss, B), Spr (Voss, B)

### ASNAMST 144. Transforming Self and Systems: Crossing Borders of Race, Ethnicity, Gender, Sexuality, and Class

(Same as CSRE 144) An exploration of crossing borders within ourselves, and between *us* and *them* through the following questions: How is understanding the self tied to understanding others? What does the *personal is political* mean for us? How can our personal identity struggles have meaning beyond the self?

How does *synergistic consciousness* move us toward meaning, balance, connectedness, and wholeness? What knowledge comes from the heart? How does self healing lead to community healing? Can *victims* claim agency? How does contemplation lead to action? What is a narrative construction of reality? In a learning community, we will engage these questions through group process, journaling, reading, drama, creative writing, and storytelling.

5 units, Spr (Murphy-Shigematsu, S)

**ASNAMST 146S. Asian American Culture and Community**

(Same as AMSTUD 146, COMPLIT 146, CSRE 146S) An examination of the history of Asians in America via one case history: the International Hotel in San Francisco. Background history of Asians in America, and the specifics of the I Hotel case as involving the convergence of global and local economies, urban redevelopment, and housing issues for minorities. Focus on the convergence of community and cultural production. Service learning component involving community work at the Manilatown Heritage Foundation in San Francisco. Service Learning Course (certified by Haas Center). GER:DB-Hum

5 units, Spr (Palumbo-Liu, D)

**ASNAMST 159. Introduction to Contemporary Asian American Poetry**

This course will introduce students to contemporary Asian American poetry, from the birth of an Asian American panethnic identity in the 1960s to the present. We will track shared themes in these works from the relationship between cultural assimilation and language acquisition, to representations of feelings of exile and alienation between *home* and *host* countries. We will read works by Lawson Inada, Theresa Cha, Marilyn Chin, Li-Young Lee, John Yau, Myung Mi Kim, and others.

5 units, Win (Staff)

**ASNAMST 161. Asian American Immigration and Health**

Employing a critical medical anthropological approach, this course focuses on the health of Asian and Pacific Islander immigrants to the United States. This course explores the construction of the Asian immigrant in biomedical discourse and governmental policies. Beginning with an historical study of Asian immigrants as feared sources of disease and contagion, this course addresses the impact of immigration status, language, health beliefs, gender, age, and definitions of community on health programs and policies.

3-5 units, Aut (Lee, S)

**ASNAMST 173S. Transcultural and Multiethnic Lives: Contexts, Controversies, and Challenges**

(Same as AFRICAAM 173S, CSRE 173S) Lived experience of people who dwell in the border world of race and nation where they negotiate transcultural and multiethnic identities and politics. Comparative, historical, and global contexts such as family and class. Controversies, such as representations of mixed race people in media and multicultural communities. What the lives of people like Tiger Woods and Barack Obama reveal about how the marginal is becoming mainstream.

5 units, not given this year

**ASNAMST 179. Asian American Experiences and Documentary Practice**

(Same as FILMSTUD 279, CSRE 179) Focus is on documentary cinema as a technology for understanding Asian Americans in the U.S. The social and historical context of the formation of the Asian American filmmaker, an authorial position that emerges in the 60s and 70s as part of the civil rights movement. Works include films by Loni Ding, Bob Nakamura and Curtis Choy; readings about the establishment of Asian American media industries and Asian American film criticism as a multi-genre. Social issue documentaries that represent new ethnographies of social experience including transnational adoption (Daughter From Danang), refugee experience (AKA Don Bonus), and sex tourism (The Women Outside). Readings include analyses of the implications of these works for cinema studies, ethnic studies, and the politics of film in everyday life. Experimental documentaries and their interrogation of the limits of the documentary form in representing identities and social problems. How does representation matter within and for Asian America GER:DB-Hum

5 units, not given this year

**ASNAMST 185A. Race and Biomedicine**

(Same as ANTHRO 185A) Race, identity, culture, biology, and

political power in biomedicine. Biological theories of racial ordering, sexuality and the medicalization of group difference. Sources include ethnography, film, and biomedical literature. Topics include colonial history and medicine, the politics of racial categorization in biomedical research, the protection of human subjects and research ethics, immigration health and citizenship, race-based models in health disparities research and policy, and recent developments in human genetic variation research.

3-5 units, not given this year

**ASNAMST 187. Geography, Time, and Trauma in Asian American Literature**

(Same as AMSTUD 261A, ENGLISH 261A) The notion that homes can be stable locations for cultural, racial, ethnic, and similarly situated identity categories. The possibility that there really is no place like home for Asian American subjects. How geography, landscape, and time situate traumas within fictional Asian American narratives.

5 units, not given this year

**ASNAMST 188. Gender and Sexuality in Asian American Literature**

(Same as AMSTUD 261F, ENGLISH 261F) How writers and representations dialogue, challenge, resist, and complicate such formative constructions of gendered/sexual identities. How queer Asian Americans face *multiple negations* that include potential expulsion from their own families and from various communities. Authors include Bharati Mukherjee, Russell Leong, Suki Kim, Shawn Wong, Louis Chu, Lawrence Chua, Catherine Liu, Jessica Hagedorn, Timothy Liu, Shani Mootoo, David Mura, among others. Secondary readings will include literary criticism, feminist and queer theory.

5 units, not given this year

**ASNAMST 200R. Directed Research**

May be repeated for credit.

1-5 units, Aut (Staff), Win (Staff), Spr (Staff)

**ASNAMST 200W. Directed Reading**

(Staff)

1-5 units, Aut (Staff), Win (Staff), Spr (Staff)

**ASNAMST 295F. Race and Ethnicity in East Asia**

(Same as HISTORY 295F, HISTORY 395F) Historical, cultural, political and theoretical perspectives. Commonly misunderstood as an ethnically homogeneous country, the People's Republic of China is home to 55 officially recognized minority groups, many of whom inhabit the strategic border regions of the country. How similar assumptions of ethnic and racial homogeneity in Taiwan, Japan, and Korea are being reexamined by scholars in disciplines including anthropology, history, and political science. GER:DB-SocSci

4-5 units, Aut (Mullaney, T)

## ATHLETICS, PHYSICAL EDUCATION, AND RECREATION (ATHLETIC) COURSES

### UNDERGRADUATE COURSES IN ATHLETICS, PHYSICAL EDUCATION, AND RECREATION

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**ATHLETIC 1. Alcohol & Health in College Life**

This course centers on alcohol issues from both a health and psychological perspective focusing on college alcohol issues and concerns.

1 unit, Spr (Castro, R; Bowen, J)

**ATHLETIC 2. Abs and Glutes**

Lower body workout to strengthen glutes and thighs, and abdominal training. Fee. (AU)

1 unit, Aut (Conniff, N), Win (McWherter, B), Spr (Staff), Sum (Staff)

**ATHLETIC 3M. Aikido**

1 unit, Aut (Ghormley, T), Win (Ghormley, T), Spr (Ghormley, T)

**ATHLETIC 4C. Archery Club Team**

This credit is offered to returning members of the specified Club Sports team. All enrollees must complete 21 hours of participation with the team and meet any other team requirements during the quarter. This is NOT a PE class or credit for beginners. While many teams are open to beginners joining, the credit is offered to returning athletes committed to the team for the year. If you are new to the team, please look to register for the credit in future quarters once you are committed as a team member. (AU) (Staff)

1 unit, Aut (Mahlow, P), Win (Mahlow, P), Spr (Mahlow, P)

**ATHLETIC 10. Band, Sports Activity**

(AU)

1 unit, Aut (Aquilanti, G), Win (Aquilanti, G), Spr (Aquilanti, G)

**ATHLETIC 12V. Baseball, Varsity Men**

(AU)

1-2 units, Aut (Marquess, M; Stotz, D), Win (Marquess, M; Stotz, D), Spr (Marquess, M; Stotz, D)

**ATHLETIC 14V. Basketball, Varsity Men**

(AU)

1-2 units, Aut (Dawkins, J), Win (Dawkins, J)

**ATHLETIC 15V. Basketball, Varsity Women**

(AU)

1-2 units, Aut (VanDerveer, T), Win (VanDerveer, T)

**ATHLETIC 18. Strengthening the Heart through Compassion**

This course is sponsored by Stanford's Center for Compassion and Altruism Research and Education (CCARE). The intent is to cultivate self-care, resilience and the strength to make a difference in the world based on a systematic approach to compassion meditation practices. Meditation, group discussions, real world applications and current research will be explored.

1 unit, Aut (Hanson, M), Win (Staff), Spr (Mcgonigal, K; Hanson, M)

**ATHLETIC 20M. Capoeira Club**

1 unit, Aut (Ghormley, T), Win (Ghormley, T), Spr (Ghormley, T)

**ATHLETIC 22C. Competitive Cheer Club**

This credit is offered to returning members of the specified Club Sports team. All enrollees must complete 21 hours of participation with the team and meet any other team requirements during the quarter. This is NOT a PE class or credit for beginners. While many teams are open to beginners joining, the credit is offered to returning athletes committed to the team for the year. If you are new to the team, please look to register for the credit in future quarters once you are committed as a team member.

1 unit, Aut (Mahlow, P), Win (Mahlow, P)

**ATHLETIC 23. Core Training**

Exercises to build muscular strength and body core endurance, focusing on balance and stability. Equipment includes stability and medicine balls. Fee. (AU)

1 unit, Aut (Conniff, N), Win (Conniff, N), Spr (Conniff, N), Sum (Staff)

**ATHLETIC 25V. Crew, Varsity Men**

(AU)

1-2 units, Aut (Amerkhanian, C), Win (Amerkhanian, C), Spr (Amerkhanian, C)

**ATHLETIC 26V. Crew, Varsity Women**

(AU)

1-2 units, Aut (Farooq, Y), Win (Farooq, Y), Spr (Farooq, Y)

**ATHLETIC 27. Cross Training Fitness**

Cross training fitness class will focus on combining different types of exercises to work the body as a whole to develop cardiovascular fitness, strength and power. All fitness levels are welcome. Class sessions will include exercises such as: indoor cycling, plyometrics, rowing, jump rope, circuit training, and various other exercises.

1 unit, Aut (Ninow, A; Stevenson, T; White, C)

**ATHLETIC 28V. Cross Country, Varsity Men**

(AU)

1-2 units, Aut (Dunn, J)

**ATHLETIC 29V. Cross Country, Varsity Women**

(AU)

1-2 units, Aut (Dunn, J)

**ATHLETIC 30. Cycling: Indoor**

Get a fantastic cardio workout on our stationary bikes. All levels and abilities welcome. Instructors motivate participants through intervals, hill climbs and coasts for the ultimate workout.

1 unit, Aut (McWherter, B), Spr (McWherter, B)

**ATHLETIC 31C. Cycling Club Team**

This credit is offered to returning members of the specified Club Sports team. All enrollees must complete 21 hours of participation with the team and meet any other team requirements during the quarter. This is NOT a PE class or credit for beginners. While many teams are open to beginners joining, the credit is offered to returning athletes committed to the team for the year. If you are new to the team, please look to register for the credit in future quarters once you are committed as a team member. (AU)

1 unit, Aut (Mahlow, P), Win (Mahlow, P), Spr (Mahlow, P)

**ATHLETIC 33. Diving, Springboard**

Basic techniques and mechanics of springboard and platform diving. Five basic categories of dives will be introduced: front, back, inward, reverse and twist. Competitive aspects of diving. Fee.

1 unit, Aut (Schavone, R)

**ATHLETIC 34V. Diving, Varsity Men**

(AU)

1-2 units, Aut (Schavone, R), Win (Schavone, R), Spr (Schavone, R)

**ATHLETIC 35V. Diving, Varsity Women**

(AU)

1-2 units, Aut (Schavone, R), Win (Schavone, R), Spr (Schavone, R)

**ATHLETIC 37C. Equestrian Club Team**

(AU)

1 unit, Aut (Bartsch, V), Win (Bartsch, V), Spr (Bartsch, V)

**ATHLETIC 38M. Eskrima**

1 unit, Aut (Ghormley, T), Win (Ghormley, T), Spr (Ghormley, T)

**ATHLETIC 39. Fencing: Beginning**

The sport of swordmanship develops quick hands, strong legs, and a strategic mind. Footwork, handwork, and bouting. Emphasis is on foil technique. All equipment provided. Fee. (AU)

1 unit, Aut (Lepeshinski, A; Posthumus, E), Win (Posthumus, E; Naulo, V)

**ATHLETIC 40. Fencing, Intermediate**

Continuation of 39; learn advanced footwork and handwork. Strategy and bouting. Introduction to epee and saber. All equipment provided. Prerequisite: 39. Fee. (AU)

1 unit, Win (Posthumus, E; Lepeshinski, A), Spr (Pogossoff, G; Posthumus, E)

**ATHLETIC 41V. Fencing, Varsity Men**

(AU)

1-2 units, Aut (Posthumus, E), Win (Posthumus, E), Spr (Posthumus, E)

**ATHLETIC 42V. Fencing, Varsity Women**

(AU) (Milgram)

1-2 units, Aut (Posthumus, E), Win (Posthumus, E), Spr (Posthumus, E)

**ATHLETIC 43. Futsal**

Futsal is a variant of soccer that is played on a smaller playing surface and mainly played indoors. Soccer greats such as Kaka, Ronaldo, Ronaldinho, Marta and Messi grew up playing Futsal and credit it for developing their incredible skills. Learn quick reflexes, fast thinking and pin-point passing. With five-a-side play and a special low bounce ball, Futsal will improve your game through its intense pace and rapid execution.

1 unit, Spr (Danielson, S; Cota, P)

**ATHLETIC 45. Field Hockey, Indoor**

Learn the game and rule of indoor field hockey

1 unit, Win (Danielson, S; Cota, P)

**ATHLETIC 46. Field Hockey, Intermediate**

For those with prior experience. Techniques, skills, and strategy.

Scrimmages and game-like scenarios. Fee. (AU)

*1 unit, not given this year*

**ATHLETIC 47V. Field Hockey, Varsity Women**  
(AU)

*1-2 units, Aut (Danielson, T), Spr (Danielson, T)*

**ATHLETIC 48V. Football, Varsity**  
(AU)

*1-2 units, Aut (Shaw, D; Miraglia, T), Spr (Shaw, D)*

**ATHLETIC 49. Golf for Women: Beginning**

Fundamentals of the golf swing: putting, chipping and sand play. Golf etiquette and rules. Fee.

*1 unit, Win (O'Connor, C; Marshall-Imrie, K)*

**ATHLETIC 51. Golf: Beginning**

Fundamentals of the golf swing; putting, chipping, and sand play. Golf etiquette and rules. Fee. (AU)

*1 unit, Aut (Miller, J), Win (Miller, J), Spr (Marrone, P), Sum (Staff)*

**ATHLETIC 52. Golf: Advanced Beginning**

Further development of the golf swing and short game. How to practice. Rules and etiquette. Prerequisite: 51 or golf experience. Fee. (AU)

*1 unit, Aut (Flippo, K), Win (Miller, J), Spr (Miller, J), Sum (Staff)*

**ATHLETIC 53. Golf: Intermediate**

Drills and practice on all facets of golf. How to lower scores and manage the game on the course. Prerequisite: 52 or equivalent. Fee. (AU)

*1 unit, Aut (Flippo, K), Win (Acosta, E), Spr (Marrone, P), Sum (Staff)*

**ATHLETIC 54. Golf: Advanced**

Goal is to refine the golf swing and increase power, distance, and accuracy. Course management, mental preparation, visualization techniques. Prerequisites: 53 or experience playing and practicing, and the ability to hit shots with relative accuracy and distance. Fee. (AU)

*1 unit, Aut (Gingell, T), Win (Ray, C; Rowe, P), Spr (Miller, J)*

**ATHLETIC 55V. Golf, Varsity Men**

(AU)

*1-2 units, Aut (Ray, C), Win (Ray, C), Spr (Ray, C)*

**ATHLETIC 56V. Golf, Varsity Women**

AU

*1-2 units, Aut (O'Connor, C), Win (O'Connor, C), Spr (O'Connor, C)*

**ATHLETIC 58. Gymnastics: Beginning**

Fundamental gymnastics movement for men and women, including flexibility and strength exercises taught on the Olympic apparatus including floor, balance beam, bars, and rings. Fee. (AU)

*1 unit, Aut (Swircek, C), Win (Ter-Zakhariants, G), Spr (Yim, T)*

**ATHLETIC 59. Gymnastics: Intermediate**

For students who have completed 58 or have a background in gymnastics. Emphasis is on tumbling and somersaulting. Group work and individualized instruction for men and women. Limited apparatus work. Fee. (AU)

*1 unit, Aut (McClure, B), Win (Yim, T), Spr (McClure, B)*

**ATHLETIC 60V. Gymnastics, Varsity Men**

(AU)

*1-2 units, Aut (Glielmi, T), Win (Glielmi, T), Spr (Glielmi, T)*

**ATHLETIC 61V. Gymnastics, Varsity Women**

(AU)

*1-2 units, Aut (Smyth, K), Win (Smyth, K), Spr (Smyth, K)*

**ATHLETIC 63. Hip Hop**

Funky, jazzy, hip hop dance for fun and cardiovascular fitness. Fee. (AU)

*1 unit, Aut (Miller Bell, A; Navarro, L), Win (Miller Bell, A; Navarro, L), Spr (Miller Bell, A; Navarro, L), Sum (Staff)*

**ATHLETIC 65. Horsemanship: Beginning Riding**

No experience needed. Basic horsemanship and riding at the walk, trot and canter. Fee. (AU)

*1 unit, Aut (Bartsch, V), Win (Bartsch, V), Spr (Bartsch, V)*

**ATHLETIC 66. Horsemanship: Advanced Beginning Riding**

Horsemanship and horse care; the canter and basic jumping.

Prerequisite: 65 or equivalent. Fee. (AU)

*1 unit, Aut (Bartsch, V), Win (Bartsch, V), Spr (Bartsch, V)*

**ATHLETIC 67. Horsemanship: Intermediate Riding**

Basic veterinary skills and barn management. Riding at all gaits and completing horsemanship patterns (Western) or jumping basic courses (English). Fee. Prerequisite: 66 or equivalent. (AU)

*1 unit, Aut (Bartsch, V), Win (Bartsch, V), Spr (Bartsch, V)*

**ATHLETIC 68. Horsemanship: Student Assistant**

(Bartsch)

*1 unit, Aut (Bartsch, V), Win (Bartsch, V), Spr (Bartsch, V)*

**ATHLETIC 69. Equine Guided Education**

EGE facilitates personal and professional development through specifically designed activities with horses. Identifying personal strengths and weaknesses, focusing on goals, and successful negotiating are among the topics explored. This course will provide an overview of the history and theory of EGE with exposure to EGE through hands-on exercises with horses. This is an un-mounted course. No experience needed. Fee.

*1 unit, Aut (Bartsch, V), Win (Staff), Spr (Staff)*

**ATHLETIC 70. Horsemanship**

This course explores the basics of horsemanship and provides the necessary foundation for beginning riding. Topics include, but are not limited to, general horse care, handling techniques, horse health and disease, and stable management. This is an un-mounted course. No experience needed. Fee.

*1 unit, Aut (Bartsch, V), Win (Staff), Spr (Staff)*

**ATHLETIC 70C. Horse Polo Club Team**

This credit is offered to returning members of the specified Club Sports team. All enrollees must complete 21 hours of participation with the team and meet any other team requirements during the quarter. This is NOT a PE class or credit for beginners. While many teams are open to beginners joining, the credit is offered to returning athletes committed to the team for the year. If you are new to the team, please look to register for the credit in future quarters once you are committed as a team member. (AU)

*1 unit, Win (Mahlow, P), Spr (Mahlow, P)*

**ATHLETIC 72C. Ice Hockey Club Team**

This credit is offered to returning members of the specified Club Sports team. All enrollees must complete 21 hours of participation with the team and meet any other team requirements during the quarter. This is NOT a PE class or credit for beginners. While many teams are open to beginners joining, the credit is offered to returning athletes committed to the team for the year. If you are new to the team, please look to register for the credit in future quarters once you are committed as a team member. Men (AU)

*1 unit, Aut (Mahlow, P), Win (Mahlow, P)*

**ATHLETIC 73M. JKA Shotokan Karate**

*1 unit, Aut (Ghormley, T), Win (Ghormley, T), Spr (Ghormley, T)*

**ATHLETIC 74C. Judo Club Team**

This credit is offered to returning members of the specified Club Sports team. All enrollees must complete 21 hours of participation with the team and meet any other team requirements during the quarter. This is NOT a PE class or credit for beginners. While many teams are open to beginners joining, the credit is offered to returning athletes committed to the team for the year. If you are new to the team, please look to register for the credit in future quarters once you are committed as a team member. (AU)

*1 unit, Win (Mahlow, P), Spr (Mahlow, P)*

**ATHLETIC 75M. Jujitsu Self Defense**

*1 unit, Aut (Ghormley, T), Win (Ghormley, T), Spr (Ghormley, T)*

**ATHLETIC 76. Kickboxing**

High intensity cardio workout incorporating kicks, punches, and elbow/knee and other combinations inspired by martial arts and boxing. Fee. (AU)

*1 unit, Aut (Mandell, M), Win (Mandell, M), Spr (Mandell, M), Sum (Staff)*

**ATHLETIC 77C. Lacrosse Club Team (Men)**

This credit is offered to returning members of the specified Club Sports team. All enrollees must complete 21 hours of participation with the team and meet any other team requirements during the quarter. This is NOT a PE class or credit for beginners. While

many teams are open to beginners joining, the credit is offered to returning athletes committed to the team for the year. If you are new to the team, please look to register for the credit in future quarters once you are committed as a team member. (AU)

*1 unit, Win (Mahlow, P), Spr (Mahlow, P)*

#### **ATHLETIC 78M. Kenpo Karate**

*1 unit, Aut (Ghormley, T), Win (Ghormley, T), Spr (Ghormley, T)*

#### **ATHLETIC 78V. Lacrosse, Varsity Women (AU)**

*1-2 units, Aut (Bokker, A), Win (Bokker, A), Spr (Bokker, A)*

#### **ATHLETIC 79. WOMEN'S LACROSSE**

This is a lacrosse class geared towards the women's game. All levels are welcome to participate. If you do not have equipment it will be provided. You will need to bring your own mouth guard. We will be playing on artificial turf, sneakers or cleats are recommended.

*1 unit, Aut (McKenzie, B; Spencer, D)*

#### **ATHLETIC 80. Lifeguard Training**

Priority to those wanting to guard at Stanford during the year. Lifeguard characteristics and responsibilities, recognition of hazards and emergencies, patron and facility surveillance, interaction with the public, rescue skills. Community first aid and CPR for the professional rescuer. Fee. Prerequisite: pass swim test (swimmer/advanced swimmer level).

*2 units, Spr (Erdrich, M; Carpenter, R)*

#### **ATHLETIC 81M. Muay Thai**

*1 unit, Aut (Ghormley, T), Win (Ghormley, T), Spr (Ghormley, T)*

#### **ATHLETIC 82. Manager: Athletic Team**

For student managers of intercollegiate teams. Prerequisite: consent of respective varsity team head coach. (AU)

*1 unit, Aut (Staff), Win (Dawkins, J), Spr (Staff)*

#### **ATHLETIC 87. Learn to Row**

This class is an introduction to the sport of rowing using ergometer machines. The fundamentals of proper form, technique and workouts to develop cardiovascular fitness will be taught.

*1 unit, Aut (Farooq, Y)*

#### **ATHLETIC 88. Beginning Rowing for Women**

This class is an introduction to the sport of rowing using ergometer machines. The fundamentals of proper form, technique and workouts to develop cardiovascular fitness will be taught. If you are interested in trying out for the Women's Rowing team this is an excellent class to give you the basics.

*1 unit, not given this year*

#### **ATHLETIC 89. Rowing Ergometer**

Introduction to aerobic based training utilizing rowing machines. Rowing, core, flexibility and VO2 expansion training. Fee.

*1 unit, Aut (Davis, M), Win (Staff)*

#### **ATHLETIC 90. Pilates Mat**

Balanced sequence of exercises emphasizing grace and balance. Breath work and precision separate Pilates from traditional conditioning methods. Fee. (AU)

*1 unit, Aut (Conniff, N), Win (Conniff, N), Spr (Conniff, N)*

#### **ATHLETIC 91C. Rugby Club Team (Men)**

This credit is offered to returning members of the specified Club Sports team. All enrollees must complete 21 hours of participation with the team and meet any other team requirements during the quarter. This is NOT a PE class or credit for beginners. While many teams are open to beginners joining, the credit is offered to returning athletes committed to the team for the year. If you are new to the team, please look to register for the credit in future quarters once you are committed as a team member. (AU)

*1 unit, Aut (Mahlow, P; Arena, D), Win (Sherman, M), Spr (Sherman, M)*

#### **ATHLETIC 92C. Rugby Club Team (Women) (AU)**

*1 unit, Aut (Sherman, M), Win (Griffin, P), Spr (Griffin, P)*

#### **ATHLETIC 95. Running at Stanford**

Develop a training plan to meet your running goals. Proper form, warm ups, cool downs. Middle distance and distance workouts to meet your running goals.

*1 unit, Win (Staff)*

#### **ATHLETIC 98. Sailing, Beginning**

Skills, theory, and techniques to enable beginners to sail with confidence in small centerboard boats. Fee. (AU)

*1 unit, Aut (Ruzicka-Hayes, C), Spr (Ustach, F)*

#### **ATHLETIC 99. Sailing, Advanced Beginning**

Continuation of ATHLETIC 98. For those with some sailing experience but not yet ready for intermediate sailing. Fee. May be repeated for credit. Prerequisites: ATHLETIC 98 or consent of instructor.

*1 unit, Aut (O'Bryan, M), Spr (O'Bryan, M)*

#### **ATHLETIC 100. Sailing, Intermediate**

Refine skills. Introduction to racing. Prerequisite: ATHLETIC 99 or consent of instructor. Fee. (AU)

*1 unit, Spr (O'Bryan, M)*

#### **ATHLETIC 104V. Sailing, Varsity Men (AU)**

*1-2 units, Aut (Vandemoer, J), Win (Vandemoer, J), Spr (Vandemoer, J)*

#### **ATHLETIC 105V. Sailing, Varsity Women (AU)**

*1-2 units, Aut (Vandemoer, J), Win (Vandemoer, J), Spr (Vandemoer, J)*

#### **ATHLETIC 107C. Ski Club Team**

This credit is offered to returning members of the specified Club Sports team. All enrollees must complete 21 hours of participation with the team and meet any other team requirements during the quarter. This is NOT a PE class or credit for beginners. While many teams are open to beginners joining, the credit is offered to returning athletes committed to the team for the year. If you are new to the team, please look to register for the credit in future quarters once you are committed as a team member. (AU)

*1 unit, Win (Mahlow, P)*

#### **ATHLETIC 109. Social Dance, Beginning**

Introduction to modern ballroom partner dancing. We'll cover steps, styling, technique, and rhythms in the five most popular social ballroom dances: Waltz, Foxtrot, Tango, Rumba, Cha-Cha. No experience or partner necessary. Fee.

*1 unit, Aut (Greer, K), Win (Greer, K), Spr (Greer, K)*

#### **ATHLETIC 112. Soccer: Intermediate/Advanced**

For the player with club or high school experience. Small group offensive and defensive tactics. Drills and small-sided games. Fee.

*1 unit, Spr (Becerra, R; Cooney, J)*

#### **ATHLETIC 113. Soccer: Indoor, Beginning/Intermediate**

For those with little or no playing experience. Skills, rules, small sided games. Fee. (AU)

*1 unit, Win (Cooney, J; Becerra, R)*

#### **ATHLETIC 114. Soccer, Indoor: Intermediate/Advanced**

Smaller ball and playing area. Emphasis is on individual ball skills through small sided games. Fee. (AU)

*1 unit, Win (Cooney, J)*

#### **ATHLETIC 115. Soccer: Advanced for Men**

Techniques under pressure; small group and team tactics. Fitness for the soccer player. Prerequisites: consent of instructor, tryouts. Fee. (AU)

*1 unit, Win (Simon, B)*

#### **ATHLETIC 116. Soccer: Advanced for Women**

Techniques under pressure; small group and team tactics. Fitness for the soccer player. Prerequisites: consent of instructor, tryouts. Fee. (AU)

*1 unit, Win (Ratcliffe, P)*

#### **ATHLETIC 118V. Soccer, Varsity Men (AU)**

*1-2 units, Aut (Simon, B), Spr (Simon, B)*

#### **ATHLETIC 119V. Soccer, Varsity Women (AU)**

*1-2 units, Aut (Ratcliffe, P), Spr (Ratcliffe, P)*

#### **ATHLETIC 121V. Softball, Varsity Women (AU)**

*1-2 units, Aut (Rittman, J), Win (Rittman, J), Spr (Rittman, J)*

**ATHLETIC 122. Spin Bike Cross Training**

Aerobic based expansion utilizing spin bikes. Emphasis on volume work rather than anaerobic training. Heart rate monitoring, core, flexibility and nutrition information for more efficient fueling. Fee.

*1 unit, Aut (Amerkhanian, C), Win (Petrakis, M; Simkin, D)*

**ATHLETIC 123. Squash, Beginning/Intermediate**

Techniques, rules and practice matches. Racquets, balls, and eye guards provided. Limited enrollment. Fee.

*1 unit, Aut (Talbot, M), Win (Talbot, M), Spr (Talbot, M)*

**ATHLETIC 124SI. Sport and Disability**

This class will provide an introduction to both the practical and theoretical sides of adaptive athletics. Students will gain an understanding of various adaptive sports, the social situation surrounding disabled athletes, and the concerns and issues that are specific to adaptive athletics. Students will also have the opportunity to volunteer for an adaptive recreation program in the community, watch a the documentary Murderball, and participate in a hands-on wheelchair basketball sports clinic.

*1 unit, Aut (Schoemaker, L), Spr (Odiaga, A; Schoemaker, L; Clauss, L; Brown, M)*

**ATHLETIC 125C. Squash Club Team (Men)**

(AU)

*1 unit, Aut (Talbot, M), Win (Talbot, M), Spr (Talbot, M)*

**ATHLETIC 126V. Squash, Varsity Women**

(AU)

*1-2 units, Aut (Talbot, M), Win (Talbot, M), Spr (Talbot, M)*

**ATHLETIC 128. Swimming: Overcome Fear of Water**

Overcome fear and discomfort in water. Learn to be comfortable and in control in both shallow and deep water. Feel balanced in water. Learn how water works and how your body works in water. If time permits, introduction to front crawl.

*1 unit, Aut (Lonaker, S), Spr (Lonaker, S)*

**ATHLETIC 129. Swimming: Beginning**

For non-swimmers or those who can swim about 10 yards but are not comfortable in deep water. Safety skills, front crawl, and back stroke. Additional strokes introduced as ability warrants. Fee. (AU)

*1 unit, Aut (Neuhold-Huber, Z), Spr (Lonaker, S), Sum (Staff)*

**ATHLETIC 130. Swimming: Advanced Beginning**

For those with limited swimming and safety skills. Safety skills, crawl, and elementary backstroke or back crawl. Introduction to sidestroke and breaststroke. Increase time and distance of swim. Prerequisite: ability to swim 25-50 yards on front and back. Fee. (AU)

*1 unit, Aut (Neuhold-Huber, Z), Win (Neuhold-Huber, Z), Spr (Neuhold-Huber, Z), Sum (Staff)*

**ATHLETIC 131. Swimming: Intermediate**

Crawl, elementary backstroke, backstroke, and sidestroke. Safety skill work as needed. Introduction to or review of breaststroke. Open turns. Introduction to butterfly, flip turn, and conditioning. Prerequisites: crawl, elementary backstroke, backstroke; some sidestroke and breaststroke; ability to swim approximately 100-200 yards continuously by mixing strokes. Fee. (AU)

*1 unit, Aut (Neuhold-Huber, Z), Win (Neuhold-Huber, Z), Spr (Whildin, S), Sum (Staff)*

**ATHLETIC 132. Swimming: Advanced**

Review and refine all basic strokes and safety skills. Introduction to or review of butterfly and flip turn. Stroke drills and information on conditioning and designing individual workouts. Prerequisite: average to good strokes; ability to swim approximately 400-500 yards continuously. Fee. (AU)

*1 unit, Aut (Tanner, J)*

**ATHLETIC 133. Swim Conditioning**

Improve cardio-respiratory endurance through directed swimming workouts. Technique corrections as needed. Prerequisite: advanced swimmer. Fee. (AU)

*1 unit, Aut (Kenney, A), Win (Bokker, A), Spr (Knapp, T)*

**ATHLETIC 134. Synchronized Swimming, Beginning**

Basic skills and techniques. Prerequisite: intermediate to advanced swimming skills. Fee. (AU)

*1 unit, Aut (Lowe, S), Spr (Lowe, S)*

**ATHLETIC 135V. Swimming, Synchronized: Varsity**

(AU)

*1-2 units, Aut (Olson, H), Win (Olson, H; Lowe, S), Spr (Olson, H; Lowe, S)*

**ATHLETIC 136V. Swimming, Varsity Men**

(AU)

*1-2 units, Aut (Kenney, A), Win (Kenney, A), Spr (Kenney, A)*

**ATHLETIC 137V. Swimming, Varsity Women**

(AU)

*1-2 units, Aut (Maurer, L), Win (Maurer, L), Spr (Maurer, L)*

**ATHLETIC 138. Table Tennis: Intermediate/Advanced**

This class is intended for players who have experience playing table-tennis including those who have taken the beginning table-tennis class. Students should have prior experience in countering, looping, chopping, and serving.

*1 unit, Spr (Shodhan, S)*

**ATHLETIC 139. Table Tennis**

Basic counters, topspins, and chops with both the forehand and backhand. Serve and return, emphasizing game situations and match play. All equipment provided. Fee.

*1 unit, Aut (Shodhan, S), Win (Shodhan, S)*

**ATHLETIC 140. Taiji Quan (Tai Chi)**

Taiji Quan (Tai Chi) is a Chinese martial arts system of slow meditative physical exercise designed for relaxation, balance and health. All levels are welcome.

*1 unit, Aut (Zhang, H), Win (Zhang, H), Spr (Zhang, H)*

**ATHLETIC 141C. Tae Kwon Do Club Team**

This credit is offered to returning members of the specified Club Sports team. All enrollees must complete 21 hours of participation with the team and meet any other team requirements during the quarter. This is NOT a PE class or credit for beginners. While many teams are open to beginners joining, the credit is offered to returning athletes committed to the team for the year. If you are new to the team, please look to register for the credit in future quarters once you are committed as a team member. (AU)

*1 unit, Aut (Ghormley, T), Win (Ghormley, T)*

**ATHLETIC 143C. Tennis Club Team**

This credit is offered to returning members of the specified Club Sports team. All enrollees must complete 21 hours of participation with the team and meet any other team requirements during the quarter. This is NOT a PE class or credit for beginners. While many teams are open to beginners joining, the credit is offered to returning athletes committed to the team for the year. If you are new to the team, please look to register for the credit in future quarters once you are committed as a team member. (AU)

*1 unit, Aut (Mahlow, P)*

**ATHLETIC 144. Tennis: Beginning**

Forehand, backhand, serve, and net play; rules and scoring. (AU)

*1 unit, Aut (Coupe, B), Win (Gould, A), Spr (Sarsfield, T), Sum (Staff)*

**ATHLETIC 145. Tennis: Low Intermediate**

Fundamental strokes and their use in a game situation. Prerequisites: 144, or knowledge of rules and scoring and average ability in fundamental strokes but limited playing experience. Fee. (AU)

*1 unit, Aut (Thornton, M), Win (Gould, A), Spr (Sarsfield, T), Sum (Staff)*

**ATHLETIC 146. Tennis: Intermediate**

Fundamental stroke review. Singles and doubles tactics. Prerequisites: 145 or average ability in fundamental strokes, and regular playing experience; NTRP rating of 3.0 or equivalent. (AU)

*1 unit, Aut (Glielmi, T), Win (Gould, A), Spr (Sarsfield, T), Sum (Staff)*

**ATHLETIC 147. Tennis: Advanced**

Drills emphasize footwork, serve and return, approach shots, volleys, lobs, and overheads. Strategy for competition in singles and doubles. Prerequisites: above average stroking and game playing ability; NTRP rating above 4.0 or equivalent. (AU)

*1 unit, Aut (Brennan, F), Win (Gould, A), Spr (Sarsfield, T), Sum (Staff)*

**ATHLETIC 148V. Tennis, Varsity Men**

(AU)

1-2 units, Aut (Whitlinger, J), Win (Whitlinger, J), Spr (Whitlinger, J)

#### **ATHLETIC 149V. Tennis, Varsity Women**

(AU)

1-2 units, Aut (Forood, L), Win (Forood, L), Spr (Forood, L)

#### **ATHLETIC 151. Total Body Workout**

For all fitness levels; tone and strengthen the entire body. Different equipment used to target all major muscle groups. (AU)

1 unit, Aut (Mandell, M), Win (McWherter, B), Spr (Staff), Sum (Staff)

#### **ATHLETIC 153V. Track and Field, Varsity Men**

(AU)

1-2 units, Aut (Floreal, E), Win (Floreal, E), Spr (Floreal, E)

#### **ATHLETIC 154V. Track and Field, Varsity Women**

(AU)

1-2 units, Aut (Floreal, E), Win (Floreal, E), Spr (Floreal, E)

#### **ATHLETIC 156C. Triathlon Club Team**

This credit is offered to returning members of the specified Club Sports team. All enrollees must complete 21 hours of participation with the team and meet any other team requirements during the quarter. This is NOT a PE class or credit for beginners. While many teams are open to beginners joining, the credit is offered to returning athletes committed to the team for the year. If you are new to the team, please look to register for the credit in future quarters once you are committed as a team member. (AU)

1 unit, Aut (Mahlow, P), Win (Mahlow, P), Spr (Mahlow, P)

#### **ATHLETIC 158C. Ultimate Frisbee Club Team (Men)**

This credit is offered to returning members of the specified Club Sports team. All enrollees must complete 21 hours of participation with the team and meet any other team requirements during the quarter. This is NOT a PE class or credit for beginners. While many teams are open to beginners joining, the credit is offered to returning athletes committed to the team for the year. If you are new to the team, please look to register for the credit in future quarters once you are committed as a team member. (AU)

1 unit, Aut (Mahlow, P), Win (Mahlow, P), Spr (Mahlow, P)

#### **ATHLETIC 159C. Ultimate Frisbee Club Team (Women)**

This credit is offered to returning members of the specified Club Sports team. All enrollees must complete 21 hours of participation with the team and meet any other team requirements during the quarter. This is NOT a PE class or credit for beginners. While many teams are open to beginners joining, the credit is offered to returning athletes committed to the team for the year. If you are new to the team, please look to register for the credit in future quarters once you are committed as a team member. (AU) (Staff)

1 unit, Aut (Mahlow, P), Win (Mahlow, P), Spr (Mahlow, P)

#### **ATHLETIC 162. Volleyball**

Drills to improve skills and game playing strategy. As ability indicates, more emphasis on team play and strategy. Fee. (AU)

1 unit, Aut (Price, A)

#### **ATHLETIC 164. Volleyball: Intermediate Sand**

Further development of skills and rules. Strategy in two- and four-person sand volleyball. Fee. (AU)

1 unit, Aut (Shibuya, K), Spr (Shaw, D)

#### **ATHLETIC 165. Volleyball: Advanced Sand**

Refine and improve skills and game playing strategy in two- and four-person sand volleyball. Must have strong skills and general knowledge of team concepts. Prerequisite: 164 or consent of the instructor. Fee. (AU)

1 unit, Aut (Shibuya, K), Spr (Shaw, D)

#### **ATHLETIC 166V. Volleyball, Varsity Men**

(AU)

1-2 units, Aut (Kosty, J), Win (Kosty, J), Spr (Kosty, J)

#### **ATHLETIC 167V. Volleyball, Varsity Women**

(AU)

1-2 units, Aut (Dunning, J), Win (Dunning, J), Spr (Dunning, J)

#### **ATHLETIC 168C. Volleyball Club Team**

This credit is offered to returning members of the specified Club Sports team. All enrollees must complete 21 hours of participation with the team and meet any other team requirements during the quarter. This is NOT a PE class or credit for beginners. While many teams are open to beginners joining, the credit is offered to

returning athletes committed to the team for the year. If you are new to the team, please look to register for the credit in future quarters once you are committed as a team member. (AU)

1 unit, Win (Staff)

#### **ATHLETIC 169. Water Polo: Beginning**

Introduction to basic skills and game play. For those who have never played or have had limited experience. Fee. (AU)

1 unit, Spr (Barnea, J)

#### **ATHLETIC 170. Water Polo: Intermediate/Advanced**

Further work on skills. Game strategies. Fee. (AU)

1 unit, Aut (Ortwein, S), Spr (Barnea, J)

#### **ATHLETIC 171V. Water Polo, Varsity Men**

(AU)

1-2 units, Aut (Vargas, J), Win (Vargas, J), Spr (Vargas, J)

#### **ATHLETIC 172V. Water Polo, Varsity Women**

(AU)

1-2 units, Aut (Tanner, J), Win (Tanner, J; Ortwein, S), Spr (Tanner, J; Ortwein, S)

#### **ATHLETIC 174. Weight Training: Beginning**

Improve fitness level through progressive resistance exercises using machines and free weights. Individualized weight training programs once basic exercises are learned. Stretching program. Basics of exercise physiology. Fee. (AU)

1 unit, Aut (Amundson, C), Spr (Tirapelle, A)

#### **ATHLETIC 176. Weight Training for Women**

All levels welcome, but designed for the beginner. Techniques and equipment for weight training. Emphasis is on stretching, proper form and progressions, and injury prevention. The basics of the physiology of strength training and planning individual programs. Fee. (AU)

1 unit, Aut (Amundson, C)

#### **ATHLETIC 177. Circuit Aerobic Weight Training**

A full-body conditioning workout with weight lifting and aerobic components. Weight training equipment organized into a circuit to maximize workout intensity in a short amount of time. Fee. (AU)

1 unit, Aut (Murphy, G), Win (Murphy, G), Spr (Murphy, G)

#### **ATHLETIC 178M. Wing Chun Kung Fu**

1 unit, Aut (Ghormley, T), Win (Ghormley, T), Spr (Ghormley, T)

#### **ATHLETIC 179. Wrestling and Introduction to Mixed Martial Arts (MMA)**

While primarily focusing on the basic techniques of collegiate wrestling, some non-striking forms of MMA, such as Brazilian jiu-jitsu and submission grappling, will be covered throughout the quarter.

1 unit, Spr (Blake, R)

#### **ATHLETIC 180V. Wrestling, Varsity**

(AU)

1-2 units, Aut (Borrelli, J), Win (Borrelli, J), Spr (Borrelli, J)

#### **ATHLETIC 181M. Wushu**

1 unit, Aut (Ghormley, T), Win (Ghormley, T), Spr (Ghormley, T)

#### **ATHLETIC 182. Yoga**

Mind, body, and spirit meet in yoga. Increase flexibility and restore health to the body. Fee. (AU)

1 unit, Aut (Carlow, A), Win (Carlow, A), Spr (Carlow, A), Sum (Staff)

#### **ATHLETIC 184. Yoga/Pilates Fusion**

Combination of power and restorative yoga with strength building Pilates exercises. Fee.

1 unit, Aut (Conniff, N), Win (Conniff, N), Spr (Conniff, N), Sum (Staff)

#### **ATHLETIC 186. Zumba**

Zumba combines Latin rhythms with cardiovascular exercise to create an aerobic routine. Interval and resistance training to maximize caloric output, fat burning, and total body toning. (AU)

1 unit, Aut (Piccolo, A), Win (Piccolo, A), Spr (Piccolo, A), Sum (Staff)

#### **ATHLETIC 187. Analysis of Human Movement**

Overview of skeletal and muscular anatomy. The mechanical principles of movement as related to efficient performance in



aquatics, dance, and sports.

2-4 units, *Win (Wilson, C)*

### **ATHLETIC 189. Business Practices in Sport**

Planning and management of intercollegiate sports and recreation. Elements of business contracts, finance, facility development, legal issues, risk management, human resources, security, and operations and event management. How an athletic and recreation department is organized. Career opportunities in sports and recreation administration.

2 units, *Spr (Purpur, R)*

### **ATHLETIC 190. Introduction to Nutrition**

How to optimize nutrition for health and performance. Topics include macronutrients, fad diets, sugar addiction, low-calorie sweeteners, caloric restriction, disease prevention, and nutrition.

1-2 units, *Aut (Wilson, C), Spr (Wilson, C), Sum (Staff)*

### **ATHLETIC 193. Lifestyle Fitness Challenge**

Lifestyle Fitness Challenge is a fun and engaging class. The students participate in a variety of exercises that include a focus on cardiovascular fitness, muscular strength and flexibility. They learn simple and easy ways to incorporate fun exercise into their weekly routines. Through presentations that cover everything from dealing with stress to back stretches, students learn more about their overall health, gaining a greater awareness about themselves and their bodies. The positive effects of this class definitely go beyond the experience that students have in the classroom and lead to lifelong changes for better health.

2 units, *Aut (Spanier, J), Win (Spanier, J; Selig, S), Spr (Spanier, J; Jordan, J)*

### **ATHLETIC 195. Mind, Body, Spirit**

Spiritual features of everyday life primarily from a psychological perspective with a focus on health. Topics include cultivating gratitude, forgiveness, life purpose, and kindness; mind/body/spirit solutions to everyday problems. Meditation and other stress management practices.

2 units, *Spr (Luskin, F)*

### **ATHLETIC 196. HAPPINESS**

Guided practice in research proven methods of creating more happiness in your life. Simple strategies for finding the good, becoming more peaceful, improving relationships and appreciating yourself.

1 unit, *Aut (Luskin, F; Pertofsky, C), Spr (Pertofsky, C; Luskin, F; Maguglin, K; Crane, S)*

### **ATHLETIC 197. Sport Psychology**

Basic theories in psychology which have the greatest influence on sport performance. Motivation, anxiety reduction, personality and self esteem, motor learning theories and sociological aspects and their influence on performance and learning.

2 units, *Spr (Schavone, R)*

### **ATHLETIC 199. Sports Nutrition with Clinical Applications**

The central theme of this course is to see how the mechanisms by which nutrition positively impacts sports performance relates to the mechanisms of health and disease. Grading is based on class participation (1 unit) or term papers and presentations (2 units) There are no prerequisites for this class, but up to a dozen students are allowed to take the course for 2 units (discussed at the first class meeting) and they should have a background that enables them to engage in an upper division discussion of nutrition. This would include having taken Hum Bio 130 or 135 (Human Nutrition or Exercise Physiology), Athletics 75 (my lower division course), Bio Core or similarly helpful courses. At the very least a student should take Hum Bio 130 or Ath 75 concurrent to taking Ath 123. Limit of 12 students taking the class for 2 credits, students must talk with instructor on first day.

1-2 units, *Spr (Wilson, C)*

### **ATHLETIC 331. Rock Climbing 1 - Introduction to Rock Climbing**

Learn the basics of rock climbing, safety and equipment.

1 unit, *Aut (Sandlin, P), Win (Collins, N), Spr (Looper, K)*

### **ATHLETIC 332. Rock Climbing 2**

Rock Climbing 2 - Intermediate Climbing Technique. Are you interested in boosting your climbing? This course is designed to instruct students in efficient climbing movement techniques for various terrain, introduce basic training principles for improving

your climbing, and reinforce best safety practices for climbing and bouldering. This is a great course for individuals getting back into climbing and those continuing their climbing education. Join us! Prerequisite: Current Belay Certification at the Stanford Climbing Wall.

1 unit, *Aut (Sandlin, P), Win (Staff), Spr (Looper, K)*

### **ATHLETIC 333. Rock Climbing 3**

Rock Climbing 3 - Intermediate 2 and Learn to Lead combined. The Rock Climbing 3 course will focus on improving climbing technical skills including intermediate to advanced climbing technique, and an introduction to sport lead climbing. Students will be introduced to a variety of climbing skills and techniques for improving safety and efficiency while climbing including body positioning, efficient and controlled dynamic movement, proper lead clipping techniques, lead belaying techniques and catching lead falls, cleaning lead anchors and rappelling, and building basic sport climbing anchors from fixed protection. Students should have a minimum of one year prior climbing and top-rope belaying experience and be able to comfortably complete top-roped climbs of at least a 5.10a level of difficulty.

1 unit, *Aut (Sandlin, P), Win (Staff), Spr (Staff)*

### **ATHLETIC 340. Rock Climbing: Strength and Conditioning**

For experienced climbers to improve climbing skills and overall fitness through rock climbing exercises that center on focus, endurance, power-endurance, and power. Prerequisite: intermediate climbing class or equivalent or consent of instructor. Fee. (AU)

1 unit, *Aut (Sandlin, P), Win (Sandlin, P), Spr (Sandlin, P)*

### **ATHLETIC 342. Rock Climbing Route Setting**

This class will introduce the route setting for rock climbing

1 unit, *Aut (Sandlin, P), Win (Sandlin, P), Spr (Sandlin, P)*

### **ATHLETIC 347. Aerial Fabrics 1**

Recreate Cirque du soleil acrobatics at a Climbing Wall aerial fabrics class

1 unit, *Aut (Granolund, K), Win (Staff), Spr (Panage, S)*

### **ATHLETIC 348. Aerial Fabrics 2**

Aerial Fabrics 2: Intermediate 1 Aerial silks is a circus art of strength, grace, and flexibility in which the performer climbs, poses, and drops through the air using suspended pieces of specialized fabric. This class continues where Aerial Fabrics 1 left off, developing the skill and comfort to really take flight in a routine. Students will work on advanced climbs and complex sequences, with an emphasis on drops. Each class will also include time spent on safety, stretching, and conditioning. Each student will have the opportunity to perform a routine at the end of the quarter. This class is designed for students who have already taken Aerial Fabrics 1 or can demonstrate mastery of the skills taught therein. Please note, for our most advanced students, we recommend taking the non-credit Intermediate II class that takes place after this one.

1 unit, *Aut (Finn, E), Win (Staff), Spr (Staff)*

### **ATHLETIC 405. Outdoor Leadership**

Skills needed to lead basic multi-day backpacking trips. Classroom sessions and wilderness trips. Topics include group dynamics and leadership, technical skills, and wilderness first aid. Class may require work over several quarters. See <http://www.stanford.edu/group/spot/training/>. (FORMERLY ATH 84)

1 unit, *Aut (Thompson, A), Win (Wright, P), Spr (Thompson, A)*

### **ATHLETIC 406. Outdoor Leadership Practicum**

Wilderness field portion of ATH 405 Outdoor Leadership. Skills needed to lead basic multi-day backpacking trips. See <http://www.stanford.edu/group/spot/training/>. You may contact SPOT with specific questions. PREREQ ATH 405 (Formerly ATH 84)

1 unit, *Aut (Thompson, A), Win (Wright, P), Spr (Wright, P)*

### **ATHLETIC 495. Outdoor Education: Assistant Instructor**

Formerly ATH 83--Assist Instructing Outdoor Education Courses. Instructor Approval and Defined Student Goals/Benchmarks Required Prior to instructing.

1 unit, *Aut (Thompson, A), Win (Fields, A), Spr (Fields, A)*

### **ATHLETIC 510. Wilderness First Aid**

Wilderness First Aid (WFA) is a class that provides a basic



introduction to backcountry and emergency medicine. Topics covered include patient assessment, addressing life threats, shock, spine safety, musculoskeletal injuries, medical emergencies, environmental emergencies, and more. Each weekly class short lectures and practical sessions. A 3-year certification card is provided by Stanford Wilderness Medicine (SWiM) upon successful completion of the course.

*1 unit, Aut (Thompson, A), Win (Schaub, M), Spr (Fields, A)*

#### **ATHLETIC 515. Wilderness First Responder**

Wilderness First Responder (WFR) is an intensive 80 hour class that focuses on basic life support techniques and tools for the outdoor professional working in the wilderness. It covers trauma, environmental and medical issues that arise in a wilderness setting using both lecture and hands-on activity of scenarios and labs for experiential education. Among other things, students will perform solid CPR and BLS skills, make improvised splints, understand basic anatomy and physiology, clean and manage wounds in the backcountry, recognize serious backcountry trauma injuries, environmental issues, medical issues, triage and know how to handle mass casualty incidents. Wilderness First Responder is a must for outdoor professionals looking to take their first aid skills to the next level, and to be prepared for medical emergencies in the wilderness. WFR certification lasts 3 years upon successful passing of written and practical exams. Course includes AEHS adult, child, and infant CPR cert

*2 units, Aut (Thompson, A), Win (Staff), Spr (Staff)*

#### **ATHLETIC 530. Climbing Wall Instructor**

The Professional Climbing Instructor's Association (PCIA) Climbing Wall Instructor (CWI) Course provides instructors with an in depth and standardized understanding of the skills essential to teaching climbing in an indoor setting. Emphasis on the importance of teaching technically accurate information & sound fundamental skills. (Formerly ATH 21)

*1 unit, Aut (Fields, A), Win (Fields, A), Spr (Staff)*

## BIOCHEMISTRY (BIOC) COURSES

### UNDERGRADUATE COURSES IN BIOCHEMISTRY

Primarily for undergraduates; graduate students may enroll with consent of adviser.

#### **BIOC 118Q. Genomics and Medicine**

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Knowledge gained from sequencing human genomes and implications for medicine and biomedical research. Novel diagnoses and treatment of diseases, including stem cells, gene therapy and rational drug design. Personal genomics and how it is used to improve health and well being. Social and ethical implications of genetic information such as privacy, discrimination and insurability. Course Webpage: <http://biochem118.stanford.edu/>. GER:DB-EngrAppSci

*3 units, Win (Brutlag, D)*

#### **BIOC 158. Genomics, Bioinformatics and Medicine**

(Same as BIOC 258, HUMBIO 158G) Molecular basis of inherited human disease. Diagnostics approaches: simple Mendelian diseases and complex, multifactorial diseases. Genomics: functional genomics, epigenetics, gene expression, SNPs, copy number and other structural genomic variations involved in disease. Novel therapeutic methods: stem cell therapy, gene therapy and drug developments that depend on the knowledge of genomics. Personal genomics, pharmacogenomics, clinical genomics and their role in the future of preventive medicine. Prerequisites: BIO 41 or HUMBIO 2A or consent of instructor. Those with credit in BIOC 118 not eligible to enroll. Course webpage: <http://biochem158.stanford.edu/>

*4 units, Aut (Brutlag, D)*

#### **BIOC 199. Undergraduate Research**

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

*1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

### GRADUATE COURSES IN BIOCHEMISTRY

Primarily for graduate students; undergraduates may enroll with consent of instructor.

#### **BIOC 200. Applied Biochemistry**

Enrollment limited to MD candidates. Fundamental concepts of biochemistry as applied to clinical medicine. Topics include thermodynamics, enzyme kinetics, vitamins and cofactors, metabolism of carbohydrates, lipids, amino acids and nucleotides, and the integration of metabolic pathways. Clinical case studies discussed in small-group, problem-based learning sessions.

*1 unit, Aut (Cowan, T; Harbury, P; Theriot, J)*

#### **BIOC 201. Advanced Molecular Biology**

Literature-based lectures and discussion on rapidly developing frontiers in chromosome structure and function and modern insights into the control of gene expression. Emphasis is on experimental approaches and insights. Topics include chromosome organization, novel modes of transcriptional control, RNA-based mechanisms for controlling gene expression and emerging translational regulatory mechanisms. Prerequisite: undergraduate molecular biology.

*5 units, not given this year*

#### **BIOC 202. Biochemistry Bootcamp**

Open to first year Biochemistry students or consent of instructor. Hands-on, five-day immersion in biochemical methods and practice, theory and application of light microscopy, and computational approaches to modern biological problems.

*1 unit, Aut (Straight, A)*

#### **BIOC 205. Molecular Foundations of Medicine**

For medical students. Topics include DNA structure, replication, repair, and recombination; gene expression, including mechanisms for regulating transcription and translation; chromosome structure and function; gene cloning, protein engineering, and genomics. Patient presentations and journal clubs illustrate how molecular biology affects the practice of medicine.

*3 units, Aut (Chu, G; Krasnow, M)*

#### **BIOC 210. Advanced Topics in Membrane Trafficking**

The structure, function, and biosynthesis of cellular membranes and organelles. Current literature. Prerequisite: consent of instructor.

*3 units, Sum (Staff)*

#### **BIOC 215. Frontiers in Biological Research**

(Same as DBIO 215, GENE 215) Literature discussion in conjunction with the Frontiers in Biological Research seminar series in which investigators present current work. Students and faculty meet beforehand to discuss papers from the speaker's primary research literature. Students meet with the speaker after the seminar to discuss their research and future direction, commonly used techniques to study problems in biology, and comparison between the genetic and biochemical approaches in biological research.

*1 unit, Aut (Harbury, P; Villeneuve, A; Calos, M), Win (Harbury, P; Villeneuve, A; Calos, M)*

#### **BIOC 218. Computational Molecular Biology**

(Same as BIOMEDIN 231) Practical, hands-on approach to field of computational molecular biology. Recommended for molecular biologists and computer scientists desiring to understand the major issues concerning analysis of genomes, sequences and structures. Various existing methods critically described and strengths and limitations of each. Practical assignments utilizing tools described. All homework and coursework submitted electronically. Course webpage: <http://biochem218.stanford.edu/>.

*3 units, Aut (Brutlag, D), Win (Brutlag, D), Spr (Staff)*

#### **BIOC 220. Chemistry of Biological Processes**

(Same as CSB 220) The principles of organic and physical chemistry as applied to biomolecules. Goal is a working knowledge of chemical principles that underlie biological processes, and chemical tools used to study and manipulate biological systems. Prerequisites: organic chemistry and biochemistry, or consent of instructor.

*4 units, alternate years, not given this year*

#### **BIOC 221. The Teaching of Biochemistry**

Required for teaching assistants in Biochemistry. Practical experience in teaching on a one-to-one basis, and problem set

design and analysis. Familiarization with current lecture and text materials; evaluations of class papers and examinations. Prerequisite: enrollment in the Biochemistry Ph.D. program or consent of instructor.

3 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### **BIOC 224. Advanced Cell Biology**

(Same as BIO 214, MCP 221) For Ph.D. students. Current research on cell structure, function, and dynamics. Topics include complex cell phenomena such as cell division, apoptosis, compartmentalization, transport and trafficking, motility and adhesion, differentiation, and multicellularity. Current papers from the primary literature. Prerequisite for advanced undergraduates: BIO 129A,B, and consent of instructor.

2-5 units, Win (Kopito, R; Nachury, M; Straight, A; Pfeiffer, S; Theriot, J)

### **BIOC 226. Interdisciplinary Approaches to Biochemistry: Single Molecule Biophysics to Clinical Outcomes**

Interdisciplinary analyses from basic biochemistry and biophysics to clinical outcomes of disease states and potential therapeutic interventions (translational research). Focus on cardiac system. Cardiomyopathies arise from missense mutations in cardiac muscle proteins, including the cardiac myosin motor. Single molecule biophysics and classical enzyme kinetics and use of induced pluripotent stem cells (iPS cells) and single cell studies lay foundation for discussions of effects of cardiomyopathy mutations on heart function. Potential therapeutic approaches discussed, including genetic analysis, DNA cloning, reconstitution of functional assemblies, x-ray diffraction and 3D reconstruction of electron microscope images, spectroscopic methods, computational approaches, single molecule biophysics, use of induced pluripotent stem cells in research, and other interdisciplinary approaches. Current papers examined. Prerequisites: basic biochemistry.

3 units, not given this year

### **BIOC 230. Molecular Interventions in Human Disease**

For M.D. students who intend to declare a concentration in molecular basis of medicine, MSTP students, and Ph.D. students. Advanced medical biochemistry focusing on cases where molecular-level research has led to new medical treatments or changes in the understanding of important diseases. Different topics each week explore the underlying molecular basis of a variety of diseases and the reasons for success and failure in molecular approaches to treatment. Student-led discussions dissect papers from the primary medical and scientific research literature.

2-3 units, not given this year

### **BIOC 236. Biology by the Numbers: Evolution**

(Same as APPPHYS 236) Topics in biology from a quantitative perspective. Subjects vary. 2011-12 focus: evolution, from basic principles of evolutionary dynamics to fundamental quantitative questions that are far from being answered; from early life, metabolic processes, and molding of earth by microbes to spread of human epidemics; from analysis of genomes and molecular phylogenies to aspects of multi-cellular development. Prerequisites: Familiarity with ordinary differential equations and probability. Biology background not required.

3 units, Spr (Fisher, D), alternate years, not given next year

### **BIOC 241. Biological Macromolecules**

(Same as BIOPHYS 241, SBI0 241) The physical and chemical basis of macromolecular function. Forces that stabilize biopolymers with three-dimensional structures and their functional implications. Thermodynamics, molecular forces, structure and kinetics of enzymatic and diffusional processes, and relationship to their practical application in experimental design and interpretation. Biological function and the level of individual molecular interactions and at the level of complex processes. Case studies in lecture and discussion of classic and current literature. Enrollment limited to 30. Prerequisites: None; background in biochemistry and physical chemistry preferred but material available for those with deficiency; undergraduates with consent of instructor only.

3-5 units, Aut (Herschlag, D; Ferrell, J; Puglisi, J; Block, S; Weis, W; Garcia, K)

### **BIOC 257. Currents in Biochemistry**

Seminars by Biochemistry faculty on their ongoing research. Background, current advances and retreats, general significance,

and tactical and strategic research directions.

1 unit, Aut (Spudich, J)

### **BIOC 258. Genomics, Bioinformatics and Medicine**

(Same as BIOC 158, HUMBIO 158G) Molecular basis of inherited human disease. Diagnostics approaches: simple Mendelian diseases and complex, multifactorial diseases. Genomics: functional genomics, epigenetics, gene expression, SNPs, copy number and other structural genomic variations involved in disease. Novel therapeutic methods: stem cell therapy, gene therapy and drug developments that depend on the knowledge of genomics. Personal genomics, pharmacogenomics, clinical genomics and their role in the future of preventive medicine. Prerequisites: BIO 41 or HUMBIO 2A or consent of instructor. Those with credit in BIOC 118 not eligible to enroll. Course webpage: <http://biochem158.stanford.edu/>

4 units, Aut (Brutlag, D)

### **BIOC 298. Biochemistry Consulting Service**

Students are presented with requests for advice from faculty and students in the biological sciences and Medical School encountering experimental and analytical problems in their research. Students work with the instructor and other biochemistry faculty to propose solutions. May be repeated for credit.

3 units, not given this year

### **BIOC 299. Directed Reading in Biochemistry**

Prerequisite: consent of instructor. (Staff)

1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### **BIOC 370. Medical Scholars Research**

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

4-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### **BIOC 399. Graduate Research and Special Advanced Work**

Allows for qualified students to undertake investigations sponsored by individual faculty members.

1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### **BIOC 459. Frontiers in Interdisciplinary Biosciences**

(Same as BIO 459, BIOE 459, CHEMENG 459, CHEM 459, PSYCH 459) Students register through their affiliated department; otherwise register for CHEMENG 459. For specialists and non-specialists. Sponsored by the Stanford BioX Program. Three seminars per quarter address scientific and technical themes related to interdisciplinary approaches in bioengineering, medicine, and the chemical, physical, and biological sciences. Leading investigators from Stanford and the world present breakthroughs and endeavors that cut across core disciplines. Pre-seminars introduce basic concepts and background for non-experts. Registered students attend all pre-seminars; others welcome. See <http://biox.stanford.edu/courses/459.html>. Recommended: basic mathematics, biology, chemistry, and physics.

1 unit, Aut (Robertson, C), Win (Robertson, C), Spr (Robertson, C)

### **BIOC 801. TGR Project**

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### **BIOC 802. TGR Dissertation**

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

## BIOENGINEERING (BIOE) COURSES

### UNDERGRADUATE COURSES IN BIOENGINEERING

Primarily for undergraduates; graduate students may enroll with consent of adviser.

#### **BIOE 10N. Form and Function of Animal Skeletons**

(Same as ME 10N) Preference to freshmen. The biomechanics and mechanobiology of the musculoskeletal system in human beings and other vertebrates on the level of the whole organism, organ systems, tissues, and cell biology. Field trips to labs. GER:DB-

EngrAppSci

3 units, not given this year

**BIOE 41. Physical Biology of Macromolecules**

Principles of statistical physics, thermodynamics, and kinetics with applications to molecular biology. Topics include entropy, temperature, chemical forces, enzyme kinetics, free energy and its uses, self assembly, cooperative transitions in macromolecules, molecular machines, feedback, and accurate replication. Prerequisites: MATH 41, 42; CHEM 31A, B (or 31X); strongly recommended: PHYSICS 41, CME 100 or MATH 51, and CME 106; or instructor approval. Winter, Instructor: D. Fisher

4 units, Win (Fisher, D)

**BIOE 42. Physical Biology of Cells**

Principles of transport, continuum mechanics, and fluids, with applications to cell biology. Topics include random walks, diffusion, Langevin dynamics, transport theory, low Reynolds number flow, and beam theory, with applications including quantitative models of protein trafficking in the cell, mechanics of the cell cytoskeleton, the effects of molecular noise in development, the electromagnetics of nerve impulses, and an introduction to cardiovascular fluid flow. Prerequisites: CHEM 31A, B (or 31X), CME 100 or MATH 51, CS 106A, and PHYSICS 41; strongly recommended: CME 106; or instructor approval. 4 units, Spr (Huang, K)

4 units, Spr (Huang, K)

**BIOE 44. Fundamentals for Engineering Biology Lab**

Introduction to next-generation techniques in genetic, molecular, biochemical, and cellular engineering. Lab modules build upon current research including: gene and genome engineering via decoupled design and construction of genetic material; component engineering focusing on molecular design and quantitative analysis of experiments; device and system engineering using abstracted genetically encoded objects; and product development based on useful applications of biological technologies. Limited enrollment. Priority given to majors.

4 units, Aut (Endy, A; Shih, J)

**BIOE 45. Computational Modeling of Microbial Communities**

(Same as MI 245) Innovative new sequencing technologies are permitting the generation of massive amounts of sequence data and changing the way we think about and pursue biological questions. Coupled to these opportunities are tremendous challenges for biologists to grapple with the manipulation and analysis of large datasets and to address quantitative questions on a systems scale. The goal of this course is to provide biologists with basic computational tools and knowledge to confront large datasets in a quantitative manner. Students will learn basic programming skills in Matlab and Perl. Covered material will include: image analysis, bioinformatics algorithms, reaction-diffusion modeling, Monte Carlo algorithms, and population dynamics. Students will apply computational skills to a miniature research project studying the human microbiome or biofuel-related photosynthetic microbial communities. Spr 2012, (Huang, K., Sonnenburg, J., and Vora, T.)

4 units, Spr (Huang, K; Sonnenburg, J; Vora, T)

**BIOE 51. Anatomy for Bioengineers**

Fundamental human anatomy, spanning major body systems and tissues including nerve, muscle, bone, cardiovascular, respiratory, gastrointestinal, and renal systems. Explore intricacies of structure and function, and how various body parts come together to form a coherent and adaptable living being. Correlate clinical conditions and therapeutic interventions. Participate in lab sessions with predissected cadaveric material and hands-on learning to gain understanding of the bioengineering human application domain. Encourage anatomical thinking, defining challenges and opportunities for bioengineers.

4 units, Spr (Srivastava, S)

**BIOE 70Q. Medical Device Innovation**

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Survey of innovative technologies and medical devices used in multiple medical specialties. Guest lecturers include Stanford Medical School physicians, entrepreneurs, and venture capitalists. Focus on how to identify clinical needs and design device solutions to address those needs. Fundamentals of starting a company. Field trips to local medical device companies and design house. No previous engineering training required.

3 units, Spr (Mandato, J; Pierce, R)

**BIOE 80. Introduction to Bioengineering**

(Same as ENGR 80) Overview of bioengineering focused on engineering analysis and design of biological systems. Topics include chemical properties of biological components, rates and equilibrium properties of biological reactions, cellular structure and communication, genetic programming of biological systems, and engineering balances and systems analysis. Application of these concepts to engineering biological systems for diverse areas, including health and medicine, biomanufacturing, and sustainability, is emphasized. Includes an introduction to MATLAB as a problem-solving tool and a team-based project emphasizing the responsible development of technologies. 4 units, Spr (Smolke) GER:DB-EngrAppSci

4 units, Spr (Smolke, C)

**BIOE 101. SYSTEMS BIOLOGY**

(Same as BIOE 210) Complex biological behaviors through the integration of computational modeling and molecular biology. Topics: reconstructing biological networks from high-throughput data and knowledge bases. Network properties. Computational modeling of network behaviors at the small and large scale. Using model predictions to guide an experimental program. Robustness, noise, and cellular variation. Prerequisites: CME 102; BIO 41, 42; or instructor approval.

4 units, Aut (Covert, M)

**BIOE 103. Systems Physiology and Design**

Biological and electrical design principles. Engineering tools used to electrically probe and model physiological systems. Basic and clinical excitable cell physiology. Topics: single-cell physiology (treatment of cells as bioelectrical devices, cable properties, ion channels and gradients, nonlinear dynamics of action potentials), network physiology and system design (neural networks, orderly recruitment of axons, Hebbian and spike timing-dependent plasticity), and excitable cell disease and interventions (major neurological and neuromuscular disease syndromes, neuromuscular simulation and surgical planning, electromagnetic stimulation instrumentation, optogenetics, tissue engineering). Prerequisites: MATH 41, 42; CME 102; PHY 41, 43; BIO 41, 42; or instructor approval.

4 units, Spr (Deisseroth, K)

**BIOE 123. Optics and Imaging**

Introduction to optical microscopy, lasers, and optical forces. Lens theory, diffraction, compound optics, aberration, gaussian optics, fluorescence spectroscopy, and optical trapping. Projects include building and testing optical microscope and optical tweezers. Win (Riedel-Kruse, I.) Limited enrollment. Priority given to majors.

4 units, Win (Riedel-Kruse, H; Quake, S)

**BIOE 131. Ethics in Bioengineering**

Bioengineering focuses on the development and application of new technologies in the biology and medicine. These technologies often have powerful effects on living systems at the microscopic and macroscopic level. They can provide great benefit to society, but they also can be used in dangerous or damaging ways. These effects may be positive or negative, and so it is critical that bioengineers understand the basic principles of ethics when thinking about how the technologies they develop can and should be applied. On a personal level, every bioengineer should understand the basic principles of ethical behavior in the professional setting. This course will involve substantial writing, and will use case-study methodology to introduce both societal and personal ethical principles, with a focus on practical applications. WIM for Bioengineering. Enrollment limited to 20; priority given to Bioengineering majors.

3 units, Spr (Altman, R)

**BIOE 141A. Biodesign Project I**

First of a two quarter series. Project and team-based experience in biological and biomedical technology design including need validation, design, and initial prototyping. Lectures (joint with ME 294) and team project time. This course is open only to students in the undergraduate Bioengineering program.

4 units, Aut (Yock, P; Srivastava, S; Smolke, C; Endy, A)

**BIOE 141B. Biodesign Project II**

Second of two quarter series. Team project work continues. Concepts are further developed through prototyping, testing and

validation. Strategies for regulatory, reimbursement and financing pathways.

4 units, Win (Srivastava, S; Yock, P; Smolke, C; Endy, A)

### **BIOE 161. Vertebrate Biology**

(Same as HUMBIO 185) Study of structure, function, evolution and behavior of vertebrate animals. Consideration of vertebrate origins and examination of classes of vertebrates. Physiology, morphology, behaviors and evolutionary relationships are treated in each vertebrate group, as these relate to overall evolutionary trends within vertebrates. Topics: swimming behaviors in sharks and bony fishes, olfaction and vision in fishes, sex determination in amphibians, reptiles, birds and mammals, navigation in sea turtles and birds, evolution and biomechanics of flight in pterosaurs birds and bats, vocalization in whales and birds, temperature adaptation in reptiles, birds and mammals.

3 units, Win (Porzig, E)

### **BIOE 191. Bioengineering Problems and Experimental Investigation**

Directed study and research for undergraduates on a subject of mutual interest to student and instructor. Prerequisites: consent of instructor and adviser. (Staff)

1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

## **GRADUATE COURSES IN BIOENGINEERING**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

### **BIOE 210. SYSTEMS BIOLOGY**

(Same as BIOE 101) Complex biological behaviors through the integration of computational modeling and molecular biology. Topics: reconstructing biological networks from high-throughput data and knowledge bases. Network properties. Computational modeling of network behaviors at the small and large scale. Using model predictions to guide an experimental program. Robustness, noise, and cellular variation. Prerequisites: CME 102; BIO 41, 42; or instructor approval.

4 units, Aut (Covert, M)

### **BIOE 212. Introduction to Biomedical Informatics Research Methodology**

(Same as BIOMEDIN 212, CS 272, GENE 212) Hands-on software building. Student teams conceive, design, specify, implement, evaluate, and report on a software project in the domain of biomedicine. Creating written proposals, peer review, providing status reports, and preparing final reports. Guest lectures from professional biomedical informatics systems builders on issues related to the process of project management. Software engineering basics. Prerequisites: BIOMEDIN 210, 211, 214, 217 or consent of instructor.

3 units, Spr (Altman, R)

### **BIOE 214. Representations and Algorithms for Computational Molecular Biology**

(Same as BIOMEDIN 214, CS 274, GENE 214) Topics: introduction to bioinformatics and computational biology, algorithms for alignment of biological sequences and structures, computing with strings, phylogenetic tree construction, hidden Markov models, Gibbs Sampling, basic structural computations on proteins, protein structure prediction, protein threading techniques, homology modeling, molecular dynamics and energy minimization, statistical analysis of 3D biological data, integration of data sources, knowledge representation and controlled terminologies for molecular biology, microarray analysis, machine learning (clustering and classification), and natural language text processing. Prerequisites: programming skills; consent of instructor for 3 units.

3-4 units, Aut (Altman, R)

### **BIOE 220. Introduction to Imaging and Image-based Neuro Anatomy**

(Same as RAD 220) The physics of medical imaging and human neuroanatomy through medical images. Emphasis is on normal anatomy, contrast mechanisms, and relative strengths of each imaging modality. Labs reinforce imaging techniques and anatomy. Prerequisites: basic biology, physics.

3 units, Win (Pauly, K; Zaharchuk, G)

### **BIOE 222A. Multimodality Molecular Imaging in Living Subjects I**

(Same as RAD 222A) Focuses on instruments and chemistries for imaging of cellular and molecular processes in vivo. Basics of instrumentation physics, chemistry of molecular imaging probes, and an introduction to preclinical and clinical molecular imaging modalities.

4 units, Aut (Levin, C; Moseley, M)

### **BIOE 222B. Multimodality Molecular Imaging in Living Subjects II**

(Same as RAD 222B) Focuses on molecular probes that target specific disease mechanisms. The ideal characteristics of molecular probes; how to optimize their design for use as effective imaging reagents that target specific steps in biological pathways and reveal the nature of disease through noninvasive assays.

4 units, Win (Levin, C; Moseley, M)

### **BIOE 222C. Multimodality Molecular Imaging in Living Subjects III**

(Same as RAD 222C) Focuses on emerging chemistries and instruments that address unmet needs for improved diagnosis and disease management in cancer, neurological disease, cardiovascular medicine and musculoskeletal disorders. Objective is to identify problems or controversies in the field, and to resolve them through understanding the relevant primary literature.

4 units, Spr (Levin, C; Moseley, M)

### **BIOE 236. Biophysical Mechanisms of Innate Immunity**

Innate immunity provides the first line of defense against disease, both infections and cancer. Innate immune effector molecules such as host defense peptides are utilized and/or deployed by many cell types (leukocytes, macrophages, NK cells, keratinocytes, epithelial and endothelial cells) and work by biophysical mechanisms of action. Based on recent primary literature, course lectures will cover the evolution, structures, mechanisms, and physiological functions of innate immune effectors. Appropriate for students with a background in biochemistry, molecular/cellular biology, physics, and/or bioengineering.

3 units, Spr (Barron, A)

### **BIOE 244. Advanced Frameworks and Approaches for Engineering Integrated Genetic Systems**

Concepts and techniques for the design and implementation of engineered genetic systems. Topics covered include the quantitative exploration of tools that support (a) molecular component engineering, (b) abstraction and composition of functional genetic devices, (c) use of control and dynamical systems theory in device and systems design, (d) treatment of molecular noise, (e) integration of DNA-encoded programs within cellular chassis, (f) designing for evolution, and (g) the use of standards in measurement, genetic layout architecture, and data exchange. Prerequisites: CME104, CME106, CHEM 33, BIO41, BIO42, BIOE41, BIOE42, and BIOE44 (or equivalents), or permission of the instructors

4 units, Win (Endy, A; Smolke, C)

### **BIOE 260. Tissue Engineering**

(Same as ORTHO 260) Principles of tissue engineering and design strategies for practical applications for tissue repair. Topics include tissue components and dynamics, morphogenesis, stem cells, cellular fate processes, cell and tissue characterization, controlled drug and gene delivery, bioreactors, cell-materials interactions, and host integration. Present research proposal to solve a real life tissue engineering problem.

3 units, Spr (Staff)

### **BIOE 261. Principles and Practice of Stem Cell Engineering**

(Same as NSUR 261) Quantitative models used to characterize incorporation of new cells into existing tissues emphasizing pluripotent cells such as embryonic and neural stem cells. Molecular methods to control stem cell decisions to self-renew, differentiate, die, or become quiescent. Practical, industrial, and ethical aspects of stem cell technology application. Final projects: team-reviewed grants and business proposals.

3 units, not given this year

### **BIOE 280. Skeletal Development and Evolution**

(Same as ME 280) The mechanobiology of skeletal growth, adaptation, regeneration, and aging is considered from developmental and evolutionary perspectives. Emphasis is on the

interactions between mechanical and chemical factors in the regulation of connective tissue biology. Prerequisites: BIO 42, and ME 80 or BIOE 42.

*3 units, not given this year*

#### **BIOE 280. Skeletal Development and Evolution**

(Same as ME 280) The mechanobiology of skeletal growth, adaptation, regeneration, and aging is considered from developmental and evolutionary perspectives. Emphasis is on the interactions between mechanical and chemical factors in the regulation of connective tissue biology. Prerequisites: BIO 42, and ME 80 or BIOE 42.

*3 units, not given this year*

#### **BIOE 281. Biomechanics of Movement**

(Same as ME 281) Experimental techniques to study human and animal movement including motion capture systems, EMG, force plates, medical imaging, and animation. The mechanical properties of muscle and tendon, and quantitative analysis of musculoskeletal geometry. Projects and demonstrations emphasize applications of mechanics in sports, orthopedics, and rehabilitation.

*3 units, Win (Delp, S)*

#### **BIOE 282. Performance, Development, and Adaptation of Skeletal Muscle**

Fundamentals of skeletal muscle by study of classical and recent research articles. Emphasis on the interactions between mechanics, biology, and electrophysiology in skeletal muscle performance, development, adaptation, control, and disease. Lab activities explore research methods discussed in class. Limited Enrollment. Applications due Friday, September 16th by 5pm. Applications available at <http://bioe282.stanford.edu/>. Prerequisites: engineering or biology core coursework. Fall (Cromie, Liske, Steele, Delp)

*3 units, Aut (Delp, S)*

#### **BIOE 284B. Cardiovascular Bioengineering**

(Same as ME 284B) Continuation of ME/BIOE 284A. Integrative cardiovascular physiology, blood fluid mechanics, and transport in the microcirculation. Sensing, feedback, and control of the circulation. Overview of congenital and adult cardiovascular disease, diagnostic methods, and treatment strategies. Engineering principles to evaluate the performance of cardiovascular devices and the efficacy of treatment strategies.

*3 units, not given this year*

#### **BIOE 291. Principles and Practice of Optogenetics for Optical Control of Biological Tissues**

Principles and practice of optical control of biological processes (optogenetics), emphasizing bioengineering approaches. Theoretical, historical, and current practice of the field. Requisite molecular-genetic, optoelectronic, behavioral, clinical, and ethical concepts, and mentored analysis and presentation of relevant papers. Final projects of research proposals and a laboratory component in BioX to provide hands-on training. Contact instructor before registering.

*3 units, Aut (Deisseroth, K)*

#### **BIOE 300A. Molecular and Cellular Bioengineering**

The molecular and cellular bases of life from an engineering perspective. Analysis and engineering of biomolecular structure and dynamics, enzyme function, molecular interactions, metabolic pathways, signal transduction, and cellular mechanics. Quantitative primary literature. Prerequisites: CHEM 171 and BIO 41 or equivalents; MATLAB or an equivalent programming language.

*3 units, Aut (Bryant, Z)*

#### **BIOE 300B. Engineering Concepts Applied to Physiology**

This course focuses on engineering approaches to quantifying, modeling and controlling the physiology and pathophysiology of complex systems, from the level of individual cells to tissue, organ and multi-organ systems. Winter (Covert)

*3 units, Win (Covert, M)*

#### **BIOE 301A. Molecular and Cellular Engineering Lab**

Preference to Bioengineering graduate students. Practical applications of biotechnology and molecular bioengineering including recombinant DNA techniques, molecular cloning, microbial cell growth and manipulation, and library screening. Emphasis is on experimental design and data analysis. Limited enrollment. Corequisite: 300A. Fall (Cochran)

*2 units, Aut (Lin, M)*

#### **BIOE 301B. Clinical Needs and Technology**

Diagnostic and therapeutic methods in medicine. Labs include a pathology/histology session, pulmonary function testing, and the Goodman Simulation Center. Each student paired with a physician for observation of an operation or procedure. Final presentation. Limited enrollment. Corequisite: 300B.

*1 unit, Win (Feinstein, J)*

#### **BIOE 301C. Diagnostic Devices Lab**

Biomedical instruments and diagnostic devices. Emphasis is on comparing measurements with theoretical predictions. Labs include ECG, MRI, microfluidics, CT, and EEG. Prerequisites: 300B and 301B. Spring (Boahen)

*3 units, Spr (Boahen, K)*

#### **BIOE 310. Systems Biology**

(Same as CS 278, CSB 278) Experimental and computational approaches to the dissection of complex biological systems. Topics include network structure, non-linear dynamics, numerical modeling approaches, noise, and robustness. Topics are introduced in the context of recent papers from the primary literature.

*4 units, alternate years, not given this year*

#### **BIOE 311. Biophysics of Developmental Biology and Tissue Engineering**

This course introduces mathematical and physical modeling approaches for understanding multi-cellular systems relevant to developmental biologists and tissue engineers. Topics include: (Morphogen) gradients; reaction-diffusion systems (Turing patterns); visco-elastic aspects and forces in tissues; morphogenesis; coordinated gene expression, genetic oscillators and synchrony; genetic networks; self-organization, noise, robustness, and evolvability; symmetries, and scaling; implications for tissue engineering and regeneration. Students will be introduced to agent based modeling and to apply it to relevant multi-cellular systems. Prerequisites: BIOE 41, BIOE 42, or equivalent or instructor approval; previous knowledge in one programming language - ideally Matlab - is recommended. Aut (Riedel-Kruse, I.H.)

*2-3 units, Aut (Riedel-Kruse, H)*

#### **BIOE 331. Protein Engineering**

The design and engineering of biomolecules emphasizing proteins, antibodies, and enzymes. Combinatorial and rational methodologies, protein structure and function, and biophysical analyses of modified biomolecules. Clinically relevant examples from the literature and biotech industry. Prerequisite: basic biochemistry. Winter, Cochran

*3 units, Win (Cochran, J)*

#### **BIOE 332. Large-Scale Neural Modeling**

Large-scale models link cellular properties, columnar microcircuits, recurrent connectivity, and feedback projections to experimentally studied behaviors such as selective attention and working memory. Emphasis is on making experimentally testable predictions by exploring spike-based communication and biophysics-based computation. Work in teams of two to implement models from the literature and develop models of your own. Run models with up to a million neurons in real-time on a special-purpose simulation platform developed at Stanford (Neurogrid). Spring, (Boahen, K.)

*3 units, Spr (Boahen, K)*

#### **BIOE 333. Interfacial Phenomena and Bionanotechnology**

Control over and understanding of interfacial phenomena and colloidal science are the essential foundation of bionanotechnology. Key mathematical relationships derived by Laplace, Gibbs, Kelvin and Young are derived and explained, along with the thermodynamics of systems of large interfacial area. Forces controlling surface and interfacial phenomena and surfactant and biomacromolecule self-assembly are discussed. Protein folding/unfolding and aggregation, and nano- and microfluidics are elucidated in these terms. Students will gain insight into the interplay between physical and chemical properties of biomolecules. Spring, (Barron, A.)

*3 units, Spr (Staff)*

#### **BIOE 334. Engineering Principles in Molecular Biology**

The achievements and difficulties that exemplify the interface of theory and quantitative experiment. Topics include: bistability, cooperativity, robust adaptation, kinetic proofreading, analysis of

fluctuations, sequence analysis, clustering, phylogenetics, maximum likelihood methods, and information theory. Sources include classic papers.

3 units, Win (Huang, K)

### BIOE 335. Molecular Motors I

Physical mechanisms of mechanochemical coupling in biological molecular motors, using F1 ATPase as the major model system. Applications of biochemistry, structure determination, single molecule tracking and manipulation, protein engineering, and computational techniques to the study of molecular motors.

3 units, Win (Bryant, Z)

### BIOE 355. Advanced Biochemical Engineering

(Same as CHEMENG 355) Combines biological knowledge and methods with quantitative engineering principles. Quantitative review of biochemistry and metabolism; recombinant DNA technology and synthetic biology (metabolic engineering). The production of protein pharmaceuticals as a paradigm for the application of chemical engineering principles to advanced process development within the framework of current business and regulatory requirements. Prerequisite: CHEMENG 181 (formerly 188) or BIOSCI 41, or equivalent.

3 units, Win (Swartz, J)

### BIOE 361. Biomaterials in Regenerative Medicine

(Same as MATSCI 381) Materials design and engineering for regenerative medicine. How materials interact with cells through their micro- and nanostructure, mechanical properties, degradation characteristics, surface chemistry, and biochemistry. Examples include novel materials for drug and gene delivery, materials for stem cell proliferation and differentiation, and tissue engineering scaffolds. Prerequisites: undergraduate chemistry, and cell/molecular biology or biochemistry.

3 units, not given this year

### BIOE 370. Microfluidic Device Laboratory

Fabrication of microfluidic devices for biological applications. Photolithography, soft lithography, and micromechanical valves and pumps. Emphasis is on device design, fabrication, and testing.

2 units, Win (Quake, S; Melin, J)

### BIOE 371. Global Biodesign: Medical Technology in an International Context

(Same as MED 271) (Same as OIT 587) Seminar examines the development and commercialization of medical technologies in the global setting focusing primarily on Europe, India and China. Faculty and guest speakers from industry and government discuss the status of the industry, as well as opportunities in and challenges to medical technology innovation unique to each geography. Topics related to development of technologies for bottom of the pyramid markets are also addressed. Students enrolling for 2 units are required to write and deliver a final paper. Application may be required due to high demand.

1-2 units, Spr (Doshi, R; Shen, C; Yock, P; Pietzsch, J)

### BIOE 372. DESIGN FOR SERVICE INNOVATION

Design for service innovation is an experiential course in which students work in multidisciplinary teams to design new services (including but not limited to web services) that will address the needs of an underserved population of users. Through a small number of lectures and guided exercises, but mostly in the context of specific team projects, students will learn to identify the key needs of the target population and to design services that address these needs. Our projects this year will focus on services for young adult survivors of severe childhood diseases. For the first time ever, children who have cystic fibrosis, rheumatoid arthritis, major cardiac repairs, organ transplants, genetic metabolic disorders, and several forms of cancer are surviving. The first wave of these survivors is reaching young adulthood (ages 18-25). Many aspects of the young adult world are not yet user-friendly for them: applying to and then entering college, adherence to required medication and diet,

4 units, Spr (Staff)

### BIOE 374A. Biodesign Innovation: Needs Finding and Concept Creation

(Same as ME 368A, MED 272A) (Same as OIT 384) Two quarter sequence. Inventing new medical devices and instrumentation, including: methods of validating medical needs; techniques for analyzing intellectual property; basics of regulatory (FDA) and

reimbursement planning; brainstorming and early prototyping. Guest lecturers and practical demonstrations.

4 units, Win (Yock, P; Zenios, S; Milroy, J; Brinton, T)

### BIOE 374B. Biodesign Innovation: Concept Development and Implementation

(Same as ME 368B, MED 272B) (Same as OIT 385) Two quarter sequence. How to take a medical device invention forward from early concept to technology translation and development. Topics include prototyping; patent strategies; advanced planning for reimbursement and FDA approval; choosing translation route (licensing versus start-up); ethical issues including conflict of interest; fundraising approaches and cash requirements; essentials of writing a business or research plan; strategies for assembling a development team. Prerequisite: MED 272A, ME368A, OIT 384 or BIOE 374A.

4 units, Spr (Yock, P; Zenios, S; Milroy, J; Brinton, T)

### BIOE 381. Orthopaedic Bioengineering

(Same as ME 381) Engineering approaches applied to the musculoskeletal system in the context of surgical and medical care. Fundamental anatomy and physiology. Material and structural characteristics of hard and soft connective tissues and organ systems, and the role of mechanics in normal development and pathogenesis. Engineering methods used in the evaluation and planning of orthopaedic procedures, surgery, and devices.

3 units, Spr (Levenston, M)

### BIOE 386. Neuromuscular Biomechanics

(Same as ME 386) The interplay between mechanics and neural control of movement. State of the art assessment through a review of classic and recent journal articles. Emphasis is on the application of dynamics and control to the design of assistive technology for persons with movement disorders.

3 units, not given this year

### BIOE 390. Introduction to Bioengineering Research

(Same as MED 289) Preference to medical and bioengineering graduate students with first preference given to Bioengineering Scholarly Concentration medical students. Bioengineering is an interdisciplinary field that leverages the disciplines of biology, medicine, and engineering to understand living systems, and engineer biological systems and improve engineering designs and human and environmental health. Students and faculty will make presentations during the course. Students will be expected to make presentations, complete a short paper, read selected articles, and take quizzes on the material.

1-2 units, Aut (Gold, G; Wang, P)

### BIOE 391. Directed Study

May be used to prepare for research during a later quarter in 392. Faculty sponsor required. May be repeated for credit.

1-6 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### BIOE 392. Directed Investigation

For Bioengineering graduate students. Previous work in 391 may be required for background; faculty sponsor required. May be repeated for credit.

1-10 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### BIOE 393. Bioengineering Departmental Research Colloquium

Bioengineering department labs at Stanford present recent research projects and results. Guest lecturers. Topics include applications of engineering to biology, medicine, biotechnology, and medical technology, including biodesign and devices, molecular and cellular engineering, regenerative medicine and tissue engineering, biomedical imaging, and biomedical computation. Aut, Win, Spr (Lin, Riedel-Kruse, Barron)

1 unit, Aut (Lin, M; Barron, A; Riedel-Kruse, H), Win (Lin, M; Huang, K), Spr (Lin, M; Riedel-Kruse, H)

### BIOE 454. Synthetic Biology and Metabolic Engineering

(Same as CHEMENG 454) Principles for the design and optimization of new biological systems. Development of new enzymes, metabolic pathways, other metabolic systems, and communication systems among organisms. Example applications include the production of central metabolites, amino acids, pharmaceutical proteins, and isoprenoids. Economic challenges and quantitative assessment of metabolic performance. Pre- or corequisite: CHEMENG 355 or equivalent.

3 units, alternate years, not given this year

**BIOE 459. Frontiers in Interdisciplinary Biosciences**

(Same as BIO 459, BIOC 459, CHEMENG 459, CHEM 459, PSYCH 459) Students register through their affiliated department; otherwise register for CHEMENG 459. For specialists and non-specialists. Sponsored by the Stanford BioX Program. Three seminars per quarter address scientific and technical themes related to interdisciplinary approaches in bioengineering, medicine, and the chemical, physical, and biological sciences. Leading investigators from Stanford and the world present breakthroughs and endeavors that cut across core disciplines. Pre-seminars introduce basic concepts and background for non-experts. Registered students attend all pre-seminars; others welcome. See <http://biox.stanford.edu/courses/459.html>. Recommended: basic mathematics, biology, chemistry, and physics.

1 unit, Aut (Robertson, C), Win (Robertson, C), Spr (Robertson, C)

**BIOE 484. Computational Methods in Cardiovascular Bioengineering**

(Same as ME 484) Lumped parameter, one-dimensional nonlinear and linear wave propagation, and three-dimensional modeling techniques applied to simulate blood flow in the cardiovascular system and evaluate the performance of cardiovascular devices. Construction of anatomic models and extraction of physiologic quantities from medical imaging data. Problems in blood flow within the context of disease research, device design, and surgical planning.

3 units, not given this year

**BIOE 485. Modeling and Simulation of Human Movement**

(Same as ME 485) Direct experience with the computational tools used to create simulations of human movement. Lecture/labs on animation of movement; kinematic models of joints; forward dynamic simulation; computational models of muscles, tendons, and ligaments; creation of models from medical images; control of dynamic simulations; collision detection and contact models. Prerequisite: 281, 331A,B, or equivalent.

3 units, Spr (Delp, S)

**BIOE 500. Thesis (Ph.D.)**

(Staff)

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**BIOE 802. TGR Dissertation**

(Staff)

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**BIOLOGY (BIO) COURSES****UNDERGRADUATE COURSES IN BIOLOGY**

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**BIO 1. Human Evolution and Environment**

Human genetic and cultural evolution and how people interact with their environments, from the ancestors of Australopithecus to current events. Issues include race, gender, and intelligence; pesticide and antibiotic resistance; abortion and contraception; ecosystem services; environmental economics and ethics; the evolution of religion; climate change; population growth and overconsumption; origins and spread of ideas and technologies; and the distribution of political and economic power. GER: DB-NatSci

3 units, Spr (Ehrlich, P)

**BIO 3. Frontiers in Marine Biology**

An introduction to contemporary research in marine biology, including ecology, conservation biology, environmental toxicology, behavior, biomechanics, evolution, neurobiology, and molecular biology. Emphasis is on new discoveries and the technologies used to make them. Weekly lectures by faculty from the Hopkins Marine Station.

1 unit, Aut (Denny, M)

**BIO 3N. Views of a Changing Sea: Literature & Science**

The state of a changing world ocean, particularly in the eastern Pacific, will be examined through historical and contemporary

fiction, non-fiction and scientific publications. Issues will include harvest and mariculture fisheries, land-sea interactions and oceanic climate change in both surface and deep waters. GER: DB-NatSci

3 units, alternate years, not given this year

**BIO 4N. Personalized Genomic Medicine**

(F,Sem) Stanford Introductory Seminar. Exploration of the exciting new field of personalized genomic medicine. Personalized medicine is based on the idea that each person's unique genome sequence can be used to predict risk of acquiring specific diseases, and to make more informed medical choices. Learn about the fascinating science behind these approaches; where they are heading in the future; and the ethical implications such technology presents. Lectures will be augmented with hands-on experience in exploring and analyzing a real person's genome. GER: DB-NatSci

3 units, Aut (Fraser, H)

**BIO 5. Ecology for Everyone**

(Same as EARTHYSYS 5) Basics of ecology, from gut bacteria to global climate change. We will link processes at several scales to connect individual behavior, population growth, species interactions and ecosystem function. Combining classroom and field experience, we will see how basic hypothesis testing provides a way to learn about the world by considering the ecology of familiar organisms such as ants, squirrels, trees and some kinds of food. No prerequisites except arithmetic; open to everyone, including but not only those who may be headed for more advanced courses in ecology and environmental science. GER: DB-NatSci

4 units, Spr (Gordon, D)

**BIO 7S. Introduction to Biology**

The major fields of biology: biochemistry, the cell, evolution, and diversity. Foundation for higher-level biology courses. GER: DB-NatSci

3 units, Sum (Staff)

**BIO 7SL. Introduction to Biology Lab**

Optional lab to be taken concurrently with BIO 7S.

2 units, Sum (Staff)

**BIO 8N. Human Evolution**

(F,Sem) Stanford Introductory Seminar. A survey of the anatomical and behavioral evidence for human evolution and of the increasingly important information from molecular genetics. Emphasis on the split between the human and chimpanzee lines 6-7 million years ago, the appearance of the australopithecids by 4.1 million years ago, the emergence of the genus Homo about 2.5 million years ago, the spread of Homo from Africa 1.7-1.6 million years ago, the subsequent divergence of Homo into different species on different continents, and the expansion of fully modern humans (Homo sapiens) from Africa about 50,000 years ago to replace the Neanderthals and other non-modern Eurasians. GER: DB-NatSci

3 units, Win (Klein, R)

**BIO 8S. Introduction to Human Physiology**

The function and regulation of human organ systems. Various diseases are examined as failures of these regulatory processes. Systems include cardiovascular, respiratory, renal, endocrine, and gastrointestinal. GER: DB-NatSci

3 units, Sum (Staff)

**BIO 9S. Introduction to Biological Research Methods**

Theory and practice of experimental biology. Introduction to how to plan an experiment, conduct, and analyze data. Introduction to scientific writing and reading scientific journal articles. Prerequisite: high school biology. GER: DB-NatSci

3 units, Sum (Staff)

**BIO 10AX. Conservation Photography**

Account of the genre of conservation photography and strategic use of visual communication in the environmental arena. Introduction to use of digital SLR cameras and digital image processing. Case studies of conservation issues accompanied by multimedia platforms including images, video, and audio. Theory and application of photographic techniques. Lectures, tutorials, demonstrations, and field trips. Individual and group projects.

2 units, Aut (McConnell, S)

**BIO 11N. Biotechnology in Everyday Life**

Preference to freshmen. The science that makes transgenic plants



and animals possible. Current and future applications of biotechnology and the ethical issues raised. GER: DB-NatSci, DB-NatSci

*3 units, not given this year*

**BIO 12N. Sensory Ecology of Marine Animals**

(F,Sem) Stanford Introductory Seminar. Animals living in the oceans experience a highly varied range of environmental stimuli. An aquatic lifestyle requires an equally rich range of sensory adaptations, including some that are totally foreign to us. In this course we will examine sensory system in marine animals from both an environmental and behavioral perspective and from the point of view of neuroscience and information systems engineering.

*3 units, Spr (Thompson, S)*

**BIO 13N. Environmental Problems and Solutions**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Students do independent investigations of current environmental problems, analyzing differing views of them and discussing possible solutions. Each student gives seminar presentations and leads seminar discussions. Short, documented position papers are written for policy makers. GER: DB-NatSci

*3 units, Spr (Ehrlich, P)*

**BIO 15N. Environmental Literacy**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Lack of public understanding of the details of most environmental problems is cited as a cause of environmental deterioration. Good citizenship requires literacy about the elements of the scientific and decision making processes that accompany most environmental issues: what can happen, what are the odds, how can the credibility of sources of expertise be assessed, which components of environmental debates deal with factual and theoretical issues, and which are political value judgments? GER: DB-NatSci

*3 units, Aut (Root, T)*

**BIO 16N. Island Ecology**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. How ecologists think about the world. Focus is on the Hawaiian Islands: origin, geology, climate, evolution and ecology of flora and fauna, and ecosystems. The reasons for the concentration of threatened and endangered species in Hawaii, the scientific basis for their protection and recovery. How knowledge of island ecosystems can contribute to ecology and conservation biology on continents. GER: DB-NatSci

*3 units, Spr (Vitousek, P)*

**BIO 20. Introduction to Brain and Behavior**

(Same as HUMBIO 21) Evolutionary principles to understand how the brain regulates behavior physiologically, and is also influenced by behavioral interactions. Topics include neuron structure and function, transmission of neural information, anatomy and physiology of sensory and motor systems, regulation of body states, the biological basis of learning and memory, and behavioral abnormalities. GER: DB-NatSci

*3 units, alternate years, not given this year*

**BIO 22N. Infection, Immunity, and Global Health**

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. The causes and prevention of infectious diseases, focusing on the interplay between pathogens and the immune system that determines the outcome of the disease. Introduction to microbiology, immunology, and epidemiology. Diseases of the past and present, including TB, malaria, AIDS, and Ebola. The roles of biological, environmental, and societal factors in disease emergence, spread, and prevention. Primary scientific literature, student-led discussions, and research projects. Prerequisite: biology background, preferably introductory college courses (e.g., 41, 42, or HUMBIO 2A, 3A. GER: DB-NatSci

*3 units, Spr (Jones, P)*

**BIO 23N. FACEBUG: The Social Life of Microbes**

Exploration of three crucial aspects of microbial life. First, examine how the unseen microbial majority is responsible for critical but under-appreciated aspects of the biology of the planet. Second, investigate the array of current genomic and imaging tools available to probe microscopic organisms in the environment. Last, we will research the importance of microbial communities and social dynamics in ecological and human health settings. GER: DB-NatSci

*3 units, not given this year*

**BIO 25Q. The Molecular Basis of Genetic Disease**

(F,Dial) Stanford Introductory Dialogue. Preference to sophomores. Focus is on two genetic diseases resulting from the production of protein molecules that are unable to fold into their native conformations, called conformational diseases: cystic fibrosis and amyotrophic lateral sclerosis or Lou Gehrig's disease. Hypotheses and controversies surrounding the molecular basis of these disorders, and implications for novel therapeutics. Readings from research literature. GER: DB-NatSci

*3 units, Spr (Kopito, R)*

**BIO 26N. Maintenance of the Genome**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. The precious blueprint for life is entrusted to the genomic DNA molecules in all living cells. Multiple strategies have evolved to prevent the deleterious consequences from endogenous DNA alterations and damage from radiation or genotoxic chemicals in the environment. In this seminar you will learn about the remarkable systems that scan cellular DNA for alterations and make repairs to ensure genomic stability. Deficiencies in DNA repair have been implicated in many hereditary diseases involving developmental defects, premature aging, and/or predisposition to cancer. An understanding of DNA repair mechanisms is important for advances in the fields of cancer biology, neurobiology, and gerontology. Background readings, introductory lectures, student presentations, short term paper. GER: DB-NatSci

*3 units, Aut (Hanawalt, P)*

**BIO 27N. Nature and Nurture in Brain Development**

(F,Sem) Stanford Introductory Seminar. Preference to sophomores. Examination of the roles of genes and the environment in shaping brain wiring and behavior, using readings of papers from the primary scientific literature as examples of how the developing nervous system integrates information from both the genetic blueprint and external experience in forming neural connections. GER: DB-NatSci

*3 units, Win (McConnell, S)*

**BIO 30N. Extinctions in Near Time: Biodiversity loss since the Pleistocene**

(F,Sem) Stanford Introductory Seminar. The transition 11,700 years ago from the Pleistocene glacial period into the Holocene interglacial witnessed the expansion of humans around the world, climatic warming and the demise of many large vertebrate species. Since that time extinctions have continued on land and in the sea, culminating with the biodiversity crisis we are experiencing today. We will explore these prehistoric extinctions: Who? When? Where? and Why? in order to learn more about our planet's future. GER: DB-NatSci

*3 units, Aut (Hadly, E)*

**BIO 31Q. Ants: Behavior, Ecology, and Evolution**

Preference to sophomores. Behavior: the organization of colonies, how they operate without central control, how they resemble other complex systems like brains. Ecology: how populations of colonies change, comparing the ecology of a species in SW American desert and invasive Argentine ants. Evolution: why are there so many species of ants; how are they alike, how do they differ, and why? Ants as the theme for exploring how to do research in animal behavior, ecology, and evolution. Research project will be on the invasive Argentine ant: its distribution on campus, foraging trails, and nest structure.

*3 units, not given this year*

**BIO 33N. Conservation Science and Practice**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Interdisciplinary. The science and art of conservation today. The forces that are driving change in Earth's atmosphere, lands, waters, and variety of life forms. Which broad dimensions of the biosphere, and which elements of ecosystems, most merit protection? The prospects for, and challenges in, making conservation economically attractive and commonplace. Field trip; project. GER: DB-NatSci

*3 units, Spr (Daily, G)*

**BIO 34N. Hunger**

(F,Sem) Stanford Introductory Seminar. The biology of hunger and satiety, disease states that disrupt normal responses to hunger and satiety, starvation responses and adaptations to starvation in a



variety of organisms, food production and distribution mechanisms, historic famines and their causes, the challenges of providing adequate food and energy for the Earth's growing population, local and global efforts to alleviate hunger, and hunger in fiction. GER: DB-NatSci

3 units, Aut (Barton, K)

### BIO 37N. Green Revolution and Plant Biotechnology

Feeding ever-growing populations is a constant challenge to mankind. In the second half of the 20th century, the breeding of improved varieties combined with the use of chemical fertilizers and pesticides led to crop yield increases labeled the Green Revolution. Modern technologies in genetic engineering are expected to bring the second green revolution. Meeting the current and future global food needs without further damaging the fragile environment requires innovative effort from scientists and the society. GER: DB-NatSci

3 units, not given this year

### BIO 38N. Photosynthesis: From Basic Mechanisms to Biofuels

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Photosynthetic processes in terrestrial and aquatic environments. Biological and chemical ways that have been developed to capture the energy of sunlight; how this light energy can be converted to usable forms of energy, including biofuels; and potential impacts of anthropogenic energy generation on the health of the planet. GER: DB-NatSci

3 units, Win (Grossman, A)

### BIO 39N. Networks in Biology

(F,Sem) Stanford Introductory Seminar. Networks are everywhere, including friendship links on Facebook, airline routes, power grids, and the Internet. Biology is no exception. Examples include food chains, protein interaction maps, and metabolic pathways. Despite their ubiquitousness, the study of networks in the real world only started about a decade ago. Exploration of the types of networks in biology and the approaches people use in studying them. Discussions and presentations of original research papers. GER: DB-NatSci

3 units, Spr (Rhee, S), alternate years, not given next year

### BIO 41. Genetics, Biochemistry, and Molecular Biology

Emphasis is on macromolecules (proteins, lipids, carbohydrates, and nucleic acids) and how their structure relates to function and higher order assembly; molecular biology, genome structure and dynamics, gene expression from transcription to translation. Prerequisites: CHEM 31X (or 31A,B), 33. Recommended: CHEM 35; MATH 19, 20, 21 or 41, 42. GER: DB-NatSci

5 units, Aut (Bergmann, D; Simoni, R)

### BIO 41S. Biochemistry, Genetics, and Molecular Biology

Emphasis is on macromolecules (proteins, lipids, carbohydrates, and nucleic acids) and how their structure relates to function and higher order assembly; molecular biology, genome structure and dynamics, gene expression from transcription to translation. Prerequisites: CHEM 31X (or 31A,B), 33; MATH 19, 20, 21 or 41, 42. Recommended: CHEM 35. GER: DB-NatSci

5 units, Sum (Staff)

### BIO 42. Cell Biology and Animal Physiology

Cell structure and function; principles of animal physiology (immunology, renal, cardiovascular, sensory, motor physiology, and endocrinology); neurobiology from cellular basis to neural regulation of physiology. Prerequisites: CHEM 31X (or 31A,B), 33. Recommended: BIO 41; CHEM 35; MATH 19, 20, 21 or 41, 42. GER: DB-NatSci

5 units, Win (Jones, P; Sapolsky, R; Heller, C; Shen, K)

### BIO 43. Plant Biology, Evolution, and Ecology

Principles of evolution: macro- and microevolution and population genetics. Ecology: the principles underlying the exchanges of mass and energy between organisms and their environments; population, community, and ecosystem ecology; populations, evolution, and global change. Equivalent to BIOHOPK 43. Prerequisites: CHEM 31X (or 31A,B), 33. Recommended: BIO 41, 42; CHEM 35; MATH 19, 20, 21 or 41, 42. GER: DB-NatSci

5 units, Spr (Mudgett, M; Vitousek, P; Fraser, H)

### BIO 44X. Core Molecular Biology Laboratory

Investigate yeast strains that are engineered to express the human protein, p53, and use modern molecular methods to identify the functional consequences of p53 mutations isolated from tumor

cells. Learn about the protein's role as a tumor suppressor through lectures and by reading and discussing a journal article. Use molecular visualization programs to examine the structure of wild type and mutant p53 proteins. Formulate a testable hypothesis and assay the ability of mutant p53 to direct expression of several reporter genes. During guided reflection, formulate further analyses to determine whether mutant p53 is present in the cell, can bind to DNA, and/or can enter the nucleus. Lab experiments, team oral presentation, individual comprehensive written laboratory report. Prerequisites: CHEM 31X, or 31A,B, and 33; concurrent or past enrollment in Biology or Human Biology core. 44X,Y should be taken sequentially in the same year, preferably as sophomores, to prepare for internships. L

5 units, Win (Cyert, M; Stearns, T; Hekmat-Scafe, D; Malladi, S; Brownell, S; Seawell, P)

### BIO 44Y. Core Plant Biology & Eco Evo Laboratory

Conduct hypothesis-driven field and laboratory research to assess abiotic and biotic contributions to the flowering phenology of hummingbird-pollinated flowering plants and the microbial communities assembled within the floral nectar. Data collection will include personal and class observations of flowers, and microbial and molecular quantification and identification of microbes. Mine databases of temperature, light exposure, water availability and plant elevation for statistical relevance to their hypothesis. Collaboration by pairs will culminate in an oral defense of hypotheses and a journal-style paper. Lab fee. Prerequisites: CHEM 31X, or 31A,B, and 33; concurrent or past enrollment in Biology or Human Biology core. 44X,Y should be taken sequentially in the same year, preferably as sophomores, to prepare for internships. Equivalent to BIOHOPK 44Y.

5 units, Spr (Malladi, S; Fukami, T; Seawell, P; Hekmat-Scafe, D)

### BIO 101. Ecology

The principles of ecology. Topics: interactions of organisms with their environment, dynamics of populations, species interactions, structure and dynamics of ecological communities, biodiversity. Half-day field trip required. Satisfies Central Menu Area 4. Prerequisite: 43, or consent of instructor. Recommended: statistics. GER: DB-NatSci

4 units, Aut (Dirzo, R; Vitousek, P)

### BIO 102. Demography: Health, Development, Environment

(Same as HUMBIO 119) Demographic methods and their application to understanding and projecting changes in human infant, child, and adult mortality and health, fertility, population, sex ratios, and demographic transitions. Progress in human development, capabilities, and freedoms. Relationships between population and environment. Prerequisites: numeracy and basic statistics; Biology or Human Biology core; or consent of instructor. GER:DB-SocSci

3 units, Spr (Tuljapurkar, S)

### BIO 104. Advanced Molecular Biology

(Same as BIO 200) Molecular mechanisms that govern the replication, recombination, and expression of eukaryotic genomes. Topics: DNA replication, DNA recombination, gene transcription, RNA splicing, regulation of gene expression, protein synthesis, and protein folding. Satisfies Central Menu Area 1. Prerequisite: Biology core. GER: DB-NatSci

5 units, Win (Frydman, J; Gozani, O)

### BIO 105A. Ecology and Natural History of Jasper Ridge Biological Preserve

(Same as EARTHSYS 105A) Formerly 96A - Jasper Ridge Docent Training. First of two-quarter sequence training program to join the Jasper Ridge education/docent program. The scientific basis of ecological research in the context of a field station, hands-on field research, field ecology and the natural history of plants and animals, species interactions, archaeology, geology, hydrology, land management, multidisciplinary environmental education; and research projects, as well as management challenges of the preserve presented by faculty, local experts, and staff. Participants lead research-focused educational tours, assist with classes and research, and attend continuing education classes available to members of the JRBP community after the course.

4 units, Win (Dirzo, R; Wilber, C)

### BIO 105B. Ecology and Natural History of Jasper Ridge

**Biological Preserve**

(Same as EARTHSYS 105B) Formerly 96B - Jasper Ridge Docent Training. First of two-quarter sequence training program to join the Jasper Ridge education/docent program. The scientific basis of ecological research in the context of a field station, hands-on field research, field ecology and the natural history of plants and animals, species interactions, archaeology, geology, hydrology, land management, multidisciplinary environmental education; and research projects, as well as management challenges of the preserve presented by faculty, local experts, and staff. Participants lead research-focused educational tours, assist with classes and research, and attend continuing education classes available to members of the JRBP community after the course.

4 units, Spr (Dirzo, R; Wilber, C)

**BIO 109A. The Human Genome and Disease**

(Same as BIO 209A, HUMBIO 158) The variability of the human genome and the role of genomic information in research, drug discovery, and human health. Concepts and interpretations of genomic markers in medical research and real life applications. Human genomes in diverse populations. Original contributions from thought leaders in academia and industry and interaction between students and guest lecturers. Students with a major, minor or coterm in Biology: 109A/209A or 109B/209B may count toward degree program but not both. GER: DB-NatSci

3 units, Win (Heller, R)

**BIO 109B. The Human Genome and Disease: Genetic Diversity and Personalized Medicine**

(Same as BIO 209B) Continuation of 109A/209A. Genetic drift: the path of human predecessors out of Africa to Europe and then either through Asia to Australia or through northern Russia to Alaska down to the W. Coast of the Americas. Support for this idea through the histocompatibility genes and genetic sequences that predispose people to diseases. Guest lectures from academia and pharmaceutical companies. Prerequisite: Biology or Human Biology core. Students with a major, minor or coterm in Biology: 109A/209A or 109B/209B may count toward degree program but not both. GER: DB-NatSci

3 units, Spr (Heller, R)

**BIO 110. DNA Replication and Genomic Maintenance**

(Same as BIO 210) Maintenance of the genome and its accurate replication are prerequisites for life. DNA replication is also intricately connected to pathways for responding to genotoxic stress, which include inevitable collisions with transcription. In eukaryotes, DNA repair and replication are tightly connected to chromatin modification. Emphasis for lecture topics include: DNA-templated chromatin transactions; Chromatin manipulation during replication and DNA damage responses; Structural biology and molecular mechanisms of replication and DNA repair enzymes; Inducible responses to genotoxic stress; Relationships of DNA damage processing to mutagenesis, carcinogenesis, aging and human genetic disease. GER: DB-NatSci

3 units, Win (Morrison, A; Hanawalt, P)

**BIO 112. Human Physiology**

(Same as BIO 212, HUMBIO 133) The functioning of organ systems emphasizing mechanisms of control and regulation. Topics: structure and function of endocrine and central nervous systems, cardiovascular physiology, respiration, salt and water balance, exercise, and gastrointestinal physiology. Satisfies Central Menu Area 3 for Bio majors. Prerequisite: Biology or Human Biology core. GER: DB-NatSci

4 units, Win (Garza, D)

**BIO 113. Fundamentals of Molecular Evolution**

(Same as BIO 244) The inference of key molecular evolutionary processes from DNA and protein sequences. Topics include random genetic drift, coalescent models, effects and tests of natural selection, combined effects of linkage and natural selection, codon bias and genome evolution. Satisfies Central Menu Areas 1 or 4. Prerequisites: Biology core or graduate standing in any department, and consent of instructor. GER: DB-NatSci

4 units, not given this year

**BIO 116. Ecology of the Hawaiian Islands**

(Same as EARTHSYS 116) Terrestrial and marine ecology and conservation biology of the Hawaiian Archipelago. Taught in the field in Hawaii as part of quarter-long sequence of courses

including Earth Sciences and Anthropology. Topics include ecological succession, plant-soil interactions, conservation biology, biological invasions and ecosystem consequences, and coral reef ecology. Restricted to students accepted into the Earth Systems of Hawaii Program. GER: DB-NatSci

4 units, alternate years, not given this year

**BIO 117. Biology and Global Change**

(Same as EARTHSYS 111, EESS 111) The biological causes and consequences of anthropogenic and natural changes in the atmosphere, oceans, and terrestrial and freshwater ecosystems. Topics: glacial cycles and marine circulation, greenhouse gases and climate change, tropical deforestation and species extinctions, and human population growth and resource use. Prerequisite: Biology or Human Biology core or graduate standing. GER: DB-NatSci

4 units, Win (Vitousek, P; Arrigo, K)

**BIO 118. Genetic Analysis of Biological Processes**

(Same as BIO 218) Genetic principles and their experimental applications. Emphasis is on the identification and use of mutations to study cellular function. Satisfies Central Menu Areas 1 or 2. Prerequisite: Biology core. GER: DB-NatSci

5 units, Spr (Baker, J)

**BIO 121. Biogeography**

Global distributions of organisms through the Phanerozoic, with emphasis on historical causes. Topics: plate tectonics, island biogeography, climatic change, dispersal, vicariance, ecology of invasions, extinction, gradients, diversity. Satisfies Central Menu Area 4. GER: DB-NatSci

3 units, not given this year

**BIO 122. Along the Track of the Yellowstone Hotspot: Fusion of Art and Science**

(Same as ARTSTUDI 184A) The 20-million-year-old track of the Yellowstone hotspot through western North America, using the field setting to investigate ecology, evolution, and geology through an aesthetic and documentary media lens. Students create: experiential ways to learn about the natural world; a scientific yet personal intimacy about how ecosystems work and how they change; and ways to convey their observations to the public. Required trip to Yellowstone National Park.

4 units, not given this year

**BIO 129A. Cellular Dynamics I: Cell Motility and Adhesion**

Cell motility emphasizing role of actin assembly and dynamics coupling actin organization to cell movement. Interaction of cells with extracellular matrix, and remodelling of extracellular matrix in development and disease. Directed cell migration by chemotaxis (neuronal path-finding, immune cells). Cell-cell adhesion, formation of intercellular junctions and mechanisms regulating cell-cell interactions in development and diseases. Emphasis is on experimental logic, methods, problem solving, and interpretation of results. Students present research papers. Satisfies Central Menu Area 2. Prerequisite: Biology core. GER: DB-NatSci

4 units, Win (Nelson, W)

**BIO 129B. Cellular Dynamics II: Building a Cell**

Principles of cell organization; how common biochemical pathways are modified to generate diversity in cell structure and function. Roles of actin and microtubule cytoskeletons in cellular architecture. Mechanisms of protein sorting and trafficking, and protein modules and switches in regulating cell polarity. Yeast to polarized epithelial cells and neurons. Emphasis is on experimental logic, methods, problem solving, and interpretation of results. Students present research papers. Satisfies Central Menu Area 2. Prerequisite: Biology core. Recommended: 129A. GER: DB-NatSci

4 units, Spr (Nelson, W)

**BIO 131. Topics in Complexity**

A survey of the tools, findings, and philosophical and cultural implications associated with the study of complex systems, including self-organization, emergence, networks, nonlinear dynamics, autopoiesis, and others. Classes will include discussions of readings as well as guest lectures by faculty describing aspects of their complex systems of study. Graduate student led seminar. See <http://complexity.stanford.edu> for more information.

1 unit, Aut (Sapolsky, R; Longo, M; Wilbanks, R; Sellis, D)

**BIO 132. Advanced Imaging Lab in Biophysics**

(Same as APPPHYS 232, BIO 232, BIOPHYS 232, MCP 232) Laboratory and lectures. Advanced microscopy and imaging, emphasizing hands-on experience with state-of-the-art techniques. Students construct and operate working apparatus. Topics include microscope optics, Koehler illumination, contrast-generating mechanisms (bright/dark field, fluorescence, phase contrast, differential interference contrast), and resolution limits. Laboratory topics vary by year, but include single-molecule fluorescence, fluorescence resonance energy transfer, confocal microscopy, two-photon microscopy, and optical trapping. Limited enrollment. Recommended: basic physics, Biology core or equivalent, and consent of instructor. GER: DB-NatSci

4 units, Spr (Block, S; Smith, S; Stearns, T; Schnitzer, M)

**BIO 136. Evolutionary Paleobiology**

A paleontological approach to evolutionary theory. Topics: history of life, speciation, heterochrony, evolutionary constraint, coevolution, macroevolution, the Cambrian Explosion, mass extinctions, taphonomy, life on land, life in the sea, life in the air. Satisfies Central Menu Area 4. Prerequisite: Biology Core. GER: DB-NatSci

4 units, not given this year

**BIO 137. Plant Genetics**

(Same as BIO 237) Gene analysis, mutagenesis, transposable elements; developmental genetics of flowering and embryo development; biochemical genetics of plant metabolism; scientific and societal lessons from transgenic plants. Satisfies Central Menu Area 2. Prerequisite: Biology core or consent of instructor. GER: DB-NatSci

3-4 units, not given this year

**BIO 139. Biology of Birds**

How birds interact with their environments and each other, emphasizing studies that had impact in the fields of population biology, community ecology, and evolution. Local bird communities. Emphasis is on field research. Enrollment limited to 20. Prerequisites: 43 or equivalent, and consent of instructor. Recommended: birding experience. GER: DB-NatSci

3 units, alternate years, not given this year

**BIO 140. Population Biology of Butterflies**

Field work on Euphydryas populations under study on campus and elsewhere in California. Course offered as participation in research when conditions permit; decisions not made until Winter Quarter. Prerequisites: 43 and consent of instructor.

2-5 units, not given this year

**BIO 141. Biostatistics**

(Same as STATS 141) Introductory statistical methods for biological data: describing data (numerical and graphical summaries); introduction to probability; and statistical inference (hypothesis tests and confidence intervals). Intermediate statistical methods: comparing groups (analysis of variance); analyzing associations (linear and logistic regression); and methods for categorical data (contingency tables and odds ratio). Course content integrated with statistical computing in R. GER:DB-Math

4-5 units, Aut (Staff)

**BIO 143. Evolution**

(Same as BIO 243) The basic facts and principles of the evolution of all life. The logic of and evidence for the correctness of Darwin's argument for evolution by natural selection. How Mendelian genetics was integrated into evolutionary thinking. The integration of physiological and ecological perspectives into the study of evolutionary adaptation within species. Species formation and evolutionary divergence among species. Patterns of evolution over long time scales. Satisfies Central Menu Area 4. GER: DB-NatSci

3 units, Aut (Watt, W)

**BIO 144. Conservation Biology**

(Same as HUMBIO 112) Principles and application of the science of preserving biological diversity. Topics: sources of endangerment of diversity; the Endangered Species Act; conservation concepts and techniques at the population, community, and landscape levels; reserve design and management; conflict mediation. 4 units if taken with a field trip and discussion component. Satisfies Central Menu Area 4 for Bio majors. Prerequisite: BIO 101, or BIO 43 or HUMBIO 2A with consent of

instructor. GER: DB-NatSci

3-4 units, Win (Boggs, C; Launer, A)

**BIO 145. Behavioral Ecology**

(Same as BIO 245) Animal behavior from an evolutionary and ecological perspective. Topics: foraging, territoriality, reproductive behavior, social groups. Lecture/seminar format; seminars include discussion of journal articles. Independent research projects. Satisfies Central Menu Area 4 for Bio majors. Prerequisites: Biology or Human Biology core, or consent of instructor. Recommended: statistics. Satisfies WIM in Biology. GER: DB-NatSci

4 units, alternate years, not given this year

**BIO 146. Population Studies**

Series of talks by distinguished speakers introducing approaches to population and resource studies.

1 unit, Win (Feldman, M)

**BIO 149. The Neurobiology of Sleep**

(Same as BIO 249, HUMBIO 161) Preference to seniors and graduate students. The neurochemistry and neurophysiology of changes in brain activity and conscious awareness associated with changes in the sleep/wake state. Behavioral and neurobiological phenomena including sleep regulation, sleep homeostasis, circadian rhythms, sleep disorders, sleep function, and the molecular biology of sleep. Enrollment limited to 16. GER: DB-NatSci

4 units, Win (Heller, C), alternate years, not given next year

**BIO 150. Human Behavioral Biology**

(Same as BIO 250, HUMBIO 160) Multidisciplinary. How to approach complex normal and abnormal behaviors through biology. How to integrate disciplines including sociobiology, ethology, neuroscience, and endocrinology to examine behaviors such as aggression, sexual behavior, language use, and mental illness. GER: DB-NatSci

5 units, Spr (Sapolsky, R), alternate years, not given next year

**BIO 151. Mechanisms of Neuron Death**

For Biology majors with background in neuroscience. Cell and molecular biology of neuron death during neurological disease. Topics: the amyloid diseases (Alzheimer's), prion diseases (kuru and Creutzfeldt-Jakob), oxygen radical diseases (Parkinson's and ALS), triplet repeat diseases (Huntington's), and AIDS-related dementia. Student presentations. Enrollment limited to 15; application required. GER: DB-NatSci

3 units, Aut (Sapolsky, R)

**BIO 152. Imaging: Biological Light Microscopy**

(Same as MCP 222) Survey of instruments which use light and other radiation for analysis of cells in biological and medical research. Topics: basic light microscopy through confocal fluorescence and video/digital image processing. Lectures on physical principles; involves partial assembly and extensive use of lab instruments. Lab. Prerequisites: some college physics, Biology core. GER: DB-NatSci

3 units, Spr (Lewis, R; Smith, S)

**BIO 153. Cellular Neuroscience: Cell Signaling and Behavior**

(Same as PSYCH 120) Neural interactions underlying behavior. Prerequisites: PSYCH 1 or basic biology. GER: DB-NatSci

4 units, Aut (Wine, J)

**BIO 154. Molecular and Cellular Neurobiology**

For advanced undergraduate students. Cellular and molecular mechanisms in the organization and functions of the nervous system. Topics: wiring of the neuronal circuit, synapse structure and synaptic transmission, signal transduction in the nervous system, sensory systems, molecular basis of behavior including learning and memory, molecular pathogenesis of neurological diseases. Satisfies Central Menu Areas 2 or 3 for Bio majors. Prerequisite for undergraduates: Biology core or equivalent, or consent of instructors. GER: DB-NatSci

4 units, alternate years, not given this year

**BIO 156. Epigenetics**

(Same as BIO 256, GENE 206, PATH 206) For graduate students in the Biosciences and upper level Biology undergraduates. Mechanisms by which phenotypes not determined by the DNA sequence are stably inherited in successive cell divisions. From the discovery of position-effect variegation in *Drosophila* in the 1920s

to present-day studies of covalent modifications of histones and DNA methylation. Topics include: position effect, gene silencing, heterochromatin, centromere identity, genomic imprinting, histone code, variant histones, and the role of epigenetics in cancer. Prerequisite: BIO41 and BIO42, or GENE 203, or consent of instructor.

*2 units, alternate years, not given this year*

#### **BIO 157. Biochemistry and Molecular Biology of Plants**

(Same as BIO 257) Biochemical and molecular basis of plant growth and adaptation. Topics include: hormone signal transduction; photoreceptor chemistry and signaling; metabolite sensing and transport; dynamics of photosynthesis; plant innate immunity and symbiosis. Lectures and readings will emphasize research methods. Prerequisite: Biology core or equivalent, or consent of instructor. GER: DB-NatSci

*3-4 units, alternate years, not given this year*

#### **BIO 158. Developmental Neurobiology**

(Same as BIO 258) For advanced undergraduates and coterminal students. The principles of nervous system development from the molecular control of patterning, cell-cell interactions, and trophic factors to the level of neural systems and the role of experience in influencing brain structure and function. Topics: neural induction and patterning cell lineage, neurogenesis, neuronal migration, axonal pathfinding, synapse elimination, the role of activity, critical periods, and the development of behavior. Satisfies Central Menu Areas 2 or 3. Prerequisite: BIO 42 or equivalent. GER: DB-NatSci

*4 units, alternate years, not given this year*

#### **BIO 160A. Developmental Biology I**

Focus is on the molecular mechanisms underlying the generation of diverse cell types and tissues during embryonic and post-embryonic animal development. The role of cell-cell communication in controlling key developmental decisions. Topics covered in this quarter include embryonic axis formation, morphogen signaling, cell type specification and stem cells. Experimental logic and methods of research in developmental biology. Discussions of research papers. Satisfies Central Menu Areas 1 or 2. Prerequisite: Biology core or consent of instructor. GER: DB-NatSci

*4 units, Aut (Simon, M)*

#### **BIO 160B. Developmental Biology II**

Continuation of BIO 160A. Focus is on the molecular mechanisms underlying the generation of diverse cell types and tissues during embryonic and post-embryonic animal development. The role of cell-cell communication in controlling key developmental decisions. The topics include sexual control of development, tissue polarity and growth, cell migration, regeneration, and the evolution of developmental mechanisms. Experimental logic and methods of research in developmental biology. Discussions of research papers. Satisfies Central Menu Areas 1 or 2. Prerequisites: Biology Core and 160A, or consent of instructor. GER: DB-NatSci

*4 units, Win (Simon, M)*

#### **BIO 161. Molecular Basis of Biological Communication**

Across molecular, cellular, organismal and communal biological scales, communication among elements of a system is required for its function. The molecules and logic at the heart of communication at levels from the interactions between cells in a developing body to how organisms perceive and respond to their physical environment and the organisms around them; how these systems normally work and how failures in communication result in and from disease. Current research literature. Prerequisites: BIO 41, 42. Recommended: BIO 160A, 129A.

*4 units, alternate years, not given this year*

#### **BIO 163. Neural Systems and Behavior**

(Same as BIO 263, HUMBIO 163) The field of neuroethology and its vertebrate and invertebrate model systems. Research-oriented. Readings include reviews and original papers. How animal brains compare; how neural circuits are adapted to species-typical behavior; and how the sensory worlds of different species represent the world. Lectures and required discussions. Satisfies Central Menu Area 3 for Bio majors. Prerequisites: BIO 42, HUMBIO 4A. GER: DB-NatSci

*4 units, Aut (Fernald, R), alternate years, not given next year*

#### **BIO 164. Biosphere-Atmosphere Interactions**

(Same as BIO 264) Physiological, ecological, and physical aspects of ecosystem function, emphasizing how ecosystems influence and are influenced by the atmosphere. Prerequisites: 42, 43; or consent of instructor. GER: DB-NatSci

*4 units, alternate years, not given this year*

#### **BIO 165. When Neurons Misfire: The Molecular Basis of Neurological Disorders**

Current topics in research and investigative therapies of neurological conditions including depression, personality disorders, schizophrenia, Parkinsons, epilepsy, aging and life-extension. Sources include primary literature with a focus on molecular mechanisms and therapeutic strategies. Emphasis placed on what the study of dysfunction in the nervous system tells us about the delicacy of proper function. Guest lecturers including Dr. Robert Sapolsky and Dr. Gary Steinberg.

*1 unit, Win (Sapolsky, R; House, P)*

#### **BIO 166. Faunal Analysis: Animal Remains for the Archaeologist**

(Same as ANTHRO 113, ANTHRO 213, BIO 266) The analysis of fossil animal bones and shells to illuminate the behavior and ecology of prehistoric collectors, especially ancient humans. Theoretical and methodological issues. The identification, counting, and measuring of fossil bones and shells. Labs. Methods of numerical analysis.

*5 units, not given this year*

#### **BIO 167. Social Animals, Social Revolutions and Social Networks**

(Same as CS 81G, FRENGEN 167) We like to think of social networks as contemporary phenomena. But before Facebook, individuals organized themselves in social networks; before Twitter, revolutionaries used media to communicate and coordinate their messages. In fact, even animal societies are networked. Do all these social networks share certain properties? What can we learn by comparing them? These are some of the questions we will ask in this course, as we traverse the natural world and past societies before taking a fresh look at our modern social networks. GER: DB-NatSci

*4 units, Spr (Gordon, D; Edelstein, D; Roberts, E)*

#### **BIO 171. Principles of Cell Cycle Control**

(Same as BIO 271, CSB 271) Genetic analysis of the key regulatory circuits governing the control of cell division. Illustration of key principles that can be generalized to other synthetic and natural biological circuits. Focus on tractable model organisms; growth control; irreversible biochemical switches; chromosome duplication; mitosis; DNA damage checkpoints; MAPK pathway-cell cycle interface; oncogenesis. Analysis of classic and current primary literature. Satisfies Central Menu Area 2. GER: DB-NatSci

*3 units, Aut (Skotheim, J; Ferrell, J)*

#### **BIO 172. Molecular Basis of Body Plan Evolution**

(Same as BIO 272) Developmental biology research, from arthropods and chordates, over the past 25 years has revealed astonishing levels of shared developmental similarities, despite large morphological differences between the two groups, and has led to speculation about the morphology of the earliest animals. This has led to a synthesis between developmental biology, zoology, and paleontology and sparked molecular developmental studies in diverse metazoan phyla. Focus is on the latest findings from comparative development and what they reveal about the early evolution of the animal phyla.

*4 units, Spr (Lowe, C)*

#### **BIO 175. Tropical Ecology and Conservation**

Spring Break trip to a field station; lectures at Stanford. How to address scientific questions concerning ecology and conservation. Field trip includes natural history observations and group research projects. Symposium based on project results. GER: DB-NatSci

*5 units, Spr (Dirzo, R)*

#### **BIO 177. Plant Microbe Interaction**

(Same as BIO 277) Molecular basis of plant symbiosis and pathogenesis. Topics include mechanisms of recognition and signaling between microbes and plant hosts, with examples such as the role of small molecules, secreted peptides, and signal transduction pathways in symbiotic or pathogenic interactions.

Readings include landmark papers together with readings in the contemporary literature. Prerequisites: Biology core and two or more upper division courses in genetics, molecular biology, or biochemistry. Recommended: plant genetics or plant biochemistry.

3 units, Spr (Long, S; Mudgett, M), alternate years, not given next year

### BIO 178. Microbiology Literature

(Same as BIO 278) For advanced undergraduates and first-year graduate students. Critical reading of the research literature in prokaryotic genetics and molecular biology, with particular applications to the study of major human pathogens. Classic and foundational papers in pathogenesis, genetics, and molecular biology; recent literature on bacterial pathogens such as Salmonella, Vibrio, and/or Yersinia. Diverse experimental approaches: biochemistry, genomics, pathogenesis, and cell biology. Prerequisites: Biology Core and two upper-division courses in genetics, molecular biology, or biochemistry.

3 units, not given this year

### BIO 182. Modeling Cultural Evolution

(Same as BIO 282) Seminar. Quantitative models for the evolution of socially transmitted traits. Rates of change of learned traits in populations and patterns of cultural diversity as a function of innovation and cultural transmission. Learning in constant and changing environments. Possible avenues for gene-culture coevolution.

3 units, Win (Feldman, M)

### BIO 183. Theoretical Population Genetics

(Same as BIO 283) Models in population genetics and evolution. Selection, random drift, gene linkage, migration, and inbreeding, and their influence on the evolution of gene frequencies and chromosome structure. Models are related to DNA sequence evolution. Prerequisites: calculus and linear algebra, or consent of instructor.

3 units, Spr (Feldman, M), alternate years, not given next year

### BIO 186. Natural History of the Vertebrates

(Same as BIO 286) Broad survey of the diversity of vertebrate life. Discussion of the major branches of the vertebrate evolutionary tree, with emphasis on evolutionary relationships and key adaptations as revealed by the fossil record and modern phylogenetics. Modern orders introduced through an emphasis on natural history, physiology, behavioral ecology, community ecology, and conservation. Lab sessions focused on comparative skeletal morphology through hands-on work with skeletal specimens. Discussion of field methods and experience with our local vertebrate communities through field trips to several of California's distinct biomes. Prerequisite: Biology core.

4 units, not given this year

### BIO 188. Biochemistry I

(Same as BIO 288, CHEMENG 181, CHEMENG 281, CHEM 181) (CHEMENG offerings formerly listed as 188/288.) Chemistry of major families of biomolecules including proteins, nucleic acids, carbohydrates, lipids, and cofactors. Structural and mechanistic analysis of properties of proteins including molecular recognition, catalysis, signal transduction, membrane transport, and harvesting of energy from light. Molecular evolution. Satisfies Central Menu Area 1 for Bio majors. Prerequisites: CHEM 33, 35, 131, and 135 or 171. GER: DB-NatSci

3 units, Aut (Cegelski, L)

### BIO 189. Biochemistry II

(Same as BIO 289, CHEMENG 183, CHEMENG 283, CHEM 183) Focus on metabolic biochemistry: the study of chemical reactions that provide the cell with the energy and raw materials necessary for life. Topics include glycolysis, gluconeogenesis, the citric acid cycle, oxidative phosphorylation, photosynthesis, the pentose phosphate pathway, and the metabolism of glycogen, fatty acids, amino acids, and nucleotides as well as the macromolecular machines that synthesize RNA, DNA, and proteins. Medical relevance is emphasized throughout. Satisfies Central Menu Area 1 for Bio majors. Prerequisite: BIO 188/288 or CHEM 181 or CHEMENG 181/281 (formerly 188/288). GER: DB-NatSci

3 units, Win (Dunn, A)

### BIO 190. Becoming a Scientist: Introduction to Research Practices and Techniques

For upper level undergraduates concurrently enrolled in academic

units for undergraduate biology research. Focus on developing skills that are essential in the transition from student to researcher. Provide better structure and support for undergraduate research experiences in order to give students a better foundation as they begin to pursue research opportunities. Engage in small seminar-style discussion sections once a week that will be comprised of research-based discussions, student led PowerPoint presentations and poster presentations. Concurrent enrollment in BIO 199 or the equivalent required.

1 unit, Aut (Brownell, S)

### BIO 196A. Biology Senior Reflection

Capstone course series for seniors. Creative, self-reflective and scientifically relevant projects conceived, produced and exhibited over the course of three quarters. Explore scientific content of personal interest through creative forms including but not limited to writing, music, fine arts, performing arts, photography, film or new media. A written essay on the creative process and scientific significance of the selected topic will accompany the creative work. Completed projects may be included in a creative portfolio. Required enrollment in 196A,B,C. Satisfies WIM in Biology. WIM

3 units, Aut (McConnell, S; Todhunter, A)

### BIO 196B. Biology Senior Reflection

Capstone course series for seniors. Creative, self-reflective and scientifically relevant projects conceived, produced and exhibited over the course of three quarters. Explore scientific content of personal interest through creative forms including but not limited to writing, music, fine arts, performing arts, photography, film or new media. A written essay on the creative process and scientific significance of the selected topic will accompany the creative work. Completed projects may be included in a creative portfolio. Required enrollment in 196A,B,C.

3 units, Win (McConnell, S; Todhunter, A)

### BIO 196C. Biology Senior Reflection

Capstone course series for seniors. Creative, self-reflective and scientifically relevant projects conceived, produced and exhibited over the course of three quarters. Explore scientific content of personal interest through creative forms including but not limited to writing, music, fine arts, performing arts, photography, film or new media. A written essay on the creative process and scientific significance of the selected topic will accompany the creative work. Completed projects may be included in a creative portfolio. Required enrollment in 196A,B,C.

3 units, Spr (McConnell, S; Todhunter, A)

### BIO 197WA. Senior Writing Project: The Personal Essay in Biology

Seminar focused on writing. Compose, workshop and revise scientifically relevant and personal essays in biology directed at a mainstream audience, interweaving research, interview, memoir, and other elements of nonfiction craft. Satisfies WIM in Biology. WIM

3 units, Spr (Todhunter, A)

### BIO 197WB. Communicating Neuroscience to a Non-Scientist

Explore the field of neuroscience through the process of communicating science to a layperson audience. Read primary scientific articles on different topics in neuroscience and write a New York Times style summary of those articles for a layperson audience. Refine student writing through multiple revisions of summaries based on instructor and peer critique. Select topics include neuronal communication, neurobiology of addiction, neurogenesis, neural development, neuroendocrinology, and neurodegenerative diseases. Prerequisite: Bio42 or the equivalent. Satisfies WIM in Biology. WIM

3 units, Spr (Brownell, S)

### BIO 198. Directed Reading in Biology

Individually arranged under the supervision of members of the faculty.

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### BIO 198X. Out-of-Department Directed Reading

Individually arranged under the supervision of members of the faculty. Credit for work arranged with out-of-department faculty is restricted to Biology majors and requires department approval. See <http://biohonors.stanford.edu> for information and petitions. May be repeated for credit.

*1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

### **BIO 199. Advanced Research Laboratory in Experimental Biology**

Individual research taken by arrangement with in-department instructors. See <http://biohonors.stanford.edu> for information on research sponsors, units, and credit for summer research. May be repeated for credit.

*1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

### **BIO 199W. Senior Honors Thesis: How to Effectively Write About Scientific Research**

Workshop. For seniors pursuing an honors thesis in a biology-focused major or program. Focus on improving scientific writing and synthesizing in the context of students' individual research projects. Complete literature review which will form the basis for the thesis introduction. Develop methods section of the thesis. Small seminar-style discussion sections with research-based discussions, student led PowerPoint presentations, and writing workshops. Co-requisite: Concurrent enrollment in 199 or 199X or equivalent. Satisfies WIM in Biology. WIM

*3 units, Aut (Brownell, S)*

### **BIO 199X. Out-of-Department Advanced Research Laboratory in Experimental Biology**

Individual research by arrangement with out-of-department instructors. Credit for 199X is restricted to declared Biology majors and requires department approval. See <http://biohonors.stanford.edu> for information on research sponsors, units, petitions, deadlines, credit for summer research, and out-of-Stanford research. May be repeated for credit.

*1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

### **BIO 271. Principles of Cell Cycle Control**

(Same as BIO 171, CSB 271) Genetic analysis of the key regulatory circuits governing the control of cell division. Illustration of key principles that can be generalized to other synthetic and natural biological circuits. Focus on tractable model organisms; growth control; irreversible biochemical switches; chromosome duplication; mitosis; DNA damage checkpoints; MAPK pathway-cell cycle interface; oncogenesis. Analysis of classic and current primary literature. Satisfies Central Menu Area 2. GER: DB-NatSci

*3 units, Aut (Skotheim, J; Ferrell, J)*

## **GRADUATE COURSES IN BIOLOGY**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

### **BIO 200. Advanced Molecular Biology**

(Same as BIO 104) Molecular mechanisms that govern the replication, recombination, and expression of eukaryotic genomes. Topics: DNA replication, DNA recombination, gene transcription, RNA splicing, regulation of gene expression, protein synthesis, and protein folding. Satisfies Central Menu Area 1. Prerequisite: Biology core.

*5 units, Win (Frydman, J; Gozani, O)*

### **BIO 203. Advanced Genetics**

(Same as DBIO 203, GENE 203) For graduate students in Bioscience programs; may be appropriate for graduate students in other programs. Focused on application of the genetics toolbox to problems in modern biology research. Topics covered include analytic methods, genetic manipulation, genome analysis, and human genetics. Lectures and faculty-led discussion sections with evaluation of papers. Students with minimal experience in genetics should prepare by working out problems in college level textbooks.

*4 units, Aut (Stearns, T; Bustamante, C; Fire, A; Sidow, A)*

### **BIO 207. Life and Death of Proteins**

How proteins are made and degraded in the cell. Discussion of primary literature. Case studies follow the evolution of scientific ideas, and evaluate how different experimental approaches contribute to our understanding of a biological problem. Emphasis on multidisciplinary approaches. Topics: protein folding and assembly, mechanisms of chaperone action, sorting into organelles, misfolding and disease, and the ubiquitin-proteasome pathway. Enrollment limited to 30.

*3 units, Win (Frydman, J)*

### **BIO 209A. The Human Genome and Disease**

(Same as BIO 109A, HUMBIO 158) The variability of the human genome and the role of genomic information in research, drug discovery, and human health. Concepts and interpretations of genomic markers in medical research and real life applications. Human genomes in diverse populations. Original contributions from thought leaders in academia and industry and interaction between students and guest lecturers. Students with a major, minor or cotermin in Biology: 109A/209A or 109B/209B may count toward degree program but not both.

*3 units, Win (Heller, R)*

### **BIO 209B. The Human Genome and Disease: Genetic Diversity and Personalized Medicine**

(Same as BIO 109B) Continuation of 109A/209A. Genetic drift: the path of human predecessors out of Africa to Europe and then either through Asia to Australia or through northern Russia to Alaska down to the W. Coast of the Americas. Support for this idea through the histocompatibility genes and genetic sequences that predispose people to diseases. Guest lectures from academia and pharmaceutical companies. Prerequisite: Biology or Human Biology core. Students with a major, minor or cotermin in Biology: 109A/209A or 109B/209B may count toward degree program but not both.

*3 units, Spr (Heller, R)*

### **BIO 210. DNA Replication and Genomic Maintenance**

(Same as BIO 110) Maintenance of the genome and its accurate replication are prerequisites for life. DNA replication is also intricately connected to pathways for responding to genotoxic stress, which include inevitable collisions with transcription. In eukaryotes, DNA repair and replication are tightly connected to chromatin modification. Emphasis for lecture topics include: DNA-templated chromatin transactions; Chromatin manipulation during replication and DNA damage responses; Structural biology and molecular mechanisms of replication and DNA repair enzymes; Inducible responses to genotoxic stress; Relationships of DNA damage processing to mutagenesis, carcinogenesis, aging and human genetic disease.

*3 units, Win (Morrison, A; Hanawalt, P)*

### **BIO 212. Human Physiology**

(Same as BIO 112, HUMBIO 133) The functioning of organ systems emphasizing mechanisms of control and regulation. Topics: structure and function of endocrine and central nervous systems, cardiovascular physiology, respiration, salt and water balance, exercise, and gastrointestinal physiology. Satisfies Central Menu Area 3 for Bio majors. Prerequisite: Biology or Human Biology core.

*4 units, Win (Garza, D)*

### **BIO 214. Advanced Cell Biology**

(Same as BIOC 224, MCP 221) For Ph.D. students. Current research on cell structure, function, and dynamics. Topics include complex cell phenomena such as cell division, apoptosis, compartmentalization, transport and trafficking, motility and adhesion, differentiation, and multicellularity. Current papers from the primary literature. Prerequisite for advanced undergraduates: BIO 129A,B, and consent of instructor.

*2-5 units, Win (Kopito, R; Nachury, M; Straight, A; Pfeffer, S; Theriot, J)*

### **BIO 215. Biochemical Evolution**

Biochemical viewpoints on the evolutionary process. Topics: prebiotic biochemistry and the origins of life; adaptive organization of metabolism; enzyme polymorphisms and other biochemical aspects of population genetics; macromolecular phylogeny and protein clocks. Prerequisites: Biology core or substantial equivalent.

*3 units, alternate years, not given this year*

### **BIO 216. Terrestrial Biogeochemistry**

(Same as EESS 216) Nutrient cycling and the regulation of primary and secondary production in terrestrial, freshwater, and marine ecosystems; land-water and biosphere-atmosphere interactions; global element cycles and their regulation; human effects on biogeochemical cycles. Prerequisite: graduate standing in science or engineering; consent of instructor for undergraduates or cotermin students.

*3 units, not given this year*

**BIO 217. Neuronal Biophysics**

Biophysical descriptions and mechanisms of passive and excitable membranes, ion channels and pumps, action potential propagation, and synaptic transmission. Introduction to dynamics of single neurons and neuronal networks. Emphasis is on the experimental basis for modern research applications. Interdisciplinary aspects of biology and physics. Literature, problem sets, and student presentations. Prerequisites: undergraduate physics, calculus, and biology.

4 units, Win (Schnitzer, M)

**BIO 218. Genetic Analysis of Biological Processes**

(Same as BIO 118) Genetic principles and their experimental applications. Emphasis is on the identification and use of mutations to study cellular function. Satisfies Central Menu Areas 1 or 2. Prerequisite: Biology core.

5 units, Spr (Baker, J)

**BIO 222. Exploring Neural Circuits**

Seminar. The logic of how neural circuits control behavior; how neural circuits are assembled during development and modified by experience. Emphasis is on primary literature. Topics include: neurons as information processing units; simple and complex circuits underlying sensory information processing and motor control; and development and plasticity of neural circuits. Advanced undergraduates and graduate students with background in physical science, engineering, and biology may apply to enroll. Recommended: background in neuroscience.

3 units, Win (Luo, L)

**BIO 223. Stochastic and Nonlinear Dynamics**

(Same as APPPHYS 223) Theoretical analysis of dynamical processes: dynamical systems, stochastic processes, and spatiotemporal dynamics. Motivations and applications from biology and physics. Emphasis is on methods including qualitative approaches, asymptotics, and multiple scale analysis. Prerequisites: ordinary and partial differential equations, complex analysis, and probability or statistical physics.

3 units, alternate years, not given this year

**BIO 227. Foundations of Community Ecology**

Discussion of classic papers in community ecology (Forbes, Clements, Gleason, Grinnell, Lindeman, Preston, Elton, Hutchinson, May, MacArthur, Odum, Connell, Paine, Tilman, etc.) and contemporary papers on related topics, to develop historical perspectives to understand current issues and identify future directions. Prerequisite for undergraduates: consent of instructor.

2 units, alternate years, not given this year

**BIO 230. Molecular and Cellular Immunology**

For advanced undergraduate and graduate students who have not previously taken an introductory immunology course. Mechanisms of innate and adaptive immune responses: molecular/cellular basis of immunity and its regulation; structure and function of antibody molecules; molecular biology and biochemistry of antigen receptors and signaling pathways; genetic control of immunity and disease susceptibility. Emphasis is on key experimental approaches. Satisfies Central Menu Areas 1 or 2. Prerequisite for undergraduates: Biology or Human Biology core, or consent of instructor.

4 units, Aut (Jones, P)

**BIO 230A. Molecular and Cellular Immunology Literature Review**

Special discussion section for graduate students. Supplement to 230. Corequisite: 230.

1 unit, Aut (Jones, P)

**BIO 232. Advanced Imaging Lab in Biophysics**

(Same as APPPHYS 232, BIO 132, BIOPHYS 232, MCP 232) Laboratory and lectures. Advanced microscopy and imaging, emphasizing hands-on experience with state-of-the-art techniques. Students construct and operate working apparatus. Topics include microscope optics, Koehler illumination, contrast-generating mechanisms (bright/dark field, fluorescence, phase contrast, differential interference contrast), and resolution limits. Laboratory topics vary by year, but include single-molecule fluorescence, fluorescence resonance energy transfer, confocal microscopy, two-photon microscopy, and optical trapping. Limited enrollment. Recommended: basic physics, Biology core or equivalent, and consent of instructor.

4 units, Spr (Block, S; Smith, S; Stearns, T; Schnitzer, M)

**BIO 237. Plant Genetics**

(Same as BIO 137) Gene analysis, mutagenesis, transposable elements; developmental genetics of flowering and embryo development; biochemical genetics of plant metabolism; scientific and societal lessons from transgenic plants. Satisfies Central Menu Area 2. Prerequisite: Biology core or consent of instructor.

3-4 units, not given this year

**BIO 243. Evolution**

(Same as BIO 143) The basic facts and principles of the evolution of all life. The logic of and evidence for the correctness of Darwin's argument for evolution by natural selection. How Mendelian genetics was integrated into evolutionary thinking. The integration of physiological and ecological perspectives into the study of evolutionary adaptation within species. Species formation and evolutionary divergence among species. Patterns of evolution over long time scales. Satisfies Central Menu Area 4.

3 units, Aut (Watt, W)

**BIO 244. Fundamentals of Molecular Evolution**

(Same as BIO 113) The inference of key molecular evolutionary processes from DNA and protein sequences. Topics include random genetic drift, coalescent models, effects and tests of natural selection, combined effects of linkage and natural selection, codon bias and genome evolution. Satisfies Central Menu Areas 1 or 4. Prerequisites: Biology core or graduate standing in any department, and consent of instructor.

4 units, not given this year

**BIO 245. Behavioral Ecology**

(Same as BIO 145) Animal behavior from an evolutionary and ecological perspective. Topics: foraging, territoriality, reproductive behavior, social groups. Lecture/seminar format; seminars include discussion of journal articles. Independent research projects. Satisfies Central Menu Area 4 for Bio majors. Prerequisites: Biology or Human Biology core, or consent of instructor. Recommended: statistics. Satisfies WIM in Biology.

4 units, alternate years, not given this year

**BIO 249. The Neurobiology of Sleep**

(Same as BIO 149, HUMBIO 161) Preference to seniors and graduate students. The neurochemistry and neurophysiology of changes in brain activity and conscious awareness associated with changes in the sleep/wake state. Behavioral and neurobiological phenomena including sleep regulation, sleep homeostasis, circadian rhythms, sleep disorders, sleep function, and the molecular biology of sleep. Enrollment limited to 16.

4 units, Win (Heller, C), alternate years, not given next year

**BIO 250. Human Behavioral Biology**

(Same as BIO 150, HUMBIO 160) Multidisciplinary. How to approach complex normal and abnormal behaviors through biology. How to integrate disciplines including sociobiology, ethology, neuroscience, and endocrinology to examine behaviors such as aggression, sexual behavior, language use, and mental illness.

5 units, Spr (Sapolsky, R), alternate years, not given next year

**BIO 254. Molecular and Cellular Neurobiology**

(Same as NBIO 254) For graduate students. Includes lectures for BIO 154. Cellular and molecular mechanisms in the organization and functions of the nervous system. Topics: wiring of the neuronal circuit, synapse structure and synaptic transmission, signal transduction in the nervous system, sensory systems, molecular basis of behavior including learning and memory, molecular pathogenesis of neurological diseases.

5 units, alternate years, not given this year

**BIO 256. Epigenetics**

(Same as BIO 156, GENE 206, PATH 206) For graduate students in the Biosciences and upper level Biology undergraduates. Mechanisms by which phenotypes not determined by the DNA sequence are stably inherited in successive cell divisions. From the discovery of position-effect variegation in *Drosophila* in the 1920s to present-day studies of covalent modifications of histones and DNA methylation. Topics include: position effect, gene silencing, heterochromatin, centromere identity, genomic imprinting, histone code, variant histones, and the role of epigenetics in cancer. Prerequisite: BIO41 and BIO42, or GENE 203, or consent of instructor.



2 units, alternate years, not given this year

**BIO 257. Biochemistry and Molecular Biology of Plants**

(Same as BIO 157) Biochemical and molecular basis of plant growth and adaptation. Topics include: hormone signal transduction; photoreceptor chemistry and signaling; metabolite sensing and transport; dynamics of photosynthesis; plant innate immunity and symbiosis. Lectures and readings will emphasize research methods. Prerequisite: Biology core or equivalent, or consent of instructor.

3-4 units, alternate years, not given this year

**BIO 258. Developmental Neurobiology**

(Same as BIO 158) For advanced undergraduates and coterminal students. The principles of nervous system development from the molecular control of patterning, cell-cell interactions, and trophic factors to the level of neural systems and the role of experience in influencing brain structure and function. Topics: neural induction and patterning cell lineage, neurogenesis, neuronal migration, axonal pathfinding, synapse elimination, the role of activity, critical periods, and the development of behavior. Satisfies Central Menu Areas 2 or 3. Prerequisite: BIO 42 or equivalent.

4 units, alternate years, not given this year

**BIO 263. Neural Systems and Behavior**

(Same as BIO 163, HUMBIO 163) The field of neuroethology and its vertebrate and invertebrate model systems. Research-oriented. Readings include reviews and original papers. How animal brains compare; how neural circuits are adapted to species-typical behavior; and how the sensory worlds of different species represent the world. Lectures and required discussions. Satisfies Central Menu Area 3 for Bio majors. Prerequisites: BIO 42, HUMBIO 4A.

4 units, Aut (Fernald, R), alternate years, not given next year

**BIO 264. Biosphere-Atmosphere Interactions**

(Same as BIO 164) Physiological, ecological, and physical aspects of ecosystem function, emphasizing how ecosystems influence and are influenced by the atmosphere. Prerequisites: 42, 43; or consent of instructor.

4 units, alternate years, not given this year

**BIO 266. Faunal Analysis: Animal Remains for the Archaeologist**

(Same as ANTHRO 113, ANTHRO 213, BIO 166) The analysis of fossil animal bones and shells to illuminate the behavior and ecology of prehistoric collectors, especially ancient humans. Theoretical and methodological issues. The identification, counting, and measuring of fossil bones and shells. Labs. Methods of numerical analysis.

5 units, not given this year

**BIO 267. Molecular Mechanisms of Neurodegenerative Disease**

(Same as NENS 267) The epidemic of neurodegenerative disorders such as Alzheimer's and Parkinson's disease occasioned by an aging human population. Genetic, molecular, and cellular mechanisms. Clinical aspects through case presentations.

4 units, Win (Kopito, R; Wyss-Coray, A; Reimer, R), alternate years, not given next year

**BIO 272. Molecular Basis of Body Plan Evolution**

(Same as BIO 172) Developmental biology research, from arthropods and chordates, over the past 25 years has revealed astonishing levels of shared developmental similarities, despite large morphological differences between the two groups, and has led to speculation about the morphology of the earliest animals. This has led to a synthesis between developmental biology, zoology, and paleontology and sparked molecular developmental studies in diverse metazoan phyla. Focus is on the latest findings from comparative development and what they reveal about the early evolution of the animal phyla.

4 units, Spr (Lowe, C)

**BIO 274S. Hopkins Microbiology Course**

(Same as BIOHOPK 274, CEE 274S, EESS 253S) (Formerly GES 274S.) Four-week, intensive. The interplay between molecular, physiological, ecological, evolutionary, and geochemical processes that constitute, cause, and maintain microbial diversity. How to isolate key microorganisms driving marine biological and geochemical diversity, interpret culture-independent molecular characterization of microbial species, and predict causes and consequences. Laboratory component: what constitutes

physiological and metabolic microbial diversity; how evolutionary and ecological processes diversify individual cells into physiologically heterogeneous populations; and the principles of interactions between individuals, their population, and other biological entities in a dynamically changing microbial ecosystem. Prerequisites: CEE 274A,B, or equivalents.

9-12 units, Sum (Staff)

**BIO 277. Plant Microbe Interaction**

(Same as BIO 177) Molecular basis of plant symbiosis and pathogenesis. Topics include mechanisms of recognition and signaling between microbes and plant hosts, with examples such as the role of small molecules, secreted peptides, and signal transduction pathways in symbiotic or pathogenic interactions. Readings include landmark papers together with readings in the contemporary literature. Prerequisites: Biology core and two or more upper division courses in genetics, molecular biology, or biochemistry. Recommended: plant genetics or plant biochemistry.

3 units, Spr (Long, S; Mudgett, M), alternate years, not given next year

**BIO 278. Microbiology Literature**

(Same as BIO 178) For advanced undergraduates and first-year graduate students. Critical reading of the research literature in prokaryotic genetics and molecular biology, with particular applications to the study of major human pathogens. Classic and foundational papers in pathogenesis, genetics, and molecular biology; recent literature on bacterial pathogens such as Salmonella, Vibrio, and/or Yersinia. Diverse experimental approaches: biochemistry, genomics, pathogenesis, and cell biology. Prerequisites: Biology Core and two upper-division courses in genetics, molecular biology, or biochemistry.

3 units, not given this year

**BIO 282. Modeling Cultural Evolution**

(Same as BIO 182) Seminar. Quantitative models for the evolution of socially transmitted traits. Rates of change of learned traits in populations and patterns of cultural diversity as a function of innovation and cultural transmission. Learning in constant and changing environments. Possible avenues for gene-culture coevolution.

3 units, Win (Feldman, M)

**BIO 283. Theoretical Population Genetics**

(Same as BIO 183) Models in population genetics and evolution. Selection, random drift, gene linkage, migration, and inbreeding, and their influence on the evolution of gene frequencies and chromosome structure. Models are related to DNA sequence evolution. Prerequisites: calculus and linear algebra, or consent of instructor.

3 units, Spr (Feldman, M), alternate years, not given next year

**BIO 286. Natural History of the Vertebrates**

(Same as BIO 186) Broad survey of the diversity of vertebrate life. Discussion of the major branches of the vertebrate evolutionary tree, with emphasis on evolutionary relationships and key adaptations as revealed by the fossil record and modern phylogenetics. Modern orders introduced through an emphasis on natural history, physiology, behavioral ecology, community ecology, and conservation. Lab sessions focused on comparative skeletal morphology through hands-on work with skeletal specimens. Discussion of field methods and experience with our local vertebrate communities through field trips to several of California's distinct biomes. Prerequisite: Biology core.

4 units, not given this year

**BIO 288. Biochemistry I**

(Same as BIO 188, CHEMENG 181, CHEMENG 281, CHEM 181) (CHEMENG offerings formerly listed as 188/288.) Chemistry of major families of biomolecules including proteins, nucleic acids, carbohydrates, lipids, and cofactors. Structural and mechanistic analysis of properties of proteins including molecular recognition, catalysis, signal transduction, membrane transport, and harvesting of energy from light. Molecular evolution. Satisfies Central Menu Area 1 for Bio majors. Prerequisites: CHEM 33, 35, 131, and 135 or 171.

3 units, Aut (Cegelski, L)

**BIO 289. Biochemistry II**

(Same as BIO 189, CHEMENG 183, CHEMENG 283, CHEM 183) Focus on metabolic biochemistry: the study of chemical



reactions that provide the cell with the energy and raw materials necessary for life. Topics include glycolysis, gluconeogenesis, the citric acid cycle, oxidative phosphorylation, photosynthesis, the pentose phosphate pathway, and the metabolism of glycogen, fatty acids, amino acids, and nucleotides as well as the macromolecular machines that synthesize RNA, DNA, and proteins. Medical relevance is emphasized throughout. Satisfies Central Menu Area 1 for Bio majors. Prerequisite: BIO 188/288 or CHEM 181 or CHEMENG 181/281 (formerly 188/288).

3 units, Win (Dunn, A)

#### **BIO 290. Teaching of Biology**

Open to upper-division undergraduates and graduate students. Practical experience in teaching lab biology or serving as an assistant in a lecture course. May be repeated for credit. Prerequisite: consent of instructor.

1-5 units, Aut (Staff), Win (Staff), Spr (Staff)

#### **BIO 291. Development and Teaching of Core Experimental Laboratories**

Preparation for teaching the core experimental courses (44X and 44Y). Emphasis is on lab, speaking, and writing skills. Focus is on updating the lab to meet the changing technical needs of the students. Taken prior to teaching either of the above courses. May be repeated for credit. Prerequisite: selection by instructor.

1-2 units, Aut (Malladi, S), Win (Malladi, S)

#### **BIO 294. Cellular Biophysics**

(Same as APPPHYS 294) Physical biology of dynamical and mechanical processes in cells. Emphasis is on qualitative understanding of biological functions through quantitative analysis and simple mathematical models. Sensory transduction, signaling, adaptation, switches, molecular motors, actin and microtubules, motility, and circadian clocks. Prerequisites: differential equations and introductory statistical mechanics.

3 units, alternate years, not given this year

#### **BIO 299. Biology PhD Lab Rotation**

Limited to first year Biology PhD students. Lab rotations with Biosciences faculty.

1-10 units, Aut (Nelson, W), Win (Nelson, W)

#### **BIO 300. Graduate Research**

For graduate students only. Individual research by arrangement with in-department instructors.

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

#### **BIO 300X. Out-of-Department Graduate Research**

Individual research by arrangement with out-of-department instructors. Master's students: credit for work arranged with out-of-department instructors is restricted to Biology students and requires approved department petition. See <http://biohonors.stanford.edu> for more information. May be repeated for credit.

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

#### **BIO 301. Frontiers in Biology**

Limited to and required of first-year Ph.D. students in molecular, cellular, and developmental biology. Current research in molecular, cellular, and developmental biology emphasizing primary research literature. Held in conjunction with the department's Monday seminar series. Students and faculty meet weekly before the seminar for a student presentation and discussion of upcoming papers.

1-3 units, Aut (Morrison, A; Skotheim, J), Win (Morrison, A; Skotheim, J)

#### **BIO 302. Current Topics and Concepts in Population Biology, Ecology, and Evolution**

Required of first-year PhD students in population biology, and ecology and evolution. Major conceptual issues and developing topics.

1 unit, Aut (Hadly, E)

#### **BIO 303. Current Topics and Concepts in Population Biology, Ecology, and Evolution**

Required of first-year PhD students in population biology, and ecology and evolution. Major conceptual issues and developing topics.

1 unit, Win (Hadly, E)

#### **BIO 304. Current Topics and Concepts in Population Biology, Ecology, and Evolution**

Required of first-year PhD students in population biology, and ecology and evolution. Major conceptual issues and developing topics.

1 unit, Spr (Hadly, E)

#### **BIO 306. Current Topics in Integrative Organismal Biology**

Limited to and required of graduate students doing research in this field. At Hopkins Marine Station.

1 unit, Aut (Sapolsky, R)

#### **BIO 312. Ethical Issues in Ecology and Evolutionary Biology**

Focus is on ethical issues addressed in Donald Kennedy's Academic Duty and others of importance to academics and scientists in the fields of ecology, behavior, and evolutionary biology. Discussions led by faculty and outside guests. Satisfies ethics course requirement for ecology and evolutionary biology. Prerequisite: PhD student in the ecology and evolutionary biology or marine program, or consent of instructor.

1 unit, Aut (Ehrlich, P)

#### **BIO 315. Seminar in Biochemical Evolution**

Literature review and discussion of current topics in biochemical evolution and molecular evolutionary genetics. Prerequisite: consent of instructor.

1-3 units, Aut (Watt, W), Win (Watt, W)

#### **BIO 321. Ecological Genetics**

Systematic exploration of (1) the types of questions that can be addressed by ecological genetics techniques (i.e., community genomics, genetic variation between species in the same ecosystem, resource use, landscape genetics, etc.); (2) laboratory techniques available; and (3) analyses and modeling best suited for ecological genetics questions. Analysis of specific research problems and efforts (now underway or planned for the near future) among seminar participants, and discussion of these efforts with group review of the relative merits of alternative approaches.

1-3 units, Aut (Daily, G; Hadly, E)

#### **BIO 323. Detecting Climate-Driven Changes in California Plant Ranges**

Seminar. For advanced undergraduates and graduate students. Future anthropogenic climate change will continue to alter plant communities, plant ranges, and ecosystems. Studies have already documented plant and animal range shifts across the globe, yet many questions remain as to how plants will respond to climate change. Which taxa and functional groups will be most sensitive to changes in climate? What will happen to ecological communities with differential response of plant species to climate? Focus is on analyzing trends in climate change and long-term plant distribution data in California. May be repeated for credit. Prerequisite: familiarity with statistical, spatial, or modeling analyses.

1-2 units, not given this year

#### **BIO 324. Interpreting Ecological Data**

Experimental design and the theory behind and appropriate use of parametric statistics including: student t-test; analysis of variance; linear regression and some variations including logistic regression and multiple regression; analysis of covariance; chi-squared similarity test; testing the independence of multiple tests; Monte Carlo and bootstrapping methods. Students encouraged to use data from their own research. Course does not fulfill undergraduate statistics requirement. Prerequisite: consent of instructor.

4 units, not given this year

#### **BIO 325. The Evolution of Body Size**

(Same as GES 325) Preference to graduate students and upper-division undergraduates in GES and Biology. The influence of organism size on evolutionary and ecological patterns and processes. Focus is on integration of theoretical principles, observations of living organisms, and data from the fossil record. What are the physiological and ecological correlates of body size? Is there an optimum size? Do organisms tend to evolve to larger size? Does productivity control the size distribution of consumers? Does size affect the likelihood of extinction or speciation? How does size scale from the genome to the phenotype? How is metabolic rate involved in evolution of body size? What is the influence of geographic area on maximum body size?

2 units, Win (Hadly, E; Payne, J)

**BIO 326. Foundations in Biogeography**

Seminar. Focus on classic papers covering the global distribution and abundance of organisms through time. Topics include: phylogenetics, phylogeography, plate tectonics, island biogeography, climatic change, dispersal, vicariance, ecology of invasions, extinction, gradients, diversity, conservation and a history of the field.

2 units, not given this year

**BIO 342. Plant Biology Seminar**

Topics announced at the beginning of each quarter. Current literature. May be repeated for credit. See <http://carnegiedpb.stanford.edu/seminars/seminars.php>.

1-3 units, Aut (Long, S), Win (Walbot, V), Spr (Long, S)

**BIO 346. Advanced Seminar on Prokaryotic Molecular Biology**

Enrollment limited to PhD students associated with departmental research groups in genetics or molecular biology.

1 unit, Aut (Long, S; Spormann, A; Huang, K), Win (Long, S; Spormann, A; Huang, K)

**BIO 375. Field Ecology & Conservation**

This course is based on question-driven research in the field, addressing both conceptual frameworks and methodological aspects of evolutionary ecology and conservation biology. It consists of faculty-led research projects and student independent projects. The field part takes place in a tropical rain forest research station in Mexico September 6-16, 2011. The field component is followed by sessions on campus, where the research data are analyzed, discussed and prepared as scientific papers. The training includes presentations of the papers in a mini-symposium organized as a professional meeting.

4 units, Aut (Dirzo, R)

**BIO 383. Seminar in Population Genetics**

Literature review, research, and current problems in the theory and practice of population genetics and molecular evolution. May be repeated for credit. Prerequisite: consent of instructor.

1-3 units, Aut (Feldman, M), Spr (Feldman, M)

**BIO 384. Theoretical Ecology**

Recent and classical research papers in ecology, and presentation of work in progress by participants. Prerequisite: consent of instructor.

1-3 units, not given this year

**BIO 388. Communication and Leadership Skills**

(Same as ENVRES 210) Focus is on delivering information to policy makers and the lay public. How to speak to the media, Congress, and the general public; how to write op-eds and articles; how to package ideas including titles, abstracts, and CVs; how to survive peer review, the promotion process, and give a job talk; and how to be a responsible science advocate.

2 units, not given this year

**BIO 390. Topics in Biology**

Seminar. Topics in biology ranging from neurobiology to ecology.

1 unit, Win (Simoni, R)

**BIO 459. Frontiers in Interdisciplinary Biosciences**

(Same as BIOC 459, BIOE 459, CHEMENG 459, CHEM 459, PSYCH 459) Students register through their affiliated department; otherwise register for CHEMENG 459. For specialists and non-specialists. Sponsored by the Stanford BioX Program. Three seminars per quarter address scientific and technical themes related to interdisciplinary approaches in bioengineering, medicine, and the chemical, physical, and biological sciences. Leading investigators from Stanford and the world present breakthroughs and endeavors that cut across core disciplines. Pre-seminars introduce basic concepts and background for non-experts. Registered students attend all pre-seminars; others welcome. See <http://biox.stanford.edu/courses/459.html>. Recommended: basic mathematics, biology, chemistry, and physics.

1 unit, Aut (Robertson, C), Win (Robertson, C), Spr (Robertson, C)

**BIO 801. TGR Project**

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**BIO 802. TGR Dissertation**

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

# BIOLOGY, HOPKINS MARINE STATION (BIOHOPK) COURSES

## UNDERGRADUATE COURSES IN BIOLOGY, HOPKINS MARINE STATION

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**BIOHOPK 43. Plant Biology, Evolution, and Ecology**

Introduction to biology in a marine context. Principles of plant biology: physiology, structure, diversity. Principles of evolution: macro and microevolution, population genetics. Ecology: the principles governing the distribution and abundance of organisms; population, community, and ecosystem ecology. Equivalent to BIO 43. Corequisite: BIOHOPK 44Y. GER: DB-NatSci

5 units, Spr (Denny, M; Palumbi, S; Watanabe, J)

**BIOHOPK 44Y. Core Laboratory in Plant Biology, Ecology and Evolution**

Laboratory and field projects provide working familiarity with the concepts, organisms, and techniques of plant and evolutionary biology, and ecology. Emphasis is on hands-on experimentation in the marine environment, analysis of data, and written and oral presentation of the experiments. Equivalent to BIO 44Y. Corequisite: BIOHOPK 43. Satisfies WIM in Biology. GER: DB-NatSci, WIM

5 units, Spr (Denny, M; Palumbi, S; Watanabe, J)

**BIOHOPK 161H. Invertebrate Zoology**

(Same as BIOHOPK 261H) (Graduate students register for 261H.) Survey of invertebrate diversity emphasizing form and function in a phylogenetic framework. Morphological diversity, life histories, physiology, and ecology of the major invertebrate groups, concentrating on local marine forms as examples. Current views on the phylogenetic relationships and evolution of the invertebrates. Lectures, lab, plus field trips. Satisfies Central Menu Area 3 for Bio majors. Prerequisite: Biology core or consent of instructor. GER: DB-NatSci

5 units, Win (Watanabe, J)

**BIOHOPK 162H. Comparative Animal Physiology**

(Same as BIOHOPK 262H) (Graduate students register for 262H.) How animals work. Topics: physiology of respiration, circulation, energy metabolism, thermal regulation, osmotic regulation, muscle physiology, and locomotion. Evolutionary and ecological physiology. Lectures, lab, and field research. An option to combine the course work with a more intensive research focus, with more units, is available. Satisfies Central Menu Area 3 for Bio majors. Prerequisite: Biology core or consent of instructor. GER: DB-NatSci

5-8 units, Spr (Block, B), not given next year

**BIOHOPK 163H. Oceanic Biology**

(Same as BIOHOPK 263H) (Graduate students register for 263H.) How the physics and chemistry of the oceanic environment affect marine plants and animals. Topics: seawater and ocean circulation, separation of light and nutrients in the two-layered ocean, oceanic food webs and trophic interactions, oceanic environments, biogeography, and global change. Lectures, discussion, and field trips. Satisfies Central Menu Area 4 for Bio majors. Recommended: PHYSICS 21 or 51, CHEM 31, Biology core, or consent of instructor. GER: DB-NatSci

4 units, Win (Denny, M)

**BIOHOPK 171H. Ecological and Evolutionary Physiology**

(Same as BIOHOPK 271H) (Graduate students register for 271H.) The interplay between environmental factors, such as temperature, light, nutrient supply, salinity, and oxygen availability, and adaptive change at the physiological level. Emphasis is on marine species and the roles played by physiological adaptations in establishing their distribution and performance. Satisfies Central Menu Area 3 for Bio majors. Prerequisite: Biology core or consent of instructor. GER: DB-NatSci

4 units, Spr (Somero, G)

**BIOHOPK 172H. Marine Ecology**

(Same as BIOHOPK 272H) (Graduate students register for 272H.)

Focus is on quantitative approaches to questions in marine ecology and ecophysiology. Statistical methods, including multivariate statistical approaches and meta-analysis. Satisfies Central Menu Area 4 for Bio majors. Prerequisite: Biology core or consent of instructor. GER: DB-NatSci

*5 units, Win (Micheli, F)*

#### **BIOHOPK 173H. Marine Conservation Biology**

(Same as BIOHOPK 273H) (Graduate students register for 273H.) The science of preserving marine diversity. Goal is to introduce students to major conservation issues associated with marine ecosystems. Topics include decline of open ocean fisheries, salmon conservation, bycatch issues in fisheries, use of marine reserves, marine invasions, marine pollution, and global warming. Includes five lecturers from other universities who specialize in marine conservation.

*1-3 units, Spr (Block, B)*

#### **BIOHOPK 174H. Experimental Design and Probability**

(Same as BIOHOPK 274H) (Graduate students register for 274H.) Variability is an integral part of biology. Introduction to probability and its use in designing experiments to address biological problems. Focus is on analysis of variance, when and how to use it, why it works, and how to interpret the results. Design of complex, but practical, asymmetrical experiments and environmental impact studies, and regression and analysis of covariance. Computer-based data analysis. Prerequisite: Biology core or consent of instructor. GER: DB-NatSci

*3 units, Spr (Watanabe, J)*

#### **BIOHOPK 184H. Holistic Biology: Monterey Bay and the Sea of Cortez**

(Same as BIOHOPK 284H) (Graduate students register for 284H.) For majors and non-majors. Complexity in natural systems from complementary points of view, including scientific, historical, philosophical, and literary. The work and writings of Ed Ricketts and John Steinbeck and historical and contemporary works concerning marine ecology and fisheries. Field work, laboratory studies with living invertebrates, and an individual research project. Course includes a component in Baja California, Mexico. Only 6 units may count towards the Biology major. Satisfies WIM in Biology. GER: DB-NatSci

*16 units, Spr (Gilly, W), alternate years, not given next year*

#### **BIOHOPK 187H. Sensory Ecology**

(Same as BIOHOPK 287H) (Graduate students register for 287H.) Topics: the ways animals receive, filter, and process information gleaned from the environment, sensory receptor mechanisms, neural processing, specialization to life underwater, communication within and between species, importance of behavior to ecosystem structure and dynamics, impact of acoustic and light pollution on marine animals. Emphasis is on the current scientific literature. The laboratory portion of the class explores sensory mechanisms using neurobiological methods and methods of experimental animal behavior.

*4 units, Win (Thompson, S)*

#### **BIOHOPK 198H. Directed Instruction or Reading**

May be taken as a prelude to research and may also involve participation in a lab or research group seminar and/or library research. Credit for work arranged with out-of-department instructors restricted to Biology majors and requires department approval. May be repeated for credit. (Staff)

*1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

#### **BIOHOPK 199H. Undergraduate Research**

Qualified undergraduates undertake individual work in the fields listed under 300H. Arrangements must be made by consultation or correspondence.

*1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

#### **BIOHOPK 166H. Molecular Ecology**

(Same as BIOHOPK 266H) (Graduate students register for 266H.) How modern technologies in gene sequencing, detection of nuclear nucleotide polymorphisms, and other approaches are used to gather data on genetic variation that allow measurement of population structure, infer demographic histories, inform conservation efforts, and advance understanding of the ecology of diverse types of organisms. GER: DB-NatSci

*5 units, not given this year*

#### **BIOHOPK 167H. Nerve, Muscle, and Synapse**

(Same as BIOHOPK 267H) (Graduate students register for 267H.) Fundamental aspects of membrane excitability, nerve conduction, synaptic transmission, and excitation-contraction coupling. Emphasis is on biophysical, molecular, and cellular level analyses of these processes in vertebrate and invertebrate systems. Labs on intra- and extracellular recording and patch clamp techniques. Lectures, discussions, and labs. Satisfies Central Menu Area 3 for Bio majors Prerequisites: PHYSICS 23, 28, 43, or equivalent; CHEM 31, 135; calculus; or consent of instructor. GER: DB-NatSci

*5 units, alternate years, not given this year*

#### **BIOHOPK 182H. Stanford at Sea**

(Same as BIOHOPK 323H, EARTHSYS 323, EESS 323) (Graduate students register for 323H.) Five weeks of marine science including oceanography, marine physiology, policy, maritime studies, conservation, and nautical science at Hopkins Marine Station, followed by five weeks at sea aboard a sailing research vessel in the Pacific Ocean. Shore component comprised of three multidisciplinary courses meeting daily and continuing aboard ship. Students develop an independent research project plan while ashore, and carry out the research at sea. In collaboration with the Sea Education Association of Woods Hole, MA. Only 6 units may count towards the Biology major. GER: DB-NatSci

*16 units, alternate years, not given this year*

#### **BIOHOPK 185H. Ecology and Conservation of Kelp Forest Communities**

(Same as BIOHOPK 285H) Eight week course. Daily lectures, labs, and scuba dives focused on kelp forest communities. Physical environment, identification, and natural history of resident organisms; ecological processes that maintain biodiversity and community organization; field methods, data analysis, and research diving techniques. Field research component contribute to ongoing studies associated with Hopkins Marine Life Observatory. Training meets requirements for Stanford scientific diver certification. Satisfies Central Menu Area 4 for Bio majors. Prerequisites: BIO 42 and 43, or BIO 42 and BIOHOPK 43, or consent of instructor; and advanced scuba certification and scuba equipment.

*10-12 units, Sum (Staff)*

## **GRADUATE COURSES IN BIOLOGY, HOPKINS MARINE STATION**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

#### **BIOHOPK 261H. Invertebrate Zoology**

(Same as BIOHOPK 161H) (Graduate students register for 261H.) Survey of invertebrate diversity emphasizing form and function in a phylogenetic framework. Morphological diversity, life histories, physiology, and ecology of the major invertebrate groups, concentrating on local marine forms as examples. Current views on the phylogenetic relationships and evolution of the invertebrates. Lectures, lab, plus field trips. Satisfies Central Menu Area 3 for Bio majors. Prerequisite: Biology core or consent of instructor.

*5 units, Win (Watanabe, J)*

#### **BIOHOPK 262H. Comparative Animal Physiology**

(Same as BIOHOPK 162H) (Graduate students register for 262H.) How animals work. Topics: physiology of respiration, circulation, energy metabolism, thermal regulation, osmotic regulation, muscle physiology, and locomotion. Evolutionary and ecological physiology. Lectures, lab, and field research. An option to combine the course work with a more intensive research focus, with more units, is available. Satisfies Central Menu Area 3 for Bio majors. Prerequisite: Biology core or consent of instructor.

*5-8 units, Spr (Block, B), not given next year*

#### **BIOHOPK 263H. Oceanic Biology**

(Same as BIOHOPK 163H) (Graduate students register for 263H.) How the physics and chemistry of the oceanic environment affect marine plants and animals. Topics: seawater and ocean circulation, separation of light and nutrients in the two-layered ocean, oceanic food webs and trophic interactions, oceanic environments, biogeography, and global change. Lectures, discussion, and field trips. Satisfies Central Menu Area 4 for Bio majors.

Recommended: PHYSICS 21 or 51, CHEM 31, Biology core, or consent of instructor.

4 units, Win (Denny, M)

**BIOHOPK 271H. Ecological and Evolutionary Physiology**

(Same as BIOHOPK 171H) (Graduate students register for 271H.) The interplay between environmental factors, such as temperature, light, nutrient supply, salinity, and oxygen availability, and adaptive change at the physiological level. Emphasis is on marine species and the roles played by physiological adaptations in establishing their distribution and performance. Satisfies Central Menu Area 3 for Bio majors. Prerequisite: Biology core or consent of instructor.

4 units, Spr (Somero, G)

**BIOHOPK 272H. Marine Ecology**

(Same as BIOHOPK 172H) (Graduate students register for 272H.) Focus is on quantitative approaches to questions in marine ecology and ecophysiology. Statistical methods, including multivariate statistical approaches and meta-analysis. Satisfies Central Menu Area 4 for Bio majors. Prerequisite: Biology core or consent of instructor.

5 units, Win (Micheli, F)

**BIOHOPK 273H. Marine Conservation Biology**

(Same as BIOHOPK 173H) (Graduate students register for 273H.) The science of preserving marine diversity. Goal is to introduce students to major conservation issues associated with marine ecosystems. Topics include decline of open ocean fisheries, salmon conservation, bycatch issues in fisheries, use of marine reserves, marine invasions, marine pollution, and global warming. Includes five lecturers from other universities who specialize in marine conservation.

1-3 units, Spr (Block, B)

**BIOHOPK 274H. Experimental Design and Probability**

(Same as BIOHOPK 174H) (Graduate students register for 274H.) Variability is an integral part of biology. Introduction to probability and its use in designing experiments to address biological problems. Focus is on analysis of variance, when and how to use it, why it works, and how to interpret the results. Design of complex, but practical, asymmetrical experiments and environmental impact studies, and regression and analysis of covariance. Computer-based data analysis. Prerequisite: Biology core or consent of instructor.

3 units, Spr (Watanabe, J)

**BIOHOPK 275H. Synthesis in Ecology**

Introduction to frameworks and approaches to synthesizing large data sets, including meta-analysis and permutational multivariate analysis of variance. Hands-on data analysis sessions. May be repeated for credit.

2 units, Win (Micheli, F)

**BIOHOPK 284H. Holistic Biology: Monterey Bay and the Sea of Cortez**

(Same as BIOHOPK 184H) (Graduate students register for 284H.) For majors and non-majors. Complexity in natural systems from complementary points of view, including scientific, historical, philosophical, and literary. The work and writings of Ed Ricketts and John Steinbeck and historical and contemporary works concerning marine ecology and fisheries. Field work, laboratory studies with living invertebrates, and an individual research project. Course includes a component in Baja California, Mexico. Only 6 units may count towards the Biology major. Satisfies WIM in Biology.

16 units, Spr (Gilly, W), alternate years, not given next year

**BIOHOPK 287H. Sensory Ecology**

(Same as BIOHOPK 187H) (Graduate students register for 287H.) Topics: the ways animals receive, filter, and process information gleaned from the environment, sensory receptor mechanisms, neural processing, specialization to life underwater, communication within and between species, importance of behavior to ecosystem structure and dynamics, impact of acoustic and light pollution on marine animals. Emphasis is on the current scientific literature. The laboratory portion of the class explores sensory mechanisms using neurobiological methods and methods of experimental animal behavior.

4 units, Win (Thompson, S)

**BIOHOPK 290H. Teaching of Biological Science**

Open to upper-division undergraduates and graduate students. Practical experience in teaching lab biology or serving as an assistant in a lecture course. Prerequisite: consent of instructor. (Staff)

1-15 units, Win (Staff), Spr (Staff), Sum (Staff)

**BIOHOPK 300H. Research**

Graduate study involving original work undertaken with staff in the fields indicated. B. Block: Comparative Vertebrate Physiology (biomechanics, metabolic physiology and phylogeny of pelagic fishes, evolution of endothermy); L. Crowder: Marine ecology, fisheries, bycatch, integrating science and policy, marine conservation; M. Denny: Biomechanics (the mechanical properties of biological materials and their consequences for animal size, shape, and performance); W. Gilly: Neurobiology (analysis of giant axon systems in marine invertebrates from molecular to behavioral levels); C. Lowe: Evolution of Development (origin of chordates, early evolution of body plans); F. Micheli: Marine Ecology (species interactions and community ecology, scale-dependent aspects of community organization, marine conservation and design of multi-species marine protected areas, behavioral ecology); S. Palumbi: Molecular Evolution (mechanisms of speciation, genetic differentiations of populations, use of mole

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**BIOHOPK 801H. TGR Project**

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**BIOHOPK 802H. TGR Dissertation**

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**BIOHOPK 264H. POPULATION GENOMICS**

The course will review genome-level data sets from next-generation sequencing and their use in cataloging genetic variation and gene expression. We will explore how these new data sets add to our growing understanding of the way genomes function and evolve in natural populations. The course will run in lecture/seminar format one day a week that will analyze recent papers in the field and will review emerging methods of data collection and evolutionary bioinformatics. We will spend one long weekend in the quarter preparing Illumina libraries, and finish by an analysis of these data for genetic variation and gene expression patterns. Prerequisites: graduate standing, or Molecular Ecology or Molecular Evolution.

3 units, Win (Palumbi, S)

**BIOHOPK 266H. Molecular Ecology**

(Same as BIOHOPK 166H) (Graduate students register for 266H.) How modern technologies in gene sequencing, detection of nuclear nucleotide polymorphisms, and other approaches are used to gather data on genetic variation that allow measurement of population structure, infer demographic histories, inform conservation efforts, and advance understanding of the ecology of diverse types of organisms.

5 units, not given this year

**BIOHOPK 267H. Nerve, Muscle, and Synapse**

(Same as BIOHOPK 167H) (Graduate students register for 267H.) Fundamental aspects of membrane excitability, nerve conduction, synaptic transmission, and excitation-contraction coupling. Emphasis is on biophysical, molecular, and cellular level analyses of these processes in vertebrate and invertebrate systems. Labs on intra- and extracellular recording and patch clamp techniques. Lectures, discussions, and labs. Satisfies Central Menu Area 3 for Bio majors Prerequisites: PHYSICS 23, 28, 43, or equivalent; CHEM 31, 135; calculus; or consent of instructor.

5 units, alternate years, not given this year

**BIOHOPK 268H. Molecular Ecology Data Analysis**

For graduate students. Using the primary literature to explore methods of data analysis for population patterns from genetic data such as microsatellites, SNPs, and DNA sequences. Emphasis is on using current software tools to discern patterns, and to understand underlying patterns in relation to population genetics. Prerequisite: molecular ecology or molecular evolution.

2 units, not given this year

**BIOHOPK 274. Hopkins Microbiology Course**

(Same as BIO 274S, CEE 274S, EESS 253S) (Formerly GES 274S.) Four-week, intensive. The interplay between molecular,

physiological, ecological, evolutionary, and geochemical processes that constitute, cause, and maintain microbial diversity. How to isolate key microorganisms driving marine biological and geochemical diversity, interpret culture-independent molecular characterization of microbial species, and predict causes and consequences. Laboratory component: what constitutes physiological and metabolic microbial diversity; how evolutionary and ecological processes diversify individual cells into physiologically heterogeneous populations; and the principles of interactions between individuals, their population, and other biological entities in a dynamically changing microbial ecosystem. Prerequisites: CEE 274A,B, or equivalents.

9-12 units, Sum (Staff)

### **BIOHOPK 280. Short Course on Ocean Policy**

Course will introduce graduate students in the natural and social sciences to ocean policy and governance, and how science influences public policy decisions at the international, national and state levels. Students will learn about pressing challenges to ocean health, and together with leaders in ocean science and policy, examine how science and scientists can work with the policy-making process to address these challenges. Prerequisite: consent of instructor. Course will use urgent ocean policy issues, such as ocean acidification and fisheries management, to demonstrate the complexity of ocean-related decision-making. Students will examine the roles of natural science, social science, and government institutions in ocean management. Students will have the opportunity to engage with experts in ocean science and policy, and participate in field trips, group projects, and other interactive activities. Students will also learn how to communicate with ocean policy makers and journal

3 units, Sum (Staff)

### **BIOHOPK 285H. Ecology and Conservation of Kelp Forest Communities**

(Same as BIOHOPK 185H) Eight week course. Daily lectures, labs, and scuba dives focused on kelp forest communities. Physical environment, identification, and natural history of resident organisms; ecological processes that maintain biodiversity and community organization; field methods, data analysis, and research diving techniques. Field research component contribute to ongoing studies associated with Hopkins Marine Life Observatory. Training meets requirements for Stanford scientific diver certification. Satisfies Central Menu Area 4 for Bio majors. Prerequisites: BIO 42 and 43, or BIO 42 and BIOHOPK 43, or consent of instructor; and advanced scuba certification and scuba equipment.

10-12 units, Sum (Staff)

### **BIOHOPK 323H. Stanford at Sea**

(Same as BIOHOPK 182H, EARTHSYS 323, EESS 323) (Graduate students register for 323H.) Five weeks of marine science including oceanography, marine physiology, policy, maritime studies, conservation, and nautical science at Hopkins Marine Station, followed by five weeks at sea aboard a sailing research vessel in the Pacific Ocean. Shore component comprised of three multidisciplinary courses meeting daily and continuing aboard ship. Students develop an independent research project plan while ashore, and carry out the research at sea. In collaboration with the Sea Education Association of Woods Hole, MA. Only 6 units may count towards the Biology major.

16 units, alternate years, not given this year

## BIOMEDICAL INFORMATICS (BIOMEDIN) COURSES

### UNDERGRADUATE COURSES IN BIOMEDICAL INFORMATICS

Primarily for undergraduates; graduate students may enroll with consent of adviser.

#### **BIOMEDIN 109Q. Genomics: A Technical and Cultural Revolution**

(Same as GENE 109Q) Preference to sophomores. Concepts of genomics, high-throughput methods of data collection, and

computational approaches to analysis of data. The social, ethical, and economic implications of genomic science. Students may focus on computational or social aspects of genomics.

3 units, not given this year

#### **BIOMEDIN 156. Economics of Health and Medical Care**

(Same as BIOMEDIN 256, ECON 126, HRP 256) Institutional, theoretical, and empirical analysis of the problems of health and medical care. Topics: demand for medical care and medical insurance; institutions in the health sector; economics of information applied to the market for health insurance and for health care; measurement and valuation of health; socioeconomic status and epidemiology; economics of obesity. Graduate students with research interests should take ECON 248. Prerequisites: ECON 50 and ECON 102A or Stats 116 or the equivalent. Recommended: ECON 51.

5 units, Aut (Bhattacharya, J)

### GRADUATE COURSES IN BIOMEDICAL INFORMATICS

Primarily for graduate students; undergraduates may enroll with consent of instructor.

#### **BIOMEDIN 200. Biomedical Informatics Colloquium**

Series of colloquia offered by program faculty, students, and occasional guest lecturers. May be repeated three times for credit.

1 unit, Aut (Musen, M), Win (Musen, M), Spr (Staff)

#### **BIOMEDIN 201. Biomedical Informatics Student Seminar**

Participants report on recent articles from the Biomedical Informatics literature or their research projects. Goals are to teach critical reading of scientific papers and presentation skills. May be repeated three times for credit.

1 unit, Aut (Musen, M), Win (Musen, M), Spr (Musen, M), Sum (Musen, M)

#### **BIOMEDIN 205. Biomedical Informatics for Medicine**

Primarily for M.D. students; open to other graduate students. Emphasis is on practical applications of bioinformatics and medical informatics for medicine, health care, clinicians, and biomedical research, focused on work at Stanford. Topics may include: methods to analyze genetic conditions, integrative methods for microarray, proteomic, and genomic data to understand the etiology of disease, clinical information systems in local healthcare facilities, cellular and radiology imaging, and pharmacogenomics. Enrollment for 2 units includes weekly assignments. Non-MD students may enroll for 1 unit. May be repeated for credit. Prerequisite: background in biomedicine. Recommended: background in programming.

1-2 units, Aut (Butte, A), Spr (Staff)

#### **BIOMEDIN 206. Informatics in Industry**

Effective management, modeling, acquisition, and mining of biomedical information in healthcare and biotechnology companies and approaches to information management adopted by companies in this ecosystem. Guest speakers from pharmaceutical/biotechnology companies, clinics/hospitals, health communities/portals, instrumentation/software vendors. May be repeated for credit.

1 unit, Spr (Staff)

#### **BIOMEDIN 207. Smart Health through Digital Medicine**

The widespread use of Health IT, such as Electronic Health Records, will radically alter the practice of medicine in the coming decades. Comprised of guest lectures, site visits and project assignments, the goal of this course is to provide an understanding of which software and technology designs can advance the delivery and quality of healthcare. May be taken for 1 unit (lectures only), 2 units (lectures and site visits), or 3 units (lectures, site visits, and project).

1-3 units, Win (Das, A)

#### **BIOMEDIN 210. Modeling Biomedical Systems: Ontology, Terminology, Problem Solving**

(Same as CS 270) Methods for modeling biomedical systems and for making those models explicit in the context of building software systems. Emphasis is on intelligent systems for decision support and Semantic Web applications. Topics: knowledge representation, controlled terminologies, ontologies, reusable problem solvers, and knowledge acquisition. Recommended:

exposure to object-oriented systems, basic biology.

3 units, Win (Musen, M)

#### **BIOMEDIN 211. Smart Health through Effective Design**

(Same as CS 271) Methods of designing and engineering software systems in complex clinical environments. Case studies illustrate factors leading to success or failure of systems. Project assignments involve focused team-based design work. Topics: user and organizational requirements, data and knowledge modeling, component-based system design, system prototyping, and human-systems interaction. Prerequisite: BIOMEDIN 210 recommended, or database or object-oriented programming course.

3 units, Win (Das, A)

#### **BIOMEDIN 212. Introduction to Biomedical Informatics**

##### **Research Methodology**

(Same as BIOE 212, CS 272, GENE 212) Hands-on software building. Student teams conceive, design, specify, implement, evaluate, and report on a software project in the domain of biomedicine. Creating written proposals, peer review, providing status reports, and preparing final reports. Guest lectures from professional biomedical informatics systems builders on issues related to the process of project management. Software engineering basics. Prerequisites: BIOMEDIN 210, 211, 214, 217 or consent of instructor.

3 units, Spr (Altman, R)

#### **BIOMEDIN 214. Representations and Algorithms for**

##### **Computational Molecular Biology**

(Same as BIOE 214, CS 274, GENE 214) Topics: introduction to bioinformatics and computational biology, algorithms for alignment of biological sequences and structures, computing with strings, phylogenetic tree construction, hidden Markov models, Gibbs Sampling, basic structural computations on proteins, protein structure prediction, protein threading techniques, homology modeling, molecular dynamics and energy minimization, statistical analysis of 3D biological data, integration of data sources, knowledge representation and controlled terminologies for molecular biology, microarray analysis, machine learning (clustering and classification), and natural language text processing. Prerequisites: programming skills; consent of instructor for 3 units.

3-4 units, Aut (Altman, R)

#### **BIOMEDIN 215. Data Driven Medicine**

With the spread of electronic health records and increasingly low cost assays for patient molecular data, powerful data repositories with tremendous potential for biomedical research, clinical care and personalized medicine are being built. But these databases are large and difficult for any one specialist to analyze. To find the hidden associations within the full set of data, we introduce methods for data-mining at the internet scale, the handling of large-scale electronic medical records data for machine learning, methods in natural language processing and text-mining applied to medical records, methods for using ontologies for the annotation and indexing of unstructured content as well as semantic web technologies. Includes a programming project. See also BIOMEDIN 225, which does not include the project. Prerequisites: BIOMEDIN 210; CS 106A highly recommended; CS 345A recommended.

3 units, Aut (Shah, N)

#### **BIOMEDIN 216. Representations and Algorithms for Molecular Biology: Lectures**

Lecture component of BIOMEDIN 214. One unit for medical and graduate students who attend lectures only; may be taken for 2 units with participation in limited assignments and final project. Lectures also available via internet. Prerequisite: familiarity with biology recommended.

1-2 units, Aut (Altman, R)

#### **BIOMEDIN 217. Translational Bioinformatics**

(Same as CS 275) Analytic, storage, and interpretive methods to optimize the transformation of genetic, genomic, and biological data into diagnostics and therapeutics for medicine. Topics: access and utility of publicly available data sources; types of genome-scale measurements in molecular biology and genomic medicine; analysis of microarray data; analysis of polymorphisms, proteomics, and protein interactions; linking genome-scale data to clinical data and phenotypes; and new questions in biomedicine

using bioinformatics. Case studies. Prerequisites: programming ability at the level of CS 106A and familiarity with statistics and biology.

4 units, Spr (Butte, A)

#### **BIOMEDIN 218. Translational Bioinformatics Lectures**

Same content as BIOMEDIN 217; for medical and graduate students who attend lectures and participate in limited assignments and final project. Analytic, storage, and interpretive methods to optimize the transformation of genetic, genomic, and biological data into diagnostics and therapeutics for medicine. Topics: access and utility of publicly available data sources; types of genome-scale measurements in molecular biology and genomic medicine; analysis of microarray data; analysis of polymorphisms, proteomics, and protein interactions; linking genome-scale data to clinical data and phenotypes; and new questions in biomedicine using bioinformatics. Case studies. Prerequisites: programming at the level of CS 106A; familiarity with statistics and biology.

2 units, Spr (Staff)

#### **BIOMEDIN 219. Mathematical Models and Medical Decisions**

Analytic methods for determining the optimal diagnostic and therapeutic decisions for the care of individual patients and for the design of policies affecting the care of patient populations. Topics: utility theory and probability modeling, empirical methods for estimating disease prevalence, probability models for periodic processes, binary decision-making techniques, Markov models of dynamic disease state problems, utility assessment techniques, parametric utility models, utility models for multidimensional outcomes, analysis of time-varying clinical outcomes, and the design of cost-constrained clinical policies. 2 units requires completion of a case study project. Prerequisites: introduction to calculus and basic statistics.

1-2 units, Win (Musen, M; Higgins, M)

#### **BIOMEDIN 224. Principles of Pharmacogenomics**

Introduction to the relevant pharmacology, genomics, experimental methods for high-throughput measurements (sequencing, expression, genotyping), analysis methods for GWAS, cheminformatics, and natural language processing. Review of key gene classes (cytochromes, transporters, GPCRs), key drugs for which genetics is critical (warfarin, clopidogrel, statins, NSAIDs, neuropsychiatric drugs and cancer drugs). Also reviews resources for pharmacogenomics (PharmGKB, Drugbank, CMAP, and others) as well as issues in doing clinical implementation of pharmacogenomics testing. Reading of key papers, including student presentations of this work.; problem sets; final project selected with approval of instructor. Prerequisites: two of BIO 41, 42, 43, 44X, 44Y or consent of instructor.

3 units, Win (Altman, R; Klein, T)

#### **BIOMEDIN 225. Data Driven Medicine: Lectures**

With the spread of electronic health records and increasingly low cost assays for patient molecular data, powerful data repositories with tremendous potential for biomedical research, clinical care and personalized medicine are being built. But these databases are large and difficult for any one specialist to analyze. To find the hidden associations within the full set of data, we introduce methods for data-mining at the internet scale, the handling of large-scale electronic medical records data for machine learning, methods in natural language processing and text-mining applied to medical records, methods for using ontologies for the annotation and indexing of unstructured content as well as semantic web technologies. The final project from Biomedin 215 is not required. Prerequisites: Biomedin 210 highly recommended; CS 106A, CS 345A recommended.

2 units, Aut (Shah, N)

#### **BIOMEDIN 231. Computational Molecular Biology**

(Same as BIOC 218) Practical, hands-on approach to field of computational molecular biology. Recommended for molecular biologists and computer scientists desiring to understand the major issues concerning analysis of genomes, sequences and structures. Various existing methods critically described and strengths and limitations of each. Practical assignments utilizing tools described. All homework and coursework submitted electronically. Course webpage: <http://biochem218.stanford.edu/>.

3 units, Aut (Brutlag, D), Win (Brutlag, D), Spr (Staff)

#### **BIOMEDIN 233. Intermediate Biostatistics: Analysis of**

**Discrete Data**

(Same as HRP 261, STATS 261) Methods for analyzing data from case-control and cross-sectional studies: the 2x2 table, chi-square test, Fisher's exact test, odds ratios, Mantel-Haenzel methods, stratification, tests for matched data, logistic regression, conditional logistic regression. Emphasis is on data analysis in SAS. Special topics: cross-fold validation and bootstrap inference.

3 units, Win (Sainani, K)

**BIOMEDIN 251. Outcomes Analysis**

(Same as HRP 252) Methods of conducting empirical studies which use large existing medical, survey, and other databases to ask both clinical and policy questions. Econometric and statistical models used to conduct medical outcomes research. How research is conducted on medical and health economics questions when a randomized trial is impossible. Problem sets emphasize hands-on data analysis and application of methods, including re-analyses of well-known studies. Prerequisites: one or more courses in probability, and statistics or biostatistics.

3 units, Spr (Staff)

**BIOMEDIN 256. Economics of Health and Medical Care**

(Same as BIOMEDIN 156, ECON 126, HRP 256) Institutional, theoretical, and empirical analysis of the problems of health and medical care. Topics: demand for medical care and medical insurance; institutions in the health sector; economics of information applied to the market for health insurance and for health care; measurement and valuation of health; socioeconomic status and epidemiology; economics of obesity. Graduate students with research interests should take ECON 248. Prerequisites: ECON 50 and ECON 102A or Stats 116 or the equivalent. Recommended: ECON 51.

5 units, Aut (Bhattacharya, J)

**BIOMEDIN 260. Computational Methods for Biomedical Image Analysis and Interpretation**

(Same as RAD 260) The latest biological and medical imaging modalities and their applications in research and medicine. Focus is on computational analytic and interpretive approaches to optimize extraction and use of biological and clinical imaging data for diagnostic and therapeutic translational medical applications. Topics include major image databases, fundamental methods in image processing and quantitative extraction of image features, structured recording of image information including semantic features and ontologies, indexing, search and content-based image retrieval. Case studies include linking image data to genomic, phenotypic and clinical data, developing representations of image phenotypes for use in medical decision support and research applications and the role that biomedical imaging informatics plays in new questions in biomedical science. Includes a project. Enrollment for 3 units with reduced project requirements requires instructor consent. Prerequisites: programming ability at the

3-4 units, Spr (Staff)

**BIOMEDIN 261. Computational Methods for Biomedical Image Analysis and Interpretation: Lectures**

(Same as RAD 261) Lecture component of RAD/BIOMEDIN 260. The latest biological and medical imaging modalities and their applications in research and medicine. Focus is on computational analytic and interpretive approaches to optimize extraction and use of biological and clinical imaging data for diagnostic and therapeutic translational medical applications. Topics include major image databases, fundamental methods in image processing and quantitative extraction of image features, structured recording of image information including semantic features and ontologies, indexing, search and content-based image retrieval. Case studies include linking image data to genomic, phenotypic and clinical data, developing representations of image phenotypes for use in medical decision support and research applications and the role that biomedical imaging informatics plays in new questions in biomedical science. Prerequisites: familiarity with statistics, basic biology. Knowledge of Matlab and programming recommended.

2 units, Spr (Staff)

**BIOMEDIN 262. Computational Genomics**

(Same as CS 262) Applications of computer science to genomics, and concepts in genomics from a computer science point of view. Topics: dynamic programming, sequence alignments, hidden Markov models, Gibbs sampling, and probabilistic context-free grammars. Applications of these tools to sequence analysis:

comparative genomics, DNA sequencing and assembly, genomic annotation of repeats, genes, and regulatory sequences, microarrays and gene expression, phylogeny and molecular evolution, and RNA structure. Prerequisites: 161 or familiarity with basic algorithmic concepts. Recommended: basic knowledge of genetics.

3 units, Win (Batzoglou, S)

**BIOMEDIN 273A. A Computational Tour of the Human Genome**

(Same as CS 273A, DBIO 273A) Introduction to computational biology through an informatic exploration of the human genome. Topics include: genome sequencing (technologies, assembly, personalized sequencing); functional landscape (genes, gene regulation, repeats, RNA genes, epigenetics); genome evolution (comparative genomics, ultraconservation, co-option). Additional topics may include population genetics, personalized genomics, and ancient DNA. Course includes primers on molecular biology, the UCSC Genome Browser, and text processing languages. Guest lectures from genomic researchers. No prerequisites. See <http://cs273a.stanford.edu/>.

3 units, Aut (Batzoglou, S; Bejerano, G)

**BIOMEDIN 290. Biomedical Informatics Teaching Methods**

Hands-on training in biomedical informatics pedagogy. Practical experience in pedagogical approaches, variously including didactic, inquiry, project, team, case, field, and/or problem-based approaches. Students create course content, including lectures, exercises, and assessments, and evaluate learning activities and outcomes. Prerequisite: instructor consent.

1-3 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**BIOMEDIN 299. Directed Reading and Research**

For students wishing to receive credit for directed reading or research time. Prerequisite: consent of instructor. (Staff)

1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**BIOMEDIN 366. Computational Biology**

(Same as STATS 166, STATS 366) Course is designed to introduce students from the mathematical, physical and engineering sciences to selected current issues in computational biology and bioinformatics. Topics: Principles of gene expression and taxa abundance measurements by microarrays and sequencing. Kernel methods for graph gene interaction graph construction. Phylogenetic trees and their uses in microbiome studies. Computational nonparametric statistics for the analyses of real genomic studies. Assignments: weekly reading of papers and a final project.

3 units, Spr (Holmes, S)

**BIOMEDIN 370. Medical Scholars Research**

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

4-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**BIOMEDIN 374. Algorithms in Biology**

(Same as CS 374) Algorithms and computational models applied to molecular biology and genetics. Topics vary annually. Possible topics include biological sequence comparison, annotation of genes and other functional elements, molecular evolution, genome rearrangements, microarrays and gene regulation, protein folding and classification, molecular docking, RNA secondary structure, DNA computing, and self-assembly. May be repeated for credit. Prerequisites: 161, 262 or 274, or BIOCHEM 218, or equivalents.

2-3 units, Aut (Batzoglou, S)

**BIOMEDIN 390A. Curricular Practical Training**

Provides educational opportunities in biomedical informatics research. Qualified biomedical informatics students engage in internship work and integrate that work into their academic program. Students register during the quarter they are employed and must complete a research report outlining their work activity, problems investigated, key results, and any follow-up on projects they expect to perform. BIOMEDIN 390A, B, and C may each be taken only once.

1 unit, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**BIOMEDIN 390B. Curricular Practical Training**

Provides educational opportunities in biomedical informatics research. Qualified biomedical informatics students engage in



internship work and integrate that work into their academic program. Students register during the quarter they are employed and must complete a research report outlining their work activity, problems investigated, key results, and any follow-up on projects they expect to perform. BIOMEDIN 390A, B, and C may each be taken only once.

*1 unit, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

#### **BIOMEDIN 390C. Curricular Practical Training**

Provides educational opportunities in biomedical informatics research. Qualified biomedical informatics students engage in internship work and integrate that work into their academic program. Students register during the quarter they are employed and must complete a research report outlining their work activity, problems investigated, key results, and any follow-up on projects they expect to perform. BIOMEDIN 390A, B, and C may each be taken only once.

*1 unit, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

#### **BIOMEDIN 432. Analysis of Costs, Risks, and Benefits of Health Care**

(Same as HRP 392) (Same as MGTECON 332) For graduate students. How to do cost/benefit analysis when the output is difficult or impossible to measure. How do M.B.A. analytic tools apply in health services? Literature on the principles of cost/benefit analysis applied to health care. Critical review of actual studies. Emphasis is on the art of practical application.

*4 units, Aut (Owens, D; Goldhaber-Fiebert, J)*

#### **BIOMEDIN 801. TGR Master's Project**

*0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

#### **BIOMEDIN 802. TGR PhD Dissertation**

*0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

## BIOPHYSICS (BIOPHYS) COURSES

### GRADUATE COURSES IN BIOPHYSICS

Primarily for graduate students; undergraduates may enroll with consent of instructor.

#### **BIOPHYS 227. Functional MRI Methods**

(Same as RAD 227) Basics of functional magnetic resonance neuroimaging, including data acquisition, analysis, and experimental design. Journal club sections. Cognitive neuroscience and clinical applications. Prerequisites: basic physics, mathematics; neuroscience recommended.

*3 units, Win (Glover, G)*

#### **BIOPHYS 228. Computational Structural Biology**

(Same as SBIO 228) Interatomic forces and interactions such as electrostatics and hydrophobicity, and protein structure in terms of amino acid properties, local chain conformation, secondary structure, domains, and families of folds. How protein motion can be simulated. Bioinformatics introduced in terms of methods that compare proteins via their amino acid sequences and their three-dimensional structures. Structure prediction via simple comparative modeling. How to detect and model remote homologues. Predicting the structure of a protein from knowledge of its amino acid sequence. Via Internet.

*3 units, not given this year*

#### **BIOPHYS 232. Advanced Imaging Lab in Biophysics**

(Same as APPPHYS 232, BIO 132, BIO 232, MCP 232) Laboratory and lectures. Advanced microscopy and imaging, emphasizing hands-on experience with state-of-the-art techniques. Students construct and operate working apparatus. Topics include microscope optics, Koehler illumination, contrast-generating mechanisms (bright/dark field, fluorescence, phase contrast, differential interference contrast), and resolution limits. Laboratory topics vary by year, but include single-molecule fluorescence, fluorescence resonance energy transfer, confocal microscopy, two-photon microscopy, and optical trapping. Limited enrollment. Recommended: basic physics, Biology core or equivalent, and consent of instructor.

*4 units, Spr (Block, S; Smith, S; Stearns, T; Schnitzer, M)*

#### **BIOPHYS 241. Biological Macromolecules**

(Same as BIOC 241, SBIO 241) The physical and chemical basis of macromolecular function. Forces that stabilize biopolymers with three-dimensional structures and their functional implications. Thermodynamics, molecular forces, structure and kinetics of enzymatic and diffusional processes, and relationship to their practical application in experimental design and interpretation. Biological function and the level of individual molecular interactions and at the level of complex processes. Case studies in lecture and discussion of classic and current literature. Enrollment limited to 30. Prerequisites: None; background in biochemistry and physical chemistry preferred but material available for those with deficiency; undergraduates with consent of instructor only.

*3-5 units, Aut (Herschlag, D; Ferrell, J; Puglisi, J; Block, S; Weis, W; Garcia, K)*

#### **BIOPHYS 242. Methods in Molecular Biophysics**

(Same as SBIO 242) Experimental methods in molecular biophysics from theoretical and practical standpoints. Emphasis is on X-ray diffraction, nuclear magnetic resonance, and fluorescence spectroscopy. Prerequisite: physical chemistry or consent of instructor.

*3 units, alternate years, not given this year*

#### **BIOPHYS 250. Seminar in Biophysics**

Required of Biophysics graduate students. Presentation of current research projects and results by faculty in the Biophysics program. May be repeated for credit.

*1 unit, Aut (Weis, W)*

#### **BIOPHYS 297. Bio-Inorganic Chemistry**

(Same as CHEM 297) Overview of metal sites in biology. Metalloproteins as elaborated inorganic complexes, their basic coordination chemistry and bonding, unique features of the protein ligand, and the physical methods used to study active sites. Active site structures are correlated with function. Prerequisites: 153 and 173, or equivalents.

*3 units, not given this year*

#### **BIOPHYS 300. Graduate Research**

Investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

*1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

#### **BIOPHYS 399. Directed Reading in Biophysics**

Prerequisite: consent of instructor.

*1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

#### **BIOPHYS 801. TGR Project**

*0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

#### **BIOPHYS 802. TGR Dissertation**

*0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

## CANCER BIOLOGY (CBIO) COURSES

### UNDERGRADUATE COURSES IN CANCER BIOLOGY

Primarily for undergraduates; graduate students may enroll with consent of adviser.

#### **CBIO 101. Cancer Biology**

(Same as PATH 101) Experimental approaches to understanding the origins, diagnosis, and treatment of cancer. Focus on key experiments and discoveries with emphasis on genetics, molecular biology, and cell biology. Topics include carcinogens, tumor virology, oncogenes, tumor suppressor genes, cell cycle regulation, angiogenesis, invasion and metastasis, cancer genomics, cancer epidemiology, and cancer therapies. Discussion sections based on primary research articles that describe key experiments in the field. Satisfies Central Menu Areas 1 or 2 for Bio majors. Prerequisite: Biology or Human Biology core or equivalent, or consent of instructor.

*4 units, Win (Lipsick, J)*



## GRADUATE COURSES IN CANCER BIOLOGY

Primarily for graduate students; undergraduates may enroll with consent of instructor.

### CBIO 241. Molecular, Cellular, and Genetic Basis of Cancer

Core course required for first-year Cancer Biology graduate students. Focus is on key experiments and classic primary research papers in cancer biology. Letter grade required. Undergraduates require consent of course director.

5 units, Aut (Giaccia, A; Graves, E)

### CBIO 242. Scientific Basis of Clinical Cancer Therapy

Required for first- and second-year medical students who wish to join the Cancer Biology Scholarly Concentration Program. Also open to advanced undergraduates; limited enrollment. The curriculum includes a sampling of recent biomedical research discoveries that led to the current cancer diagnosis and therapeutic treatments.

3 units, Spr (Koong, A)

### CBIO 260. Teaching in Cancer Biology

Practical experience in teaching by serving as a teaching assistant in a cancer biology course. Unit values are allotted individually to reflect the level of teaching responsibility assigned to the student.

1-10 units, Aut (Giaccia, A), Win (Lipsick, J), Spr (Staff)

### CBIO 275. Tumor Immunology

(Same as IMMUNOL 275) Focuses on the ability of innate and adaptive immune responses to recognize and control tumor growth. Topics include: tumor antigens, tumor immunosurveillance and immunoediting, tumor immunotherapy, cancer vaccines and dendritic cell therapy. Tracks the historical developments of our understanding of modulating tumor immune response and discusses their relative significance in the light of current research findings. Prerequisite: for undergraduates, human biology or biology core.

3 units, Aut (Rothbard, J; Engleman, E)

### CBIO 280. Cancer Biology Journal Club

Required of and limited to first- and second-year graduate students in Cancer Biology. Recent papers in the literature presented by graduate students. When possible, discussion relates to and precedes cancer-related seminars at Stanford. Attendance at the relevant seminar required.

1 unit, Aut (Giaccia, A), Win (Giaccia, A), Spr (Staff)

### CBIO 299. Directed Reading in Cancer Biology

Prerequisite: consent of instructor.

1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### CBIO 399. Graduate Research

Students undertake investigations sponsored by individual faculty members. Cancer Biology Ph.D. students must register as soon as they begin dissertation-related research work.

1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### CBIO 801. TGR Project

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### CBIO 802. TGR Dissertation

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

## CARDIOTHORACIC SURGERY (CTS) COURSES

### UNDERGRADUATE COURSES IN CARDIOTHORACIC SURGERY

Primarily for undergraduates; graduate students may enroll with consent of adviser.

#### CTS 199. Undergraduate Research

Allows for qualified students to undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

## GRADUATE COURSES IN CARDIOTHORACIC SURGERY

Primarily for graduate students; undergraduates may enroll with consent of instructor.

### CTS 370. Medical Scholars Research

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

4-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### CTS 399. Graduate Research

Allows for qualified students to undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

## CATALAN LANGUAGE (CATLANG) COURSES

### UNDERGRADUATE COURSES IN CATALAN LANGUAGE

Primarily for undergraduates; graduate students may enroll with consent of adviser.

#### CATLANG 1A. Accelerated First-Year Catalan, Part A

For students with knowledge of another Romance language, preferably Spanish. Emphasis is on developing socially and culturally appropriate proficiency in interpersonal, interpretive, and presentational spheres. Completion of 2A fulfills the University language requirement. Prerequisite: consent of instructor.

5 units, Aut (Tahmassian, L)

#### CATLANG 2A. Accelerated First-Year Catalan, Part B

For students with knowledge of another Romance language, preferably Spanish. Emphasis is on developing socially and culturally appropriate proficiency in interpersonal, interpretive, and presentational spheres. Completion of 2A fulfills the University language requirement. Prerequisite: consent of instructor.

5 units, Win (Tahmassian, L)

#### CATLANG 11A. Accelerated Second-Year Catalan, Part A

Sequence integrating culture and language of the Catalan-speaking world. Socially and culturally appropriate forms in narrations, descriptions, and expression of ideas and opinions. Emphasis is on oral and written proficiency in formal, informal, academic, and professional contexts. Prerequisite: consent of instructor.

3-5 units, Spr (Tahmassian, L)

#### CATLANG 12A. Accelerated Second-Year Catalan, Part B

Sequence integrating culture and language of the Catalan-speaking world. Socially and culturally appropriate forms in narrations, descriptions, and expression of ideas and opinions. Emphasis is on oral and written proficiency in formal, informal, academic, and professional contexts. Prerequisite: consent of instructor.

3-5 units, not given this year

#### CATLANG 199. Individual Work

May be repeated for credit. Prerequisite: consent of instructor.

1-5 units, Aut (Staff), Win (Staff), Spr (Staff)

### GRADUATE COURSES IN CATALAN LANGUAGE

Primarily for graduate students; undergraduates may enroll with consent of instructor.

#### CATLANG 395. Graduate Studies in Catalan

May be repeated for credit. Prerequisite: consent of instructor.

2-5 units, Aut (Staff), Win (Staff), Spr (Staff)

# CENTER FOR TEACHING AND LEARNING (CTL) COURSES

## UNDERGRADUATE COURSES IN CENTER FOR TEACHING AND LEARNING

Primarily for undergraduates; graduate students may enroll with consent of adviser.

### CTL 25SI. Navigating Stanford: Optimizing Your Undergraduate Experience

Navigating Stanford aims to put you on the path to making the most out of your exciting journey at Stanford. Covering various aspects of student life--from the best places to eat and study, to how to develop meaningful and lasting relationships with professors--this course is intended to get Stanford's newest and youngest students thinking about the ways they can make the most out of the next four years. Featuring a range of guest speakers and themes, this class will give incoming freshmen the opportunity to encounter a diversity of experiences and perspectives from the people who know Stanford best: its students.

2 units, Aut (Allen, D)

### CTL 53. Working Smarter

College-level strategies and skills in time management, reading, speaking, writing, and test preparation. Students explore learning preferences to develop strategies in different academic settings.

2 units, Sum (Staff)

### CTL 100. The Next Three Years: Making the Most of Stanford

This course is designed for frosh approaching the end of year one at Stanford. The goal is to help you think more broadly and more deeply about the remainder of your Stanford undergraduate education, reflecting on what you have learned so far. Weekly meetings will consist of presentations and discussions, emphasizing an integrated approach to making the most of Stanford. The course will include guest lecturers and background readings. Aspects of a student's life that will be discussed include coursework, residential life, personal health and development, extracurricular groups, different types of relationships (friends and close others, teacher-student, advisor-advisee, peer mentoring), community and public service, and career development. The course should build your knowledge of and ability to use the many resources at Stanford designed to assist you in all these areas, as well as connecting you with the experiences of other students, helping you to peer into your own future.

1 unit, not given this year

### CTL 105. Voice and Articulation Intensive for Non-Native English Speakers

Workshop focusing on exercises designed to help foreign students improve their articulation and delivery in English. Work includes breath, sound, enunciation, melody, and colloquialism.

1-2 units, Win (Freeland, T)

### CTL 115. Voice Workshop

(Same as CTL 215) Focus is on breath, voice production, expansion of vocal range and stamina, and clarity of articulation. Geared toward public speaking including presentations, lectures, and job talks. May be taken in conjunction with CTL 117.

1-2 units, Aut (Freeland, T), Spr (Freeland, T)

### CTL 117. The Art of Effective Speaking

(Same as CTL 217) The principles and practice of effective oral communication. Through formal and informal speaking activities, students develop skills framing and articulating ideas through speech. Strategies for speaking extemporaneously, preparing and delivering multimedia presentations, formulating persuasive arguments, refining critical clarity of thought, and enhancing general facility and confidence in oral self-expression.

3 units, Aut (Freeland, T), Spr (Freeland, T)

### CTL 118. Public Speaking: Romancing the Room

A practical approach to the art of public speaking. Emphasis is on developing skills in speech types including impromptu, personal experience, interviewing, demonstration, persuasive, and special occasion. Materials include videotape, texts of famous speeches, and a final dinner program of speeches. Students evaluate

presentations by others. \$55 materials fee.

3 units, Sum (Staff)

### CTL 119. Oral Communication Tutor Teaching Practicum

Seminar. For students with a strong background in public speaking who wish to train as public speaking tutors for CTL's Oral Communication Program. Readings, exercises, and supervised teaching refine speaking skills. Preparation to serve as a peer tutor in a variety of academic disciplines. Prerequisite: application and consent of instructor.

1-3 units, Spr (Allen, D; Yeager, L)

### CTL 120. Peer Tutor Training

Goal is to help students become effective peer tutors for course material already mastered by articulating aims; developing practical tutoring skills including strategies for drop-in sessions; observing experienced tutors; discussing reading assignments; role playing; and reflecting on experiences as a peer tutor intern. Prerequisite: consent of instructor.

1 unit, Aut (Glickman, A), Win (Staff)

### CTL 125. From the Page to the Stage: The Performance of Literature

The oral interpretation of literature as performance art and mode of literary analysis. Focus is on contemporary and local expression including topics such as the Spoken Word Collective at Stanford, the ensemble performance of short works of fiction by San Francisco's Word for Word Performing Arts Company, and the storytelling art of Awele Makeba which combines theater, oral history, and music. No performance experience necessary.

3 units, not given this year

### CTL 130. Beyond Stereotype Threat: Claiming a Rightful Place in an Academic Community

(Same as PSYCH 125) Stereotype threat as mitigating the quality of a student's test performance; its impact on academic success at Stanford. How to reduce the impact of stereotype threat on Stanford students.

3 units, not given this year

### CTL 175. Intertextuality, Interpretation, and Performance

Literary and performance theories from the late 20th century to the present. The performative link between writing and speech. Students apply theories in critical writings, performances, and intertextual assemblages. How to find and refine one's own voices in writing and vocality.

4 units, not given this year

### CTL 177. Performance of Power: Oratory and Authority from the Ancient World to the Postmodern

Speech as action has long been seen as essential to leadership. Theories and examples of oratory, from Aristotle to George W. Bush, assessing each as model of voice-activated authority. The impact of mass media technologies as they transform the public space of oratory.

4 units, Win (Freeland, T)

### CTL 180. Interpersonal and Small Group Communication

(Same as CTL 280) Communication effectiveness in the contexts of dyads, the workplace, family, and society. Listening, conflict resolution, leadership, power and its implementation, group dynamics, emotions, and cultural influences on interactions. Sources include readings videos/DVDs, role playing, interviews, individual and group presentations, and group exercises.

3 units, not given this year

### CTL 190. Persuasive Speaking

(Same as CTL 290) Persuasion is the act of influencing others to see, feel, think, believe, and/or act in a way that is consistent with what the speaker or sender advocates. Persuasion seeks to engender power, and how that power is used can vary widely. How to effectively persuade others in interpersonal, family, workplace, and public spheres. How to be astute consumers of persuasive messages, including those from other individuals and from public sources such as media, advertising, and politics. In-class exercises and speeches to assist participants in developing and executing persuasive skills.

3 units, not given this year

### CTL 199. Independent Study

Special study under lecturer direction, usually leading to a written report or an oral presentation. Prerequisite: consent of instructor.

1-3 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

## GRADUATE COURSES IN CENTER FOR TEACHING AND LEARNING

Primarily for graduate students; undergraduates may enroll with consent of instructor.

### CTL 215. Voice Workshop

(Same as CTL 115) Focus is on breath, voice production, expansion of vocal range and stamina, and clarity of articulation. Geared toward public speaking including presentations, lectures, and job talks. May be taken in conjunction with CTL 117.

1-2 units, Aut (Freeland, T), Spr (Freeland, T)

### CTL 217. The Art of Effective Speaking

(Same as CTL 117) The principles and practice of effective oral communication. Through formal and informal speaking activities, students develop skills framing and articulating ideas through speech. Strategies for speaking extemporaneously, preparing and delivering multimedia presentations, formulating persuasive arguments, refining critical clarity of thought, and enhancing general facility and confidence in oral self-expression.

3 units, Aut (Freeland, T), Spr (Freeland, T)

### CTL 219. Oral Communication for Graduate Students

Graduate student speaking activities such as teaching (delivering lectures, guiding discussion, and facilitating small groups), professional presentations and conference papers, and preparing for oral exams and defenses. In-class projects, discussion, and individual evaluation assist students in developing effective techniques for improving oral communication skills.

1-3 units, Sum (Staff)

### CTL 224. Fundamentals of College Teaching in the Humanities and Humanistic Social Sciences

For teaching assistants in the humanities and humanistic social sciences. Topics include current research on learning and teaching, practice teaching sessions, leading discussions, designing assignments and group activities, grading and feedback practices, and teaching with technology.

1-3 units, not given this year

### CTL 225. Teaching Development Series

Teaching and academic career topics from CTL's workshops series. Documented participation in a minimum of 10 hours required for credit. Offerings vary quarterly. See <http://ctl.stanford.edu> for current information. May be repeated for credit. Prerequisite: consent of instructor.

1 unit, not given this year

### CTL 226. Advanced College Teaching and Professional Development in Humanities and Humanistic Social Sciences

For advanced graduate students in the humanities and humanistic social sciences interested in an academic career. Topics include current research on teaching and learning, effective lecturing, designing courses and assignments, writing a persuasive teaching statement, disciplinary and interdisciplinary teaching, and research on early career faculty.

1-3 units, Win (Denman, M)

### CTL 230. Mentoring in Research

Knowledge, skills, and hands-on training to mentor undergraduate research assistants and to impact relationships with your own mentors and advisers. Topics include communication and project management skills, different learning styles, and cultural, ethnic and socioeconomic diversity. Case studies, scenarios, and small group activities. Five weeks.

1 unit, not given this year

### CTL 231. Future Faculty Seminar

(Same as INDE 231) For graduate students from all disciplines who are considering faculty careers. Postdoctoral fellows, TGR students, and research/clinical trainees may audit by consent of instructor. Explores the broad spectrum of duties and opportunities presented through faculty positions beyond the research-related aspects. Develops awareness of resources and skills that lead to faculty success; answers field-specific and related faculty job questions through discussions with representatives of a variety of academic institutions and fellow course participants. Topics include: finding and obtaining faculty positions, negotiating and navigating the first year, and working toward tenure. May be

repeated for credit.

1 unit, Aut (Eberle, S; Puglisi, J; Wright-Dunbar, R)

### CTL 280. Interpersonal and Small Group Communication

(Same as CTL 180) Communication effectiveness in the contexts of dyads, the workplace, family, and society. Listening, conflict resolution, leadership, power and its implementation, group dynamics, emotions, and cultural influences on interactions. Sources include readings videos/DVDs, role playing, interviews, individual and group presentations, and group exercises.

3 units, not given this year

### CTL 290. Persuasive Speaking

(Same as CTL 190) Persuasion is the act of influencing others to see, feel, think, believe, and/or act in a way that is consistent with what the speaker or sender advocates. Persuasion seeks to engender power, and how that power is used can vary widely. How to effectively persuade others in interpersonal, family, workplace, and public spheres. How to be astute consumers of persuasive messages, including those from other individuals and from public sources such as media, advertising, and politics. In-class exercises and speeches to assist participants in developing and executing persuasive skills.

3 units, not given this year

### CTL 297X. Teaching and Learning in Higher Education

(Same as EDUC 297X) Open to master's and doctoral students in all disciplines. How teachers can promote lasting learning and ask which pedagogies are most effective in today's college classrooms. Readings analyze teaching and learning in diverse disciplines and institutional types. Students observe the instruction of a Stanford master teacher. Students write a paper about the instruction of the teacher they observe or prepare a syllabus and commentary for a course of their design.

3-4 units, Win (Ehrlich, T; Miller, B)

### CTL 299. Independent Study

Special study under lecturer direction, usually leading to a written report or an oral presentation. Prerequisite: consent of instructor.

1-3 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### CTL 312. Science and Engineering Course Design

(Same as ENGR 312) For students interested in an academic career and who anticipate designing science courses at the undergraduate or graduate level. Goal is to apply research on science learning to the design of effective course materials. Topics include syllabus design, course content and format decisions, assessment planning and grading, and strategies for teaching improvement.

2-3 units, Win (Sheppard, S; Wright-Dunbar, R)

## CHEMICAL ENGINEERING (CHEMENG) COURSES

### UNDERGRADUATE COURSES IN CHEMICAL ENGINEERING

Primarily for undergraduates; graduate students may enroll with consent of adviser.

#### CHEMENG 10. The Chemical Engineering Profession

Open to all undergraduates. Overview of and careers in chemical engineering; opportunities to develop networks with working professionals. Panel discussions on career paths and post-graduation opportunities available. Areas include biotechnology, electronics, energy, environment, management consulting, nanotechnology, and graduate school in business, law, medicine, and engineering.

1 unit, Aut (Jaramillo, T)

#### CHEMENG 20. Introduction to Chemical Engineering

(Same as ENGR 20) Overview of chemical engineering through discussion and engineering analysis of physical and chemical processes. Topics: overall staged separations, material and energy balances, concepts of rate processes, energy and mass transport, and kinetics of chemical reactions. Applications of these concepts to areas of current technological importance: biotechnology, energy, production of chemicals, materials processing, and purification. Prerequisite: CHEM 31. GER:DB-EngrAppSci

3 units, Spr (Khosla, C)

### CHEMENG 25B. Biotechnology

(Same as ENGR 25B) Biology and chemistry fundamentals, genetic engineering, cell culture, protein production, pharmaceuticals, genomics, viruses, gene therapy, evolution, immunology, antibodies, vaccines, transgenic animals, cloning, stem cells, intellectual property, governmental regulations, and ethics. Prerequisites: CHEM 31 and MATH 41 or equivalent courage. GER:DB-EngrAppSci

3 units, Spr (Wang, C)

### CHEMENG 25E. Energy: Chemical Transformations for Production, Storage, and Use

(Same as ENGR 25E) An introduction and overview to the challenges and opportunities of energy supply and consumption. Emphasis on energy technologies where chemistry and engineering play key roles. Review of energy fundamentals along with historical energy perspectives and current energy production technologies. In depth analyses of solar thermal systems, biofuels, photovoltaics and electrochemical devices (batteries and fuel cells). Prerequisites: high school chemistry or equivalent. GER:DB-EngrAppSci

3 units, Win (Robertson, C; Bent, S)

### CHEMENG 35N. Renewable Energy for a Sustainable World

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. An overall world energy assessment, projections, and technologies. How to assess good and bad potential impacts of leading renewable energy candidates: benefit versus impact ratio using quantitative cradle-to-grave approach. Technologies suitable for near-term application in developing economic systems. Governmental policies, governmental versus private sector investments, raw materials supply issues, and impact of cultural influences on technology choices and speed of implementation. GER:DB-EngrAppSci

3 units, Aut (Swartz, J)

### CHEMENG 60Q. Environmental Regulation and Policy

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. How environmental policy is formulated in the U.S. How and what type of scientific research is incorporated into decisions. How to determine acceptable risk, the public's right to know of chemical hazards, waste disposal and clean manufacturing, brownfield redevelopment, and new source review regulations. The proper use of science and engineering including media presentation and misrepresentation, public scientific and technical literacy, and emotional reactions. Alternative models to formulation of environmental policy. Political and economic forces, and stakeholder discussions. GER:DB-EngrAppSci

3 units, Aut (Robertson, C; Libicki, S)

### CHEMENG 70Q. Masters of Disaster

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. For students interested in science, engineering, politics, and the law. Learn from past disasters to avoid future ones. How disasters can be tracked to failures in the design process. The roles of engineers, artisans, politicians, lawyers, and scientists in the design of products. Failure as rooted in oversight in adhering to the design process. Student teams analyze real disasters and design new products presumably free from the potential for disastrous outcomes. GER:DB-EngrAppSci

3 units, Aut (Robertson, C; Moalli, J)

### CHEMENG 80Q. Art, Chemistry, and Madness: The Science of Art Materials

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Chemistry of natural and synthetic pigments in five historical palettes: earth (paleolithic), classical (Egyptian, Greco-Roman), medieval European (Middle Ages), Renaissance (old masters), and synthetic (contemporary). Composite nature of paints using scanning electron microscopy images; analytical techniques used in art conservation, restoration, and determination of provenance; and inherent health hazards. Paintings as mechanical structures. Hands-on laboratory includes stretching canvas, applying gesso grounds, grinding pigments, preparing egg tempera paint, bamboo and quill pens, gilding and illumination, and papermaking. GER:DB-EngrAppSci

3 units, Spr (Frank, C; Loesch-Frank, S)

### CHEMENG 100. Chemical Process Modeling, Dynamics, and

### Control

Mathematical methods applied to engineering problems using chemical engineering examples. The development of mathematical models to describe chemical process dynamic behavior. Analytical and computer simulation techniques for the solution of ordinary differential equations. Dynamic behavior of linear first- and second-order systems. Introduction to process control. Dynamics and stability of controlled systems. Prerequisites: CHEMENG 20 or ENGR 20; CME 102 or MATH 53.

3 units, Aut (Opatkiewicz, J)

### CHEMENG 110. Equilibrium Thermodynamics

Thermodynamic properties, equations of state, properties of non-ideal systems including mixtures, and phase and chemical equilibria. Prerequisite: CHEM 171 or equivalent.

3 units, Win (Bao, Z)

### CHEMENG 120A. Fluid Mechanics

The flow of isothermal fluids from a momentum transport viewpoint. Continuum hypothesis, scalar and vector fields, fluid statics, non-Newtonian fluids, shell momentum balances, equations of motion and the Navier-Stokes equations, creeping and potential flow, parallel and nearly parallel flows, time-dependent parallel flows, boundary layer theory and separation, introduction to drag correlations. Prerequisites: junior in Chemical Engineering or consent of instructor; 100 and CME 102 or equivalent.

4 units, Win (Fuller, G)

### CHEMENG 120B. Energy and Mass Transport

General diffusive transport, heat transport by conduction, Fourier's law, conduction in composites with analogies to electrical circuits, advection-diffusion equations, forced convection, boundary layer heat transport via forced convection in laminar flow, forced convection correlations, free convection, free convection boundary layers, free convection correlations and application to geophysical flows, melting and heat transfer at interfaces, radiation, diffusive transport of mass for dilute and non-dilute transfer, mass and heat transport analogies, mass transport with bulk chemical reaction, mass transport with interfacial chemical reaction, evaporation. Prerequisite 120A or consent of instructor.

4 units, Spr (Spakowitz, A)

### CHEMENG 124. Catalysis

(Same as CHEMENG 224) Introduction to heterogeneous catalysis, including models of surface reactivity, kinetics, catalyst structure, electro-catalysis and photo-catalysis, and links to homogeneous and enzyme catalysis. Selected applications and challenges in energy transformations.

3-3 units, Spr (Noerskov, J)

### CHEMENG 130. Separation Processes

Analysis and design of equilibrium and non-equilibrium separation processes. Possible examples: distillation, liquid-liquid extraction, flash distillation, electrophoresis, centrifugation, membrane separations, chromatography, and reaction-assisted separation processes.

3 units, Spr (Jaramillo, T)

### CHEMENG 140. Micro and Nanoscale Fabrication Engineering

(Same as CHEMENG 240) (Same as CHEMENG 140) Survey of fabrication and processing technologies in industrial sectors, such as semiconductor, biotechnology, and energy. Chemistry and transport of electronic and energy device fabrication. Solid state materials, electronic devices and chemical processes including crystal growth, chemical vapor deposition, etching, oxidation, doping, diffusion, thin film deposition, plasma processing. Micro and nanopatterning involving photolithography, unconventional soft lithography and self assembly. Recommended: CHEM 33, 171, and PHYSICS 55

3 units, Win (Bao, Z)

### CHEMENG 150. Biochemical Engineering

Systems-level combination of chemical engineering concepts with biological principles. The production of protein pharmaceuticals as a paradigm to explore quantitative biochemistry and cellular physiology, the elemental stoichiometry of metabolism, recombinant DNA technology, synthetic biology and metabolic engineering, fermentation development and control, product isolation and purification, protein folding and formulation, and biobusiness and regulatory issues. Prerequisite: CHEMENG 181

(formerly 188) or BIOSCI 41 or equivalent.

3 units, Win (Hwang, L)

#### **CHEMENG 160. Polymer Science and Engineering**

(Same as CHEMENG 260) Interrelationships among molecular structure, morphology, and mechanical behavior of polymers. Topics include amorphous and semicrystalline polymers, glass transitions, rubber elasticity, linear viscoelasticity, and rheology. Applications of polymers in biomedical devices and microelectronics. Recommended: CHEM 33 and 171, or equivalent.

3 units, Aut (Frank, C)

#### **CHEMENG 170. Kinetics and Reactor Design**

Chemical kinetics, elementary reactions, mechanisms, rate-limiting steps, and quasi-steady state approximations. Ideal isothermal and non-isothermal reactors; design principles. Steady state and unsteady state operation of reactors; conversion and limitations of thermodynamic equilibrium. Enzymes and heterogeneous catalysis and catalytic reaction mechanisms. Prerequisites: 110, 120A, 120B.

3 units, Aut (Bent, S)

#### **CHEMENG 174. Environmental Microbiology I**

(Same as CHEMENG 274, CEE 274A) Basics of microbiology and biochemistry. The biochemical and biophysical principles of biochemical reactions, energetics, and mechanisms of energy conservation. Diversity of microbial catabolism, flow of organic matter in nature: the carbon cycle, and biogeochemical cycles. Bacterial physiology, phylogeny, and the ecology of microbes in soil and marine sediments, bacterial adhesion, and biofilm formation. Microbes in the degradation of pollutants. Prerequisites: CHEM 33, 35, and BIOSCI 41, CHEMENG 181 (formerly 188), or equivalents.

3 units, Aut (Spormann, A), Sum (Staff)

#### **CHEMENG 180. Chemical Engineering Plant Design**

Open to seniors in chemical engineering or by consent of instructor. Application of chemical engineering principles to the design of practical plants for the manufacture of chemicals and related materials. Topics: flow-sheet development from a conceptual design, equipment design for distillation, chemical reactions, heat transfer, pumping, and compression; estimation of capital expenditures and production costs; plant construction.

3 units, Spr (Pavone, A)

#### **CHEMENG 181. Biochemistry I**

(Same as BIO 188, BIO 288, CHEMENG 281, CHEM 181) (CHEMENG offerings formerly listed as 188/288.) Chemistry of major families of biomolecules including proteins, nucleic acids, carbohydrates, lipids, and cofactors. Structural and mechanistic analysis of properties of proteins including molecular recognition, catalysis, signal transduction, membrane transport, and harvesting of energy from light. Molecular evolution. Satisfies Central Menu Area I for Bio majors. Prerequisites: CHEM 33, 35, 131, and 135 or 171. GER: DB-NatSci

3 units, Aut (Cegelski, L)

#### **CHEMENG 183. Biochemistry II**

(Same as BIO 189, BIO 289, CHEMENG 283, CHEM 183) Focus on metabolic biochemistry: the study of chemical reactions that provide the cell with the energy and raw materials necessary for life. Topics include glycolysis, gluconeogenesis, the citric acid cycle, oxidative phosphorylation, photosynthesis, the pentose phosphate pathway, and the metabolism of glycogen, fatty acids, amino acids, and nucleotides as well as the macromolecular machines that synthesize RNA, DNA, and proteins. Medical relevance is emphasized throughout. Satisfies Central Menu Area I for Bio majors. Prerequisite: BIO 188/288 or CHEM 181 or CHEMENG 181/281 (formerly 188/288). GER: DB-NatSci

3 units, Win (Dunn, A)

#### **CHEMENG 185A. Chemical Engineering Laboratory A**

Experimental aspects of chemical engineering science. Emphasizes laboratory work and development of communication skills. Lab work in student groups. Student presentations. Prerequisites: 120A,B. Corequisite: 170.

4 units, Aut (Sattely, E)

#### **CHEMENG 185B. Chemical Engineering Laboratory B**

Methods and techniques in molecular biology and biochemical engineering. Emphasis is on team organization, communication

skills, experimental design, and project execution. Creation of presentations, experiments, and demonstrations for high school students. Additional laboratory times to be arranged. Prerequisite: BIO 41, CHEMENG 181, or equivalent.

4 units, Win (Wang, C)

#### **CHEMENG 190. Undergraduate Research in Chemical Engineering**

Laboratory or theoretical work for undergraduates under the supervision of a faculty member. Research in one of the graduate research groups or other special projects in the undergraduate chemical engineering lab. Students should consult advisers for information on available projects.

1-6 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

#### **CHEMENG 190H. Undergraduate Honors Research in Chemical Engineering**

For Chemical Engineering majors pursuing a B.S. with Honors degree who have submitted an approved research proposal to the department. Unofficial transcript must document BSH status and at least 9 units of 190H research for a minimum of 3 quarters. May be repeated for credit.

1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

#### **CHEMENG 191H. Undergraduate Honors Seminar**

For Chemical Engineering majors approved for B.S. with Honors research program. Honors research proposal must be submitted and unofficial transcript document BSH status prior to required concurrent registration in 190H and 191H. May be repeated for credit. Corequisite: 190H

1 unit, Aut (Sattely, E), Win (Sattely, E), Spr (Sattely, E), Sum (Staff)

## **GRADUATE COURSES IN CHEMICAL ENGINEERING**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

#### **CHEMENG 224. Catalysis**

(Same as CHEMENG 124) Introduction to heterogeneous catalysis, including models of surface reactivity, kinetics, catalyst structure, electro-catalysis and photo-catalysis, and links to homogeneous and enzyme catalysis. Selected applications and challenges in energy transformations.

3-3 units, Spr (Noerskov, J)

#### **CHEMENG 240. Micro and Nanoscale Fabrication Engineering**

(Same as CHEMENG 140) (Same as CHEMENG 140) Survey of fabrication and processing technologies in industrial sectors, such as semiconductor, biotechnology, and energy. Chemistry and transport of electronic and energy device fabrication. Solid state materials, electronic devices and chemical processes including crystal growth, chemical vapor deposition, etching, oxidation, doping, diffusion, thin film deposition, plasma processing. Micro and nanopatterning involving photolithography, unconventional soft lithography and self assembly. Recommended: CHEM 33, 171, and PHYSICS 55

3 units, Win (Bao, Z)

#### **CHEMENG 260. Polymer Science and Engineering**

(Same as CHEMENG 160) Interrelationships among molecular structure, morphology, and mechanical behavior of polymers. Topics include amorphous and semicrystalline polymers, glass transitions, rubber elasticity, linear viscoelasticity, and rheology. Applications of polymers in biomedical devices and microelectronics. Recommended: CHEM 33 and 171, or equivalent.

3 units, Aut (Frank, C)

#### **CHEMENG 274. Environmental Microbiology I**

(Same as CHEMENG 174, CEE 274A) Basics of microbiology and biochemistry. The biochemical and biophysical principles of biochemical reactions, energetics, and mechanisms of energy conservation. Diversity of microbial catabolism, flow of organic matter in nature: the carbon cycle, and biogeochemical cycles. Bacterial physiology, phylogeny, and the ecology of microbes in soil and marine sediments, bacterial adhesion, and biofilm formation. Microbes in the degradation of pollutants. Prerequisites: CHEM 33, 35, and BIOSCI 41, CHEMENG 181 (formerly 188),

or equivalents.

3 units, Aut (Spormann, A), Sum (Staff)

### **CHEMENG 281. Biochemistry I**

(Same as BIO 188, BIO 288, CHEMENG 181, CHEM 181) (CHEMENG offerings formerly listed as 188/288.) Chemistry of major families of biomolecules including proteins, nucleic acids, carbohydrates, lipids, and cofactors. Structural and mechanistic analysis of properties of proteins including molecular recognition, catalysis, signal transduction, membrane transport, and harvesting of energy from light. Molecular evolution. Satisfies Central Menu Area 1 for Bio majors. Prerequisites: CHEM 33, 35, 131, and 135 or 171.

3 units, Aut (Cegelski, L)

### **CHEMENG 283. Biochemistry II**

(Same as BIO 189, BIO 289, CHEMENG 183, CHEM 183) Focus on metabolic biochemistry: the study of chemical reactions that provide the cell with the energy and raw materials necessary for life. Topics include glycolysis, gluconeogenesis, the citric acid cycle, oxidative phosphorylation, photosynthesis, the pentose phosphate pathway, and the metabolism of glycogen, fatty acids, amino acids, and nucleotides as well as the macromolecular machines that synthesize RNA, DNA, and proteins. Medical relevance is emphasized throughout. Satisfies Central Menu Area 1 for Bio majors. Prerequisite: BIO 188/288 or CHEM 181 or CHEMENG 181/281 (formerly 188/288).

3 units, Win (Dunn, A)

### **CHEMENG 300. Applied Mathematics in the Chemical and Biological Sciences**

(Same as CME 330) Mathematical solution methods via applied problems including chemical reaction sequences, mass and heat transfer in chemical reactors, quantum mechanics, fluid mechanics of reacting systems, and chromatography. Topics include generalized vector space theory, linear operator theory with eigenvalue methods, phase plane methods, perturbation theory (regular and singular), solution of parabolic and elliptic partial differential equations, and transform methods (Laplace and Fourier). Prerequisites: CME 102/ENGR 155A and CME 104/ENGR 155B, or equivalents.

3 units, Aut (Shaqfeh, E)

### **CHEMENG 310. Microhydrodynamics**

(Same as ME 451D) Transport phenomena on small-length scales appropriate to applications in microfluidics, complex fluids, and biology. The basic equations of mass, momentum, and energy, derived for incompressible fluids and simplified to the slow-flow limit. Topics: solution techniques utilizing expansions of harmonic and Green's functions; singularity solutions; flows involving rigid particles and fluid droplets; applications to suspensions; lubrication theory for flows in confined geometries; slender body theory; and capillarity and wetting. Prerequisites: 120A,B, 300, or equivalents.

3 units, Win (Fuller, G)

### **CHEMENG 320. Chemical Kinetics and Reaction Engineering**

Theoretical and experimental tools useful in understanding and manipulating reactions mediated by small-molecules and biological catalysts. Theoretical: first classical chemical kinetics and transition state theory; then RRKM theory and Monte Carlo simulations. Experimental approaches include practical application of modern spectroscopic techniques, stopped-flow measurements, temperature-jump experiments, and single-molecule approaches to chemical and biological systems. Both theory and application are framed with regard to systems of particular interest, including industrially relevant enzymes, organometallic catalysts, heterogeneous catalysis, electron transfer reactions, and chemical kinetics within living cells.

3 units, Aut (Dunn, A)

### **CHEMENG 340. Molecular Thermodynamics**

Classical thermodynamics and quantum mechanics. Development of statistical thermodynamics to address the collective behavior of molecules. Establishment of theories for gas, liquid, and solid phases, including phase transitions and critical behavior. Applications include electrolytes, ion channels, surface adsorption, ligand binding to proteins, hydrogen bonding in water, hydrophobicity, polymers, and proteins.

3 units, Aut (Spakowitz, A)

### **CHEMENG 345. Fundamentals and Applications of**

### **Spectroscopy**

Development of theoretical approaches to spectroscopy, including spectroscopic transitions, transition probabilities, and selection rules. Application to photon and electron spectroscopies of the gas and solid phases. Topics: rotational spectroscopy; infrared and Raman vibrational spectroscopies; fluorescence spectroscopy; Auger, x-ray and ultraviolet photoelectron spectroscopies. Prerequisite: CHEM 271 or course in quantum mechanics.

3 units, Win (Jaramillo, T)

### **CHEMENG 355. Advanced Biochemical Engineering**

(Same as BIOE 355) Combines biological knowledge and methods with quantitative engineering principles. Quantitative review of biochemistry and metabolism; recombinant DNA technology and synthetic biology (metabolic engineering). The production of protein pharmaceuticals as a paradigm for the application of chemical engineering principles to advanced process development within the framework of current business and regulatory requirements. Prerequisite: CHEMENG 181 (formerly 188) or BIOSCI 41, or equivalent.

3 units, Win (Swartz, J)

### **CHEMENG 441. Fundamentals of Electrochemistry**

Introduction to fundamentals of electrochemistry, including the thermodynamic, kinetic, and transport phenomena that influence the behavior of electrochemical systems. The topics covered include current- and potential-controlled experiments, diffusion and mass transfer, Butler-Volmer and Tafel kinetics, cyclic voltammetry, electrochemical double layer structures, semiconductor electrochemistry, and Marcus theory.

3 units, Aut (Jaramillo, T)

### **CHEMENG 442. Structure and Reactivity of Solid Surfaces**

The structure of solid surfaces including experimental methods for determining the structure of single crystal surfaces. The adsorption of molecules on these surfaces including the thermodynamics of adsorption processes, surface diffusion, and surface reactions. Molecular structure of adsorbates. Current topics in surface structure and reactivity, including systems for heterogeneous catalysis and electronic materials.

3 units, not given this year

### **CHEMENG 444. Quantum Simulations of Molecules and Materials**

Understanding electronic structure theory and its use in solving problems in engineering, chemistry, physics, and biology. An introduction to the quantum mechanical many-body problem, density functional theory, approximate total energy methods, usual approximations to the exchange-correlation energy. Overview of methods to solve the quantum mechanical electronic structure problem, an introduction to different numerical implementations, and hands-on experience with a particular electronic structure code. Examples from the literature of the application of electronic structure theory in engineering, chemistry, physics, and biology. Development of a critical approach to the capability of different computational approaches. A self-defined project required. Prerequisite: quantum mechanics.

3 units, not given this year

### **CHEMENG 450. Advances in Biotechnology**

Guest academic and industrial speakers. Latest developments in fields such as bioenergy, green process technology, production of industrial chemicals from renewable resources, protein pharmaceutical production, industrial enzyme production, stem cell applications, medical diagnostics, and medical imaging. Biotechnology ethics, business and patenting issues, and entrepreneurship in biotechnology.

3 units, Spr (Swartz, J; Hwang, L)

### **CHEMENG 451. Chemical Principles in Drug Discovery and Development**

Application of physical and organic chemistry to the discovery and subsequent product development of small molecule and macromolecular drugs. Course discusses key physical, chemical, and biological properties of drug candidates and how to measure them, how to engineer them. Discussion of principles of drug formulation and delivery. Graduate-level background in physical and organic chemistry recommended.

3 units, Aut (Khosla, C)

**CHEMENG 454. Synthetic Biology and Metabolic Engineering**  
(Same as BIOE 454) Principles for the design and optimization of new biological systems. Development of new enzymes, metabolic pathways, other metabolic systems, and communication systems among organisms. Example applications include the production of central metabolites, amino acids, pharmaceutical proteins, and isoprenoids. Economic challenges and quantitative assessment of metabolic performance. Pre- or corequisite: CHEMENG 355 or equivalent.

*3 units, alternate years, not given this year*

**CHEMENG 456. Metabolic Biochemistry of Microorganisms**  
(Same as CEE 274B) Microbial metabolism, biochemical and metabolic principles, unity and diversity of metabolic pathways, evolution of enzymes and metabolic pathways, microbial degradation of natural and anthropogenic organic compounds, predicting biodegradation, and metabolic origin of life.

*3 units, Win (Spormann, A)*

**CHEMENG 457. Microbial Ecology and Evolution**

(Same as CEE 274C) Structure/function relationship of microbial communities; metabolic and ecological basis of interactions in microbial communities; microbial ecology and population biology in natural and human host systems; and evolution of microbial life. Prerequisite: CEE 274A, CHEMENG 281 (formerly 288), or equivalent.

*3 units, not given this year*

**CHEMENG 458. Recent Advances in Genetic, Cellular, and Biomolecular Systems**

Current topics, experimental methods, technologies, quantitative analysis, and mathematical models.

*3 units, not given this year*

**CHEMENG 459. Frontiers in Interdisciplinary Biosciences**

(Same as BIO 459, BIOC 459, BIOE 459, CHEM 459, PSYCH 459) Students register through their affiliated department; otherwise register for CHEMENG 459. For specialists and non-specialists. Sponsored by the Stanford BioX Program. Three seminars per quarter address scientific and technical themes related to interdisciplinary approaches in bioengineering, medicine, and the chemical, physical, and biological sciences. Leading investigators from Stanford and the world present breakthroughs and endeavors that cut across core disciplines. Pre-seminars introduce basic concepts and background for non-experts. Registered students attend all pre-seminars; others welcome. See <http://biox.stanford.edu/courses/459.html>. Recommended: basic mathematics, biology, chemistry, and physics.

*1 unit, Aut (Robertson, C), Win (Robertson, C), Spr (Robertson, C)*

**CHEMENG 460. Polymer Surfaces and Interfaces**

Principles of interfacial thermodynamics and polymer physics applied to polymer surfaces and interfaces, particularly in relation to biomedical devices. Treatments of intermolecular forces; conformational statistics of macromolecular structure; tethering of polymers at different interfaces; techniques for chemical modification of surfaces; methods for physical characterization of polymer surfaces and interfaces. Applications in adhesion, biocompatibility, prosthetic orthopedic devices, and ophthalmic devices. Prerequisite: exposure to principles of polymer science or consent of instructor.

*3 units, not given this year*

**CHEMENG 462. Complex Fluids and Non-Newtonian Flows**

Division of complex fluids into suspensions, solutions, and melts. Suspensions as colloidal and non-colloidal. Extra stress and relation to the stresslet. Suspension rheology including Brownian and non-Brownian fibers. Microhydrodynamics and the Fokker-Planck equation. Linear viscoelasticity and the weak flow limit. Polymer solutions including single mode (dumbbell) and multimode models. Nonlinear viscoelasticity. Intermolecular effects in nondilute solutions and melts and the concept of reptation. Prerequisites: low Reynolds number hydrodynamics or consent of instructor.

*3 units, not given this year*

**CHEMENG 462. Complex Fluids and Non-Newtonian Flows**

(Same as ME 455) Definition of a complex liquid and microrheology. Division of complex fluids into suspensions, solutions, and melts. Suspensions as colloidal and non-colloidal.

Extra stress and relation to the stresslet. Suspension rheology including Brownian and non-Brownian fibers. Microhydrodynamics and the Fokker-Planck equation. Linear viscoelasticity and the weak flow limit. Polymer solutions including single mode (dumbbell) and multimode models. Nonlinear viscoelasticity. Intermolecular effects in nondilute solutions and melts and the concept of reptation. Prerequisites: low Reynolds number hydrodynamics or consent of instructor.

*3 units, not given this year*

**CHEMENG 464. Polymer Chemistry**

Polymer material design, synthesis, characterization, and application. Topics include organic and kinetic aspects of polymerization, polymer characterization techniques, and structure and properties of bulk polymers for commercial applications and emerging technologies.

*3 units, Aut (Bao, Z)*

**CHEMENG 466. Polymer Physics**

Concepts and applications in the equilibrium and dynamic behavior of complex fluids. Topics include solution thermodynamics, scaling concepts, semiflexibility, characterization of polymer size (light scattering, osmotic pressure, size-exclusion chromatography, intrinsic viscosity), viscoelasticity, rheological measurements, polyelectrolytes, liquid crystals, biopolymers, and gels.

*3 units, not given this year*

**CHEMENG 467. Physics of Biomacromolecules**

Advanced topics in the equilibrium and dynamic behavior of biomacromolecules. Theoretical approaches addressed include path integral approaches to polymer Green function theory, polymer field theory, application of Smoluchowski and fractional Fokker Planck equations to biopolymer transport, and Brownian dynamics and Monte Carlo simulations. These methods will be applied to topics such as DNA/protein semiflexibility, DNA supercoiling, lyotropic polymer ordering, anomalous diffusion in crowded environments, motor-protein transport, and protein dynamics. Prerequisites: CHEMENG 340 and 466 or consent of the instructor.

*3 units, not given this year*

**CHEMENG 482. Creating a Startup I**

(Same as SOMGEN 282) (Same as STRAMGT 356) Focuses on the creation of a new venture by providing frameworks and applying them to the identification and pursuit of a business opportunity. Concepts include the new venture formation process, opportunity identification, evaluation and analysis, customer development, business models, market research, design thinking, team formation, team dynamics, leadership, venture viability research and managing intellectual property. Part of the course is partitioned by vertical market to reflect vertical-specific topics and issues. Students form teams, conduct field work, and iterate on the combination of business model -- product -- market. Teams present to a panel of entrepreneurs, venture capitalists, angel investors, and faculty. Three-unit option excludes some of the coursework associated with opportunity identification and market research. Prerequisite: by application/instructor consent. Application form at [http://www.gsb.stanford.edu/ces/teaching/356\\_application\\_n](http://www.gsb.stanford.edu/ces/teaching/356_application_n)

*3-4 units, Aut (Mendelson, H)*

**CHEMENG 484. Creating a Startup II**

(Same as SOMGEN 284) (Same as STRAMGT 366) Students work in teams to continue to develop the new ventures identified in CHEMENG 482/SOMGEN 282. Each team works with a Silicon Valley mentor to develop its new venture. In addition, the course covers topics such as partnering, operational staging, human resource development, leadership, financing, equity arrangements, term sheets, and customer acquisition and go-to-market strategies. Students develop a business plan for pursuing the opportunity based on their field work and research and present it to a panel of entrepreneurs, venture capitalists, angel investors, and faculty. Three-unit option excludes some of the coursework associated with financial modeling. Prerequisite: Instructor consent.

*3-4 units, Win (Mendelson, H)*

**CHEMENG 500. Special Topics in Protein Biotechnology**

Recent developments and current research. May be repeated for credit. Prerequisite: graduate standing and consent of instructor.



1 unit, Aut (Swartz, J), Win (Swartz, J), Spr (Swartz, J), Sum (Staff)

**CHEMENG 501. Special Topics in Semiconductor Processing**  
Recent developments and current research. May be repeated for credit. Prerequisite: graduate standing and consent of instructor.

1 unit, Aut (Bent, S), Win (Bent, S), Spr (Bent, S), Sum (Staff)

**CHEMENG 503. Special Topics in Biocatalysis**  
Recent developments and current research. May be repeated for credit. Prerequisite: graduate standing and consent of instructor.

1 unit, Aut (Khosla, C), Win (Khosla, C), Spr (Khosla, C), Sum (Staff)

**CHEMENG 505. Special Topics in Microrheology**  
Recent developments and current research. May be repeated for credit. Prerequisite: graduate standing and consent of instructor.

1 unit, Aut (Fuller, G), Win (Fuller, G), Spr (Fuller, G), Sum (Staff)

**CHEMENG 507. Special Topics in Polymer Physics and Molecular Assemblies**

Recent developments and current research. May be repeated for credit. Prerequisite: graduate standing and consent of instructor.

1 unit, Aut (Frank, C), Win (Frank, C), Spr (Frank, C), Sum (Staff)

**CHEMENG 510. Special Topics in Transport Mechanics**  
Recent developments and current research. May be repeated for credit. Prerequisite: graduate standing and consent of instructor.

1 unit, Aut (Shaqfeh, E), Win (Shaqfeh, E), Spr (Shaqfeh, E), Sum (Staff)

**CHEMENG 513. Special Topics in Functional Organic Materials for Electronic and Optical Devices**

Recent developments and current research. May be repeated for credit. Prerequisite: graduate standing and consent of instructor.

1 unit, Aut (Bao, Z), Win (Bao, Z), Spr (Bao, Z), Sum (Staff)

**CHEMENG 514. Special Topics in Biopolymer Physics**  
Recent developments and current research. May be repeated for credit. Prerequisite: graduate standing and consent of instructor.

1 unit, Aut (Spakowitz, A), Win (Spakowitz, A), Spr (Spakowitz, A), Sum (Staff)

**CHEMENG 515. Special Topics in Molecular and Systems Biology**

Recent developments and current research. May be repeated for credit. Prerequisite: graduate standing and consent of instructor.

1 unit, Aut (Wang, C), Win (Wang, C), Spr (Wang, C), Sum (Staff)

**CHEMENG 516. Special Topics in Energy and Catalysis**  
Recent developments and current research. May be repeated for credit. Prerequisite: graduate standing and consent of instructor.

1 unit, Aut (Jaramillo, T), Win (Jaramillo, T), Spr (Jaramillo, T), Sum (Staff)

**CHEMENG 517. Special Topics in Microbial Physiology and Metabolism**

Recent developments and current research. May be repeated for credit. Prerequisite: graduate standing and consent of instructor.

1 unit, Aut (Spormann, A), Win (Spormann, A), Spr (Spormann, A), Sum (Staff)

**CHEMENG 518. Special Topics in Advanced Biophysics and Protein Design**

Recent developments and current research. May be repeated for credit. Prerequisite: graduate standing and consent of instructor.

1 unit, Aut (Dunn, A), Win (Dunn, A), Spr (Dunn, A), Sum (Staff)

**CHEMENG 519. Special Topics in Interface Science and Catalysis**

Recent developments and current research. May be repeated for credit. Prerequisite: graduate standing and consent of instructor.

1 unit, Aut (Noerskov, J), Win (Noerskov, J), Spr (Noerskov, J), Sum (Staff)

**CHEMENG 520. Special Topics in Biological Chemistry**  
Recent developments and current research. May be repeated for credit. Prerequisite: graduate standing and consent of instructor.

1 unit, Aut (Sattely, E), Win (Sattely, E), Spr (Sattely, E), Sum (Staff)

**CHEMENG 600. Graduate Research in Chemical Engineering**  
Laboratory and theoretical work leading to partial fulfillment of requirements for an advanced degree.

1-12 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**CHEMENG 699. Colloquium**

Weekly lectures by experts from academia and industry in the field of chemical engineering.

1 unit, Aut (Wang, C), Win (Wang, C), Spr (Wang, C)

## CHEMICAL SYSTEMS BIOLOGY (CSB) COURSES

### UNDERGRADUATE COURSES IN CHEMICAL SYSTEMS BIOLOGY

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**CSB 199. Undergraduate Research**

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### GRADUATE COURSES IN CHEMICAL SYSTEMS BIOLOGY

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**CSB 210. Signal Transduction Pathways and Networks**

The molecular mechanisms through which cells receive and respond to external signals. Emphasis is on principles of cell signaling, the systems-level properties of signal transduction modules, and experimental strategies through which cell signaling pathways are being studied. Prerequisite: working knowledge of biochemistry and genetics.

4 units, Win (Meyer, T)

**CSB 220. Chemistry of Biological Processes**

(Same as BIOC 220) The principles of organic and physical chemistry as applied to biomolecules. Goal is a working knowledge of chemical principles that underlie biological processes, and chemical tools used to study and manipulate biological systems. Prerequisites: organic chemistry and biochemistry, or consent of instructor.

4 units, alternate years, not given this year

**CSB 230. Current Methods in Proteomics**

Introduces students to the instrumentation, experimental strategies, and computational methods used for identification and quantification of protein concentrations and posttranslational modifications on a systems-wide level. Topics include mass spectrometry (instrumentation configurations; polypeptide ionization; sample preparation and fractionation techniques; mass spectra interpretation; relative and absolute protein quantitation; and proteome-scale dataset analysis), protein and antibody arrays, multiparameter flow cytometry with Bayesian analysis, ribosomal protein translation profiling, and GFP and fluorescence imaging based quantification of protein abundance and post-translational modifications.

3 units, Aut (Elias, J; Teruel, M)

**CSB 240A. A Practical Approach to Drug Discovery and Development**

Advancing a drug from discovery of a therapeutic target to human trials and commercialization. Topics include: high throughput assay development, compound screening, lead optimization, protecting intellectual property, toxicology testing, regulatory issues, assessment of clinical need, defining the market, conducting clinical trials, project management, and commercialization issues, including approach to licensing and raising capital.

3 units, alternate years, not given this year

**CSB 240B. A Practical Approach to Drug Discover and Development**

(Continuation of 240A) Advancing a drug from discovery of a



therapeutic target to human trials and commercialization. Topics include: high throughput assay development, compound screening, lead optimization, protecting intellectual property, toxicology testing, regulatory issues, assessment of clinical need, defining the market, conducting clinical trials, project management, and commercialization issues, including approach to licensing and raising capital. Prerequisite: 240A.

*3 units, alternate years, not given this year*

#### **CSB 242. Drug Discovery and Development Seminar Series**

The scientific principles and technologies involved in making the transition from a basic biological observation to the creation of a new drug emphasizing molecular and genetic issues. Prerequisite: biochemistry, chemistry, or bioengineering.

*1 unit, Win (Mochly-Rosen, D; Grimes, K), Spr (Mochly-Rosen, D; Grimes, K)*

#### **CSB 250. The Biology of Chromatin Templated Processes**

Topics include mechanisms of DNA replication; gene expressions regulation; DNA damage sensing and DNA repair; chromatin structure and function; and epigenetics and nuclear reprogramming. Prerequisite: working knowledge of molecular biology, biochemistry and genetics, or instructor consent.

*4 units, alternate years, not given this year*

#### **CSB 260. Quantitative Chemical Biology**

Current topics including protein and small molecule engineering, cell signaling sensors and modulators, molecular imaging, chemical genetics, combinatorial chemistry, in vitro evolution, and signaling network modeling. Prerequisites: undergraduate organic chemistry, and biochemistry or cell biology.

*4 units, Spr (Staff), alternate years, not given next year*

#### **CSB 270. Research Seminar**

Guest speakers and discussion on current research in pharmacology.

*1-2 units, not given this year*

#### **CSB 271. Principles of Cell Cycle Control**

(Same as BIO 171, BIO 271) Genetic analysis of the key regulatory circuits governing the control of cell division. Illustration of key principles that can be generalized to other synthetic and natural biological circuits. Focus on tractable model organisms; growth control; irreversible biochemical switches; chromosome duplication; mitosis; DNA damage checkpoints; MAPK pathway-cell cycle interface; oncogenesis. Analysis of classic and current primary literature. Satisfies Central Menu Area 2.

*3 units, Aut (Skotheim, J; Ferrell, J)*

#### **CSB 278. Systems Biology**

(Same as BIOE 310, CS 278) Experimental and computational approaches to the dissection of complex biological systems. Topics include network structure, non-linear dynamics, numerical modeling approaches, noise, and robustness. Topics are introduced in the context of recent papers from the primary literature.

*4 units, alternate years, not given this year*

#### **CSB 299. Directed Reading in Chemical and Systems Biology**

Prerequisite: consent of instructor.

*1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

#### **CSB 370. Medical Scholars Research**

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

*4-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

#### **CSB 399. Graduate Research**

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

*1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

#### **CSB 801. TGR Project**

*0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

#### **CSB 802. TGR Dissertation**

*0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

## CHEMISTRY (CHEM) COURSES

### UNDERGRADUATE COURSES IN CHEMISTRY

Primarily for undergraduates; graduate students may enroll with consent of adviser.

#### **CHEM 24N. Nutrition and History**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Intended to broaden the introductory chemistry experience. The biochemical basis of historically important nutritional deficiencies (vitamins, minerals, starvation, metabolic variants that predispose to disease) and environmental toxins is related to physiological action and the sociological, political, and economic consequences of its effect on human populations. Prerequisite: high school chemistry. Recommended: 31A,B, or 31X, or 33.

*3 units, Spr (Huestis, W)*

#### **CHEM 25N. Science in the News**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Possible topics include: diseases such as avian flu, HIV, and malaria; environmental issues such as climate change, atmospheric pollution, and human population; energy sources in the future; evolution; stem cell research; nanotechnology; and drug development. Focus is on the scientific basis for these topics as a basis for intelligent discussion of societal and political implications. Sources include the popular media and scientific media for the nonspecialist, especially those available on the web.

*3 units, Aut (Andersen, H)*

#### **CHEM 25Q. Science-in-Theatre: A New Genre?**

(S,Sem) (Same as DRAMA 25N) Stanford Introductory Seminar. Preference to sophomores. How scientists acquire their rules, mores, and idiosyncrasies through a form of intellectual osmosis in a mentor-disciple relationship. Scientists represented as Franksteins or nerds, rather than normal. Why more intellectually challenging plays have appeared on the Anglo-American theatre scene where scientific behavior and even science are presented accurately. Students engage in a playwriting experiment.

*3 units, Win (Djerassi, C)*

#### **CHEM 26N. The What, Why, How and wow's of Nanotechnology**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Introduction to nanotechnology with discussion of basic science at the nanoscale, its difference from molecular and macroscopic scales, and implications and applications. Developments in nanotechnology in the past two decades, from imaging and moving single atoms on surfaces to killing cancer cells with nanoscale tools and gadgets. GER: DB-NatSci

*3 units, Spr (Dai, H)*

#### **CHEM 27N. Lasers: The Light Fantastic**

Preference to freshmen. Introduction to lasers and their impact on everyday life. The operation of lasers using concepts of atomic and molecular energy levels, optics, and resonance. The use of lasers to produce guide stars for astronomy, sculpt the cornea, measure molecules in the ozone layer, transmit optical information over the web, measure the distance to the moon, and observe a single protein molecule in action. Prerequisites: CHEM 31A or X, or PHYSICS 23 and 25, or equivalents. GER: DB-NatSci

*3 units, not given this year*

#### **CHEM 31A. Chemical Principles I**

For students with moderate or no background in chemistry. Stoichiometry; periodicity; electronic structure and bonding; gases; enthalpy; phase behavior. Emphasis is on skills to address structural and quantitative chemical questions; lab provides practice. Recitation. GER: DB-NatSci

*4 units, Aut (Dai, H; Schwartz, J)*

#### **CHEM 31AC. Problem Solving in Science**

Development and practice of critical problem solving skills using chemical examples. Limited enrollment. Prerequisite: consent of instructor. Corequisite: CHEM 31A.

*1 unit, Aut (Schwartz, J)*

**CHEM 31B. Chemical Principles II**

Chemical equilibrium; acids and bases; oxidation and reduction reactions; chemical thermodynamics; kinetics. Lab. Prerequisite: 31A. GER: DB-NatSci

4 units, Win (Andersen, H; Schwartz, J)

**CHEM 31BC. Problem Solving in Science**

Development and practice of critical problem solving skills using chemical examples. Students should also be concurrently enrolled in the parent course 31B. Limited enrollment and with permission of the instructor.

1 unit, Win (Schwartz, J)

**CHEM 31X. Chemical Principles**

Accelerated; for students with substantial chemistry background. Chemical equilibria concepts, equilibrium constants, acids and bases, chemical thermodynamics, quantum concepts, models of ionic and covalent bonding, atomic and molecular orbital theory, periodicity, and bonding properties of matter. Recitation. Prerequisites for Autumn Quarter only: AP chemistry score of 5 or passing score on chemistry placement test. No Summer Quarter prerequisites. Recommended: high school physics. GER: DB-NatSci

4 units, Aut (Fayer, M; Cox, C), Sum (Staff)

**CHEM 33. Structure and Reactivity**

Organic chemistry, functional groups, hydrocarbons, stereochemistry, thermochemistry, kinetics, chemical equilibria. Recitation. Prerequisite: 31A,B, or 31X, or an AP Chemistry score of 5. GER: DB-NatSci

4 units, Win (Stack, T; Kanan, M), Spr (Schwartz, J; Wender, P), Sum (Staff)

**CHEM 33C. Problem Solving in Science**

Development and practice of critical problem solving skills using chemical examples. Limited enrollment. Prerequisite: consent of instructor. Corequisite: CHEM 33.

1 unit, Spr (Schwartz, J)

**CHEM 34XN. General Chemistry Laboratory**

(F,Sem) Stanford Introductory Seminar. Introduction to chemical laboratory practice. Topics include preparation of compounds and characterization of their properties by modern spectroscopic techniques. Corequisite: Chemistry 31X or the equivalent. Limited to 12 students; enrollment by consent of the instructor.

1 unit, Aut (Cox, C; Fayer, M)

**CHEM 35. Organic Monofunctional Compounds**

Organic chemistry of oxygen and nitrogen aliphatic compounds. Recitation. Prerequisite: 33. GER: DB-NatSci

4 units, Aut (Du Bois, J), Spr (Huestis, W), Sum (Staff)

**CHEM 36. Organic Chemistry Laboratory I**

Techniques for separations of compounds: distillation, crystallization, extraction, and chromatographic procedures. Lecture treats theory; lab provides practice. Prerequisite: 33. GER: DB-NatSci

3 units, Aut (McClory, M), Spr (Hua, Y), Sum (Staff)

**CHEM 110. Directed Instruction/Reading**

Undergraduates pursue a reading program under supervision of a faculty member in Chemistry; may also involve participation in lab. Prerequisites: superior work in 31A,B, 31X, or 33; and consent of instructor and the Chemistry undergraduate study committee.

1-2 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**CHEM 111. Exploring Chemical Research at Stanford**

Preference to freshmen and sophomores. Department faculty describe their cutting-edge research and its applications.

1 unit, Win (Markland, T)

**CHEM 130. Organic Chemistry Laboratory II**

Diels-Alder, reduction, and Wittig reactions; qualitative analysis. Lab. Limited enrollment Autumn Quarter. Prerequisite: 36. Corequisite: 35. GER: DB-NatSci

4 units, Aut (Hua, Y), Win (Hua, Y)

**CHEM 131. Organic Polyfunctional Compounds**

Aromatic compounds, polysaccharides, amino acids, proteins, natural products, dyes, purines, pyrimidines, nucleic acids, and polymers. Prerequisite: 35. GER: DB-NatSci

3 units, Aut (Kool, E), Win (Trost, B)

**CHEM 132. Synthesis Laboratory**

Advanced synthetic methods in organic and inorganic laboratory chemistry. Prerequisites: 35, 130. GER: DB-NatSci

3 units, Win (Cox, C)

**CHEM 134. Analytical Chemistry Laboratory**

Methods include gravimetric, volumetric, spectrophotometric, and chromatographic. Writing instruction includes communications, full papers, research proposals, and referee papers. Lab. Prerequisite: 130. GER: DB-NatSci

5 units, Spr (Cox, C)

**CHEM 135. Physical Chemical Principles**

Introductory physical chemistry intended for students of the life sciences, geology and environmental engineering. Chemical kinetics: rate laws, integration of rate laws, reaction mechanisms, enzyme kinetics. Chemical thermodynamics: first, second and third laws, thermochemistry, entropy, free energy, chemical equilibrium, physical equilibrium, osmotic pressure, other colligative properties. Prerequisites: 31A,B, or 31X, calculus. GER: DB-NatSci

3 units, Spr (Pande, V)

**CHEM 137. Special Topics in Organic Chemistry**

(Formerly 181.) Chemical view of the biological processes of life. Topics include: structure and function of proteins, peptides, and nucleic acids; and how to use chemistry to mediate biological processes. GER: DB-NatSci

3 units, Win (McClory, M)

**CHEM 151. Inorganic Chemistry I**

Theories of electronic structure, stereochemistry, and symmetry properties of inorganic molecules. Topics: ionic and covalent interactions, electron-deficient bonding, and molecular orbital theories. Emphasis is on the chemistry of the metallic elements. Prerequisites: 35. Recommended: 171. GER: DB-NatSci

3 units, Win (Stack, T)

**CHEM 153. Inorganic Chemistry II**

The theoretical aspects of inorganic chemistry. Group theory; many-electron atomic theory; molecular orbital theory emphasizing general concepts and group theory; ligand field theory; application of physical methods to predict the geometry, magnetism, and electronic spectra of transition metal complexes. Prerequisites: 151, 173. GER: DB-NatSci

3 units, Spr (Solomon, E)

**CHEM 155. Advanced Inorganic Chemistry**

(Same as CHEM 255) Chemical reactions of organotransition metal complexes and their role in homogeneous catalysis. Analogous patterns among reactions of transition metal complexes in lower oxidation states. Physical methods of structure determination. Prerequisite: one year of physical chemistry.

3 units, not given this year

**CHEM 171. Physical Chemistry**

Chemical thermodynamics; fundamental principles, Gibbsian equations, systematic deduction of equations, equilibrium conditions, phase rule, gases, solutions. Prerequisites: 31A,B, or 31X, 35; MATH 51. GER: DB-NatSci

3 units, Aut (Cui, B)

**CHEM 173. Physical Chemistry**

Introduction to quantum chemistry: the basic principles of wave mechanics, the harmonic oscillator, the rigid rotator, infrared and microwave spectroscopy, the hydrogen atom, atomic structure, molecular structure, valence theory. Prerequisites: MATH 51, 53; PHYSICS 41, 43. Recommended: PHYSICS 45. GER: DB-NatSci

3 units, Win (Boxer, S)

**CHEM 174. Physical Chemistry Laboratory I**

Experimental investigations in spectroscopy, thermodynamics, and electronics. Students take measurements on molecular systems, design and build scientific instruments, and computer-automate them with software that they write themselves. Prerequisites: 134, MATH 51, PHYSICS 44. Corequisite 173. GER: DB-NatSci

4 units, Win (Chidsey, C)

**CHEM 175. Physical Chemistry**

Introduction to kinetic theory and statistical mechanics: molecular theory of matter and heat, transport phenomena in gases, Boltzmann distribution law, partition functions for ideal gases. Introduction to chemical kinetics: measurement of rates of

reactions, relationship between rate and reaction mechanism, consideration of specific reactions, transition-state theory of reaction rates. Prerequisites: 171, 173. GER: DB-NatSci

3 units, Spr (Markland, T)

#### CHEM 176. Physical Chemistry Laboratory II

Use of chemical instrumentation to study physical chemical time-dependent processes. Experiments include reaction kinetics, fluorimetry, and nuclear magnetic and electron spin resonance spectroscopy. Lab. Prerequisite: 173. GER: DB-NatSci

3 units, Spr (Cui, B)

#### CHEM 181. Biochemistry I

(Same as BIO 188, BIO 288, CHEMENG 181, CHEMENG 281) (CHEMENG offerings formerly listed as 188/288.) Chemistry of major families of biomolecules including proteins, nucleic acids, carbohydrates, lipids, and cofactors. Structural and mechanistic analysis of properties of proteins including molecular recognition, catalysis, signal transduction, membrane transport, and harvesting of energy from light. Molecular evolution. Satisfies Central Menu Area I for Bio majors. Prerequisites: CHEM 33, 35, 131, and 135 or 171. GER: DB-NatSci

3 units, Aut (Cegelski, L)

#### CHEM 183. Biochemistry II

(Same as BIO 189, BIO 289, CHEMENG 183, CHEMENG 283) Focus on metabolic biochemistry: the study of chemical reactions that provide the cell with the energy and raw materials necessary for life. Topics include glycolysis, gluconeogenesis, the citric acid cycle, oxidative phosphorylation, photosynthesis, the pentose phosphate pathway, and the metabolism of glycogen, fatty acids, amino acids, and nucleotides as well as the macromolecular machines that synthesize RNA, DNA, and proteins. Medical relevance is emphasized throughout. Satisfies Central Menu Area I for Bio majors. Prerequisite: BIO 188/288 or CHEM 181 or CHEMENG 181/281 (formerly 188/288). GER: DB-NatSci

3 units, Win (Dunn, A)

#### CHEM 184. Biological Chemistry Laboratory

Modern techniques in biological chemistry including protein purification, characterization of enzyme kinetics, heterologous expression of His-tagged fluorescent proteins, site-directed mutagenesis, and single-molecule fluorescence microscopy. Prerequisite: 181. GER: DB-NatSci

4 units, Spr (Cegelski, L)

#### CHEM 185. Biochemistry III

Advanced biophysical chemistry. Topics include: protein and DNA structure, stability, and folding, membrane lateral organization and dynamics, and transmembrane transport. Prerequisites: 171, 173, 183. GER: DB-NatSci

3 units, Spr (Boxer, S)

#### CHEM 190. Introduction to Methods of Investigation

Limited to undergraduates admitted under the honors program or by special arrangement with a member of the teaching staff. For general character and scope, see 200. Prerequisite: 130. Corequisite: 300.

1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### GRADUATE COURSES IN CHEMISTRY

Primarily for graduate students; undergraduates may enroll with consent of instructor.

#### CHEM 200. Research and Special Advanced Work

Qualified graduate students undertake research or advanced lab work not covered by listed courses under the direction of a member of the teaching staff. For research and special work, students register for 200.

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

#### CHEM 221. Advanced Organic Chemistry

Molecular orbital theory and orbital symmetry. Thermochemistry and thermochemical kinetics. Unimolecular reaction rate theory. Methods of determining organic reaction mechanisms from a theoretical and experimental point of view. Prerequisites: 137, 175.

3 units, Aut (Kanan, M)

#### CHEM 223. Advanced Organic Chemistry

Continuation of 221 with emphasis on physical methods. Prerequisite: 221 or consent of instructor.

3 units, Win (Trost, B)

#### CHEM 225. Advanced Organic Chemistry

Continuation of 223. Organic reactions, new synthetic methods, conformational analysis, and exercises in the syntheses of complex molecules. Prerequisite: 223 or consent of instructor.

3 units, Spr (Wender, P)

#### CHEM 227. Synthesis and Analysis at the Chemistry-Biology Interface

Focus on organic chemistry of biomacromolecules. Synthetic methods and conjugation chemistry; labeling and chemical modification of nucleic acids and peptides; combinatorial library construction and selection methods. Prerequisite: One year of undergraduate organic chemistry.

3 units, Spr (Kool, E)

#### CHEM 229. Organic Chemistry Seminar

Required of graduate students majoring in organic chemistry. Students giving seminars register for 231.

1 unit, Aut (Trost, B), Win (Trost, B), Spr (Trost, B)

#### CHEM 231. Organic Chemistry Seminar Presentation

Required of graduate students majoring in organic chemistry for the year in which they present their organic seminar. Second-year students must enroll all quarters.

1 unit, Aut (Solomon, E), Win (Solomon, E), Spr (Solomon, E)

#### CHEM 233A. Creativity in Organic Chemistry

Required of second- and third-year Ph.D. candidates in organic chemistry. The art of formulating, writing, and orally defending a research progress report (A) and two research proposals (B, C). Second-year students register for A and B; third-year students register for C. A: Aut, B: Spr, C: Spr

1 unit, Aut (Solomon, E)

#### CHEM 233B. Creativity in Organic Chemistry

Required of second- and third-year Ph.D. candidates in organic chemistry. The art of formulating, writing, and orally defending a research progress report (A) and two research proposals (B, C). Second-year students register for A and B; third-year students register for C. A: Aut, B: Spr, C: Spr

1 unit, Spr (Solomon, E)

#### CHEM 233C. Creativity in Organic Chemistry

Required of second- and third-year Ph.D. candidates in organic chemistry. The art of formulating, writing, and orally defending a research progress report (A) and two research proposals (B, C). Second-year students register for A and B; third-year students register for C. A: Aut, B: Spr, C: Spr

1 unit, Spr (Solomon, E)

#### CHEM 235. Applications of NMR Spectroscopy

The uses of NMR spectroscopy in chemical and biochemical sciences, emphasizing data acquisition for liquid samples and including selection, setup, and processing of standard and advanced experiments.

3 units, Win (Lynch, S)

#### CHEM 237. Electrochemistry

Principles of electrochemistry and their application to redox systems, electron transfer, electroanalysis, electrodeposition, electrocatalysis, batteries, and fuel cells. Prerequisite: 171 or equivalent.

3 units, Spr (Chidsey, C)

#### CHEM 251. Advanced Inorganic Chemistry

Chemical reactions of inorganic compounds with focus on mechanisms of reactions mediated by inorganic and organometallic complexes. The structural and electronic basis of reactivity including oxidation and reduction; kinetics and thermodynamics of inorganic reactions. Prerequisite: one year of physical chemistry.

3 units, not given this year

#### CHEM 253. Advanced Inorganic Chemistry

Electronic structure and physical properties of transition metal complexes. Ligand field and molecular orbital theories, magnetism and magnetic susceptibility, electron paramagnetic resonance including hyperfine interactions and zero field splitting and electronic absorption spectroscopy including vibrational interactions. Prerequisite: 153 or the equivalent.

3 units, Win (Solomon, E)

#### CHEM 255. Advanced Inorganic Chemistry

(Same as CHEM 155) Chemical reactions of organotransition

metal complexes and their role in homogeneous catalysis. Analogous patterns among reactions of transition metal complexes in lower oxidation states. Physical methods of structure determination. Prerequisite: one year of physical chemistry.

*3 units, not given this year*

**CHEM 258A. Research Progress in Inorganic Chemistry**

Required of all second-, third-, and fourth-year Ph.D. candidates in inorganic chemistry. Students present their research progress in written and oral forms (A); present a seminar in the literature of the field of research (B); and formulate, write, and orally defend a research proposal (C). Second-year students register for A; third-year students register for B; fourth-year students register for C.

*1 unit, Win (Solomon, E)*

**CHEM 258B. Research Progress in Inorganic Chemistry**

Required of all second-, third-, and fourth-year Ph.D. candidates in inorganic chemistry. Students present their research progress in written and oral forms (A); present a seminar in the literature of the field of research (B); and formulate, write, and orally defend a research proposal (C). Second-year students register for A; third-year students register for B; fourth-year students register for C.

*1 unit, Spr (Solomon, E)*

**CHEM 258C. Research Progress in Inorganic Chemistry**

Required of all second-, third-, and fourth-year Ph.D. candidates in inorganic chemistry. Students present their research progress in written and oral forms (A); present a seminar in the literature of the field of research (B); and formulate, write, and orally defend a research proposal (C). Second-year students register for A; third-year students register for B; fourth-year students register for C.

*1 unit, Aut (Staff), Win (Solomon, E)*

**CHEM 259. Inorganic Chemistry Seminar**

Required of graduate students majoring in inorganic chemistry.

*1 unit, Aut (Solomon, E), Win (Solomon, E), Spr (Solomon, E)*

**CHEM 271. Advanced Physical Chemistry**

The principles of quantum mechanics. General formulation, mathematical methods, and applications of quantum theory. Exactly solvable problems and approximate methods including time independent perturbation theory and the variational method. Time dependent methods including exactly solvable problems, time dependent perturbation theory, and density matrix formalism. Different representations of quantum theory including the Schrödinger, matrix, and density matrix methods. Absorption and emission of radiation Angular momentum. Atomic structure calculations and simple molecular structure methods. Prerequisite: 175.

*3 units, Aut (Fayer, M)*

**CHEM 273. Advanced Physical Chemistry**

Topics in advanced quantum mechanics: ab initio electronic structure theory (Hartree-Fock, configuration interaction, multi-configuration self-consistent-field, and many-body perturbation theory techniques) and density functional theory, time-dependent quantum mechanics (time evolution operator, Feynman path integrals, correlation functions), interaction of radiation and matter (semiclassical and quantum theories of radiation, transition probabilities, selection rules), and vibrations and rotations of polyatomic molecules (normal modes, anharmonicity, wave functions and energy levels of rigid rotations, vibration-rotation interaction). Prerequisite: Chem 271 or Physics 230.

*3 units, Win (Martinez, T)*

**CHEM 275. Advanced Physical Chemistry**

The principles and methods of statistical mechanics from the ensemble point of view, statistical thermodynamics, heat capacities of solids and polyatomic gases, chemical equilibria, equations of state of fluids, and phase transitions. Prerequisite: 271.

*3 units, Spr (Pecora, R)*

**CHEM 276. Advanced Physical Chemistry**

The statistical mechanical basis for computer simulations of atomic and molecular liquids. Principles of the Monte Carlo method, Metropolis algorithm, and application to lattice models and continuum fluids. Principles of molecular dynamics calculations, methods for sampling equilibrium ensembles, algorithms for dynamics. Periodic boundary conditions, methods for dealing with long-ranged forces, construction of potential energy functions, estimation of statistical error in results of simulations. Prerequisite: 275. it might be repeatable for credit.

*3 units, not given this year*

**CHEM 277. Materials Chemistry and Physics**

Topics: structures and symmetries and of solid state crystalline materials, chemical applications of group theory in solids, quantum mechanical electronic band structures of solids, phonons in solids, synthesis methods and characterization techniques for solids including nanostructured materials, selected applications of solid state materials and nanostructures. May be repeated for credit. Prerequisite: 271 or equivalent, or consent of instructor.

*3 units, not given this year*

**CHEM 278A. Research Progress in Physical Chemistry**

Required of all second- and third-year Ph.D. candidates in physical and biophysical chemistry and chemical physics. Second-year students present their research progress and plans in brief written and oral summaries (A); third-year students prepare a written progress report (B). A: Win, B: Win

*1 unit, Win (Cui, B)*

**CHEM 278B. Research Progress in Physical Chemistry**

Required of all second- and third-year Ph.D. candidates in physical and biophysical chemistry and chemical physics. Second-year students present their research progress and plans in brief written and oral summaries (A); third-year students prepare a written progress report (B). A: Win, B: Win

*1 unit, Win (Cui, B)*

**CHEM 279. Physical Chemistry Seminar**

Required of graduate students majoring in physical chemistry. May be repeated for credit.

*1 unit, Aut (Cegelski, L), Win (Cegelski, L), Spr (Cui, B)*

**CHEM 280. Single-Molecule Spectroscopy and Imaging**

Theoretical and experimental techniques necessary to achieve single-molecule sensitivity in laser spectroscopy: interaction of radiation with spectroscopic transitions; systematics of signals, noise, and signal-to-noise; modulation and imaging methods; and analysis of fluctuations; applications to modern problems in biophysics, cellular imaging, physical chemistry, single-photon sources, and materials science. Prerequisites: 271, previous or concurrent enrollment in 273.

*3 units, not given this year*

**CHEM 285. Chemical Principles in Drug Discovery and Development**

Application of physical organic chemistry to the discovery and subsequent product development of small molecule and macromolecular drugs. Key physical, chemical, and biological properties of drug candidates, how to measure them, and how to engineer them. Principles of drug formulation and delivery. Recommended: graduate-level background in physical and organic chemistry.

*3 units, Aut (Khosla, C)*

**CHEM 297. Bio-Inorganic Chemistry**

(Same as BIOPHYS 297) Overview of metal sites in biology. Metalloproteins as elaborated inorganic complexes, their basic coordination chemistry and bonding, unique features of the protein ligand, and the physical methods used to study active sites. Active site structures are correlated with function. Prerequisites: 153 and 173, or equivalents.

*3 units, not given this year*

**CHEM 299. Teaching of Chemistry**

Required of all teaching assistants in Chemistry. Techniques of teaching chemistry by means of lectures and labs.

*1-3 units, Aut (Hua, Y), Win (Hua, Y), Spr (Hua, Y)*

**CHEM 300. Department Colloquium**

Required of graduate students. May be repeated for credit.

*1 unit, Aut (Trost, B), Win (Trost, B), Spr (Trost, B)*

**CHEM 301. Research in Chemistry**

Required of graduate students who have passed the qualifying examination. Open to qualified graduate students with the consent of the major professor. Research seminars and directed reading deal with newly developing areas in chemistry and experimental techniques. May be repeated for credit. Search for adviser name on Axxess.

*2 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**CHEM 309. Navigating Career Options for Ph.D. Chemists**

Planning a post-graduate career. Topics include career options, job search strategies, job application process, long-term career

planning, and minority issues in science careers. Workshops focused on developing professional skills working with CDC and CTL, and panel discussions with chemistry Ph.D.s working in a range of fields. (Zare)

*1 unit, not given this year*

#### **CHEM 390. Curricular Practical Training for Chemists**

For Chemistry majors who need work experience as part of their program of study.

*1 unit, Aut (Staff)*

#### **CHEM 459. Frontiers in Interdisciplinary Biosciences**

(Same as BIO 459, BIOC 459, BIOE 459, CHEMENG 459, PSYCH 459) Students register through their affiliated department; otherwise register for CHEMENG 459. For specialists and non-specialists. Sponsored by the Stanford BioX Program. Three seminars per quarter address scientific and technical themes related to interdisciplinary approaches in bioengineering, medicine, and the chemical, physical, and biological sciences. Leading investigators from Stanford and the world present breakthroughs and endeavors that cut across core disciplines. Pre-seminars introduce basic concepts and background for non-experts. Registered students attend all pre-seminars; others welcome. See <http://biox.stanford.edu/courses/459.html>. Recommended: basic mathematics, biology, chemistry, and physics.

*1 unit, Aut (Robertson, C), Win (Robertson, C), Spr (Robertson, C)*

#### **CHEM 802. TGR Dissertation**

*0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

## CHICANA/O STUDIES (CHICANST) COURSES

### UNDERGRADUATE COURSES IN CHICANA/O STUDIES

Primarily for undergraduates; graduate students may enroll with consent of adviser.

#### **CHICANST 14N. Growing Up Bilingual**

(F,Sem) (Same as CSRE 14N, EDUC 114N) Stanford Introductory Seminar. This course is a Freshman Introductory Seminar that has as its purpose introducing students to the sociolinguistic study of bilingualism by focusing on bilingual communities in this country and on bilingual individuals who use two languages in their everyday lives. Much attention is given to the history, significance, and consequences of language contact in the United States. The course focuses on the experiences of long-term US minority populations as well as that of recent immigrants.

*3 units, Win (Valdes, G)*

#### **CHICANST 117N. Film, Nation, Latinidad**

(Same as CSRE 117N, ILAC 117N) Examination of films from Spain, Mexico, and Latina/o USA that expand, trouble, contest, parody, or otherwise interrogate notions of national identity. Filmmakers may include Lourdes Portillo, Alejandro González Iñárritu, John Sayles, Maria Novaro, Pedro Almodóvar, and Gregory Nava.

*3-4 units, not given this year*

#### **CHICANST 125S. Chicano/Latino Politics**

(Same as POLISCI 125S) The political position of Latinos and Latinas in the U.S. Focus is on Mexican Americans, with attention to Cuban Americans, Puerto Ricans, and other groups. The history of each group in the American polity; their political circumstances with respect to the electoral process, the policy process, and government; the extent to which the demographic category Latino is meaningful; and group identity and solidarity among Americans of Latin American ancestry. Topics include immigration, education, affirmative action, language policy, and environmental justice. GER:DB-SocSci

*5 units, not given this year*

#### **CHICANST 160N. Latino/Latina Performance in the United States**

(F,Sem) (Same as CSRE 160N, DRAMA 17N) Stanford Introductory Seminar. Preference to freshmen. This course will

introduce works by U.S. Latino and Latina performance artists producing from the margins of the mainstream Euro-American theater world. We will examine how performance art serves as a kind of dramatized political forum for Latino/a artists, producing some of the most transgressive explorations of queer and national/ethnic identities in the U.S. today. By the course's conclusion, each student will create and perform in a staged reading of an original performance piece. GER:DB-Hum, EC-AmerCul

*3 units, Win (Moraga, C)*

#### **CHICANST 164. Immigration and the Changing United States**

(Same as CSRE 164, SOC 164, SOC 264) The role of race and ethnicity in immigrant group integration in the U.S. Topics include: theories of integration; racial and ethnic identity formation; racial and ethnic change; immigration policy; intermarriage; hybrid racial and ethnic identities; comparisons between contemporary and historical waves of immigration. GER:DB-SocSci

*5 units, Aut (Jimenez, T)*

#### **CHICANST 166. Mexicans, Mexican Americans, and Chicanos in American Society**

(Same as SOC 166, SOC 266) Contemporary sociological issues affecting Mexican-origin people in the U.S. Topics include: the immigrant experience, immigration policy, identity, socioeconomic integration, internal diversity, and theories of incorporation. GER:DB-SocSci

*5 units, not given this year*

#### **CHICANST 168. New Citizenship: Grassroots Movements for Social Justice in the U.S.**

(Same as ANTHRO 169A, CSRE 168, FEMST 140H) Focus is on the contributions of immigrants and communities of color to the meaning of citizenship in the U.S. Citizenship, more than only a legal status, is a dynamic cultural field in which people claim equal rights while demanding respect for differences. Academic studies of citizenship examined in dialogue with the theory and practice of activists and movements. Engagement with immigrant organizing and community-based research is a central emphasis.

*5 units, Win (Coll, K)*

#### **CHICANST 180E. Introduction to Chicana/o Studies**

(Same as CSRE 180E) Historical and contemporary experiences that have defined the status of Mexican-origin people living in the U.S. Topics include the U.S./Mexico border and the borderlands; immigration and anti-immigration sentiment; literary and cultural traditions; music; labor; historical perspectives on Mexicans in the U.S. and the Chicano movement; urban realities; gender relations; political and economic changes; and inter- and intra-group interactions. Sources include social science and humanities scholarship. GER:DB-Hum, EC-AmerCul

*5 units, Spr (Gallardo, S)*

#### **CHICANST 189W. Language and Minority Rights**

(Same as CSRE 189W, EDUC 189X) Language as it is implicated in migration and globalization. The effects of globalization processes on languages, the complexity of language use in migrant and indigenous minority contexts, the connectedness of today's societies brought about by the development of communication technologies. Individual and societal multilingualism; preservation and revival of endangered languages. GER:EC-GlobalCom

*3 units, not given this year*

#### **CHICANST 200. Latin@ Literature**

(Same as CSRE 200, ILAC 280, ILAC 382) Texts by U.S. Latin@s of Mexican, Puerto Rican, Cuban, and Dominican descent. Examines how these writers' shared history of Spanish colonization and U.S. imperialism has resulted in differing representations of home and homeland, nation, diaspora, history, and memory. Explores how racialization informs the production of gendered identities as well as sexualities. Analysis of the formal conventions of fiction, poetry, drama, memoir, and film.

*3-5 units, Win (Yarbro-Bejarano, Y)*

#### **CHICANST 200R. Directed Research**

*1-5 units, Aut (Staff), Win (Staff), Spr (Staff)*

#### **CHICANST 200W. Directed Reading**

(Staff)

*1-5 units, Aut (Staff), Win (Staff), Spr (Staff)*

**CHICANST 201B. From Racial Justice to Multiculturalism: Movement-based Arts Organizing in the Post Civil Rights Era** (Same as CSRE 201B) How creative projects build and strengthen communities of common concern. Projects focus on cultural reclamation, multiculturalism, cultural equity and contemporary cultural wars, media literacy, independent film, and community-based art. Guest artists and organizers, films, and case studies.

*5 units, Aut (Hernandez, G)*

**CHICANST 293. Latino American Avant Garde** (Same as ARTHIST 293) African contribution to modern art practices in Latino America. Mexico, Brazil, and Cuba as models. Cultural and historical context. GER:DB-Hum

*5 units, not given this year*

## GRADUATE COURSES IN CHICANA/O STUDIES

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**CHICANST 201C. Critical Concepts in Chicana/o Literature** (Same as CSRE 201C, ILAC 380E) Interrogation of the critical discourses that have configured and reconfigured the canon of Chicana/o literature over the last thirty years. Close textual readings of primary texts, mainly narrative, within the development of Chicana/o literary and cultural criticism. Construction of narrative genealogies and foundational texts. Impact of the publication of late-nineteenth or pre-movement novels and Chicana feminist/lesbian/queer critiques. Consideration of alternative paradigms such as positioning Chicana/o literature within a U.S. Latina/o literary imaginary, and the shift of critical discourse in the field of visual art from a paradigm of resistance and affirmation to one of post Chicano.

*3-5 units, not given this year*

## CHINESE GENERAL (CHINGEN) COURSES

### UNDERGRADUATE COURSES IN CHINESE GENERAL

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**CHINGEN 51. Chinese Calligraphy**

Practice in writing Chinese characters with a brush, emphasizing standardized script and the composition of the characters and improving handwriting. Limited enrollment. May be repeated for credit. Prerequisite: CHINLANG 3 or equivalent.

*1-2 units, Spr (Chuang, Y)*

**CHINGEN 70N. Marvelous Creatures: Animals and Humans in Chinese Literature**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Read novels and short stories as well as view films that feature an array of marvelous creatures from late imperial times to the contemporary era. What animal imageries and metaphors can reveal about the Chinese and how they relate to the natural, supernatural, and human worlds across the centuries. GER:DB-Hum, EC-GlobalCom

*3-4 units, Spr (Lee, H)*

**CHINGEN 73. Chinese Language, Culture, and Society**

(Same as CHINGEN 173) Topics include the origin of Chinese, development of dialects, emergence of the standard, preferred formulaic expressions, the evolution of writing, and language policies in greater China. Prerequisite: CHINLANG 1 or 1B, or equivalent. GER:DB-SocSci, EC-GlobalCom

*4 units, not given this year*

**CHINGEN 91. Traditional East Asian Culture: China**

Required for Chinese and Japanese majors. Introduction to Chinese culture in a historical context. Topics include political and socioeconomic institutions, religion, ethics, education, and art and literature. GER:DB-Hum, EC-GlobalCom

*5 units, Aut (Liu, L)*

**CHINGEN 117. Worship of Buddhist Images in Medieval China**

(Same as CHINGEN 217) Explores Buddhist image-making practices from Han to Tang China from a trans-Asian perspective. Topics include characteristics of earliest Chinese images (vis-a-vis those of Indian subcontinent), their growth as a dominant artistic genre, inroads of foreign images and Chinese interactions, constructions of Buddhist ritual spaces such as monumental pagodas and cave temples, cross-cultural contexts of image worship.

*3-5 units, Spr (Kim, M)*

**CHINGEN 118. Constructing National History in East Asian Archaeology**

(Same as CHINGEN 218) Archaeological studies in contemporary East Asia share a common concern, to contribute to building a national narrative and cultural identity. This course focuses on case studies from China, Korea, and Japan, examining the influence of particular social-political contexts, such as nationalism, on the practice of archaeology in modern times. GER:DB-SocSci

*3-5 units, Win (Liu, L)*

**CHINGEN 119. Popular Culture and Casino Capitalism in China**

(Same as CHINGEN 219) Examination of different forms of Chinese popular culture used to gauge or control fate and uncertainty, from geomancy and qigong to ghost culture and mahjong. Ways in which Chinese are incorporating these cultural forms into the informal economy to get rich quick: rotating credit associations, stock market speculation, pyramid schemes, underground lotteries, counterfeiting. Impact of casino capitalism on Chinese culture and social life today.

*3-4 units, not given this year*

**CHINGEN 120. Soldiers and Bandits in Chinese Culture**

(Same as CHINGEN 220) Social roles and literary images of two groups on the margins of traditional Chinese society; historical and comparative perspectives.

*3-5 units, not given this year*

**CHINGEN 121. Classical Chinese Rituals**

(Same as CHINGEN 221) Meanings of rituals regarding death, wedding, war, and other activities; historical transformations of classical rituals throughout the premodern period; legacy of the Chinese ritual tradition. Sources include canonical texts.

*3-5 units, not given this year*

**CHINGEN 131. Chinese Poetry in Translation**

(Same as CHINGEN 231) From the first millennium B.C. through the 12th century. Traditional verse forms representative of the classical tradition; highlights of the most distinguished poets. History, language, and culture. Chinese language not required. GER:DB-Hum, EC-GlobalCom

*4 units, not given this year*

**CHINGEN 132. Chinese Fiction and Drama in Translation**

(Same as CHINGEN 232) From early times to the 18th century, emphasizing literary and thematic discussions of major works in English translation. GER:DB-Hum, EC-GlobalCom

*4 units, not given this year*

**CHINGEN 133. Literature in 20th-Century China**

(Same as CHINGEN 233) (Graduate students register for 233.) How modern Chinese culture evolved from tradition to modernity; the century-long drive to build a modern nation state and to carry out social movements and political reforms. How the individual developed modern notions of love, affection, beauty, and moral relations with community and family. Sources include fiction and film clips. WIM course. GER:DB-Hum, EC-GlobalCom

*4-5 units, Aut (Wang, B)*

**CHINGEN 134. Early Chinese Mythology**

(Same as CHINGEN 234) The definition of a myth. Major myths of China prior to the rise of Buddhism and Daoism including: tales of the early sage kings such as Yu and the flood; depictions of deities in the underworld; historical myths; tales of immortals in relation to local cults; and tales of the patron deities of crafts. GER:DB-Hum

*3-5 units, not given this year*

**CHINGEN 136. The Chinese Family**

(Same as CHINGEN 236) History and literature. Institutional,

ritual, affective, and symbolic aspects. Perspectives of gender, class, and social change. GER:EC-GlobalCom

3-5 units, not given this year

**CHINGEN 137. Tiananmen Square: History, Literature, Iconography**

(Same as CHINGEN 237) Multidisciplinary. Literary and artistic representations of this site of political and ideological struggles throughout the 20th century. Tiananmen-themed creative, documentary, and scholarly works that shed light on the dynamics and processes of modern Chinese culture and politics. No knowledge of Chinese required. GER:DB-Hum, EC-GlobalCom

3-5 units, *Win (Lee, H)*

**CHINGEN 138. Love and Politics in Chinese Cinema**

(Same as CHINGEN 238) How films work as expressions of desire, impulse, emotional connection, and communal attachment during times of social upheaval and reconstruction. Film theory and aesthetics, and alternative paradigms about world and social relations. Chinese language not required. GER:DB-Hum

4-5 units, not given this year

**CHINGEN 139. Cultural Revolution as Literature**

(Same as CHINGEN 239) Literary form, aesthetic sensibility, and themes of trauma, identity, and the limits of representation in major literary works concerning the Cultural Revolution in China. Recommended: background in Chinese history or literature.

4 units, not given this year

**CHINGEN 140. Chinese Justice: Law, Morality, and Literature**

(Same as CHINGEN 240) Explores the relationship between law and morality in Chinese literature, culture, and society. Readings include court case romances, crime plays, detective novels, and legal dramas from traditional era and modern and contemporary periods. Prior coursework in Chinese history, civilization, or literature is recommended. All readings are in English. GER:EC-GlobalCom

3-5 units, not given this year

**CHINGEN 141. Emergence of Chinese Civilization from Caves to Palaces**

(Same as ARCHLGY 111, CHINGEN 241) Introduces processes of cultural evolution from the Paleolithic to the Three Dynasties in China. By examining archaeological remains, ancient inscriptions, and traditional texts, four major topics will be discussed: origins of modern humans, beginnings of agriculture, development of social stratification, and emergence of states and urbanism. GER:DB-Hum

3-4 units, *Aut (Liu, L)*

**CHINGEN 150. Sex, Gender, and Power in Modern China**

(Same as CHINGEN 250) Investigates how sex, gender, and power are entwined in the Chinese experience of modernity. Topics include anti-footbinding campaigns, free love/free sex, women's mobilization in revolution and war, the new Marriage Law of 1950, Mao's iron girls, postsocialist celebrations of sensuality, and emergent queer politics. Readings range from feminist theory to China-focused historiography, ethnography, memoir, biography, fiction, essay, and film. All course materials are in English. GER:DB-Hum, EC-Gender

3-5 units, *Spr (Lee, H)*

**CHINGEN 193E. Female Divinities in China**

(Same as CHINGEN 393E) The role of powerful goddesses, such as the Queen Mother of the West, Guanyin, and Chen Jinggu, in Chinese religion. Imperial history to the present day. What roles goddesses played in the spirit world, how this related to the roles of human women, and why a civilization that excluded women from the public sphere granted them such a major, even dominant place, in the religious sphere. Readings in English-language secondary literature. GER:DB-Hum, EC-Gender

3-5 units, not given this year

**CHINGEN 198. Senior Colloquium in Chinese Studies**

Students research, write, and present a capstone essay or honors thesis.

1 unit, *Win (Lee, H)*

## GRADUATE COURSES IN CHINESE GENERAL

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**CHINGEN 173. Chinese Language, Culture, and Society**

(Same as CHINGEN 73) Topics include the origin of Chinese, development of dialects, emergence of the standard, preferred formulaic expressions, the evolution of writing, and language policies in greater China. Prerequisite: CHINLANG 1 or 1B, or equivalent.

4 units, not given this year

**CHINGEN 200. Directed Readings in Asian Languages**

For Chinese literature. Prerequisite: consent of instructor. (Staff)

1-12 units, *Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**CHINGEN 201. Chinese Proseminar**

3 units, *Win (Wang, B)*

**CHINGEN 201. Teaching Chinese Humanities**

Prepares graduate students to teach humanities at the undergraduate level. Topics include syllabus development and course design, techniques for generating discussion, effective grading practices, and issues particular to the subject matter.

1 unit, not given this year

**CHINGEN 217. Worship of Buddhist Images in Medieval China**

(Same as CHINGEN 117) Explores Buddhist image-making practices from Han to Tang China from a trans-Asian perspective. Topics include characteristics of earliest Chinese images (vis-a-vis those of Indian subcontinent), their growth as a dominant artistic genre, inroads of foreign images and Chinese interactions, constructions of Buddhist ritual spaces such as monumental pagodas and cave temples, cross-cultural contexts of image worship.

3-5 units, *Spr (Kim, M)*

**CHINGEN 218. Constructing National History in East Asian Archaeology**

(Same as CHINGEN 118) Archaeological studies in contemporary East Asia share a common concern, to contribute to building a national narrative and cultural identity. This course focuses on case studies from China, Korea, and Japan, examining the influence of particular social-political contexts, such as nationalism, on the practice of archaeology in modern times.

3-5 units, *Win (Liu, L)*

**CHINGEN 219. Popular Culture and Casino Capitalism in China**

(Same as CHINGEN 119) Examination of different forms of Chinese popular culture used to gauge or control fate and uncertainty, from geomancy and qigong to ghost culture and mahjong. Ways in which Chinese are incorporating these cultural forms into the informal economy to get rich quick: rotating credit associations, stock market speculation, pyramid schemes, underground lotteries, counterfeiting. Impact of casino capitalism on Chinese culture and social life today.

3-4 units, not given this year

**CHINGEN 220. Soldiers and Bandits in Chinese Culture**

(Same as CHINGEN 120) Social roles and literary images of two groups on the margins of traditional Chinese society; historical and comparative perspectives.

3-5 units, not given this year

**CHINGEN 221. Classical Chinese Rituals**

(Same as CHINGEN 121) Meanings of rituals regarding death, wedding, war, and other activities; historical transformations of classical rituals throughout the premodern period; legacy of the Chinese ritual tradition. Sources include canonical texts.

3-5 units, not given this year

**CHINGEN 231. Chinese Poetry in Translation**

(Same as CHINGEN 131) From the first millennium B.C. through the 12th century. Traditional verse forms representative of the classical tradition; highlights of the most distinguished poets. History, language, and culture. Chinese language not required.

4 units, not given this year



**CHINGEN 232. Chinese Fiction and Drama in Translation**

(Same as CHINGEN 132) From early times to the 18th century, emphasizing literary and thematic discussions of major works in English translation.

*4 units, not given this year*

**CHINGEN 233. Literature in 20th-Century China**

(Same as CHINGEN 133) (Graduate students register for 233.) How modern Chinese culture evolved from tradition to modernity; the century-long drive to build a modern nation state and to carry out social movements and political reforms. How the individual developed modern notions of love, affection, beauty, and moral relations with community and family. Sources include fiction and film clips. WIM course.

*4-5 units, Aut (Wang, B)*

**CHINGEN 234. Early Chinese Mythology**

(Same as CHINGEN 134) The definition of a myth. Major myths of China prior to the rise of Buddhism and Daoism including: tales of the early sage kings such as Yu and the flood; depictions of deities in the underworld; historical myths; tales of immortals in relation to local cults; and tales of the patron deities of crafts.

*3-5 units, not given this year*

**CHINGEN 236. The Chinese Family**

(Same as CHINGEN 136) History and literature. Institutional, ritual, affective, and symbolic aspects. Perspectives of gender, class, and social change.

*3-5 units, not given this year*

**CHINGEN 237. Tiananmen Square: History, Literature, Iconography**

(Same as CHINGEN 137) Multidisciplinary. Literary and artistic representations of this site of political and ideological struggles throughout the 20th century. Tiananmen-themed creative, documentary, and scholarly works that shed light on the dynamics and processes of modern Chinese culture and politics. No knowledge of Chinese required.

*3-5 units, Win (Lee, H)*

**CHINGEN 238. Love and Politics in Chinese Cinema**

(Same as CHINGEN 138) How films work as expressions of desire, impulse, emotional connection, and communal attachment during times of social upheaval and reconstruction. Film theory and aesthetics, and alternative paradigms about world and social relations. Chinese language not required.

*4-5 units, not given this year*

**CHINGEN 239. Cultural Revolution as Literature**

(Same as CHINGEN 139) Literary form, aesthetic sensibility, and themes of trauma, identity, and the limits of representation in major literary works concerning the Cultural Revolution in China. Recommended: background in Chinese history or literature.

*4 units, not given this year*

**CHINGEN 240. Chinese Justice: Law, Morality, and Literature**

(Same as CHINGEN 140) Explores the relationship between law and morality in Chinese literature, culture, and society. Readings include court case romances, crime plays, detective novels, and legal dramas from traditional era and modern and contemporary periods. Prior coursework in Chinese history, civilization, or literature is recommended. All readings are in English.

*3-5 units, not given this year*

**CHINGEN 241. Emergence of Chinese Civilization from Caves to Palaces**

(Same as ARCHLGY 111, CHINGEN 141) Introduces processes of cultural evolution from the Paleolithic to the Three Dynasties in China. By examining archaeological remains, ancient inscriptions, and traditional texts, four major topics will be discussed: origins of modern humans, beginnings of agriculture, development of social stratification, and emergence of states and urbanism.

*3-4 units, Aut (Liu, L)*

**CHINGEN 250. Sex, Gender, and Power in Modern China**

(Same as CHINGEN 150) Investigates how sex, gender, and power are entwined in the Chinese experience of modernity. Topics include anti-footbinding campaigns, free love/free sex, women's mobilization in revolution and war, the new Marriage Law of 1950, Mao's iron girls, postsocialist celebrations of sensuality, and emergent queer politics. Readings range from feminist theory to

China-focused historiography, ethnography, memoir, biography, fiction, essay, and film. All course materials are in English.

*3-5 units, Spr (Lee, H)*

**CHINGEN 393E. Female Divinities in China**

(Same as CHINGEN 193E) The role of powerful goddesses, such as the Queen Mother of the West, Guanyin, and Chen Jinggu, in Chinese religion. Imperial history to the present day. What roles goddesses played in the spirit world, how this related to the roles of human women, and why a civilization that excluded women from the public sphere granted them such a major, even dominant place, in the religious sphere. Readings in English-language secondary literature.

*3-5 units, not given this year*

## CHINESE LANGUAGE (CHINLANG) COURSES

### UNDERGRADUATE COURSES IN CHINESE LANGUAGE

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**CHINLANG 1. First-Year Modern Chinese, First Quarter**

Conversation, grammar, reading, elementary composition. Daily sections may be set at the beginning of the quarter to suit schedule requirements.

*5 units, Aut (Zeng, H)*

**CHINLANG 1B. First-Year Modern Chinese for Bilingual Students, First Quarter**

For students with elementary comprehension and speaking skills who need work on conversation, grammar, reading, and composition.

*3 units, Aut (Lin, N)*

**CHINLANG 2. First-Year Modern Chinese, Second Quarter**

Continuation of 1. Daily sections may be set at the beginning of the quarter to suit schedule requirements. Prerequisite: placement test, 1 or consent of instructor.

*5 units, Win (Zeng, H)*

**CHINLANG 2B. First-Year Modern Chinese for Bilingual Students, Second Quarter**

Continuation of 1B. For students with elementary comprehension and speaking skills who need work on conversation, grammar, reading, and composition. Prerequisite: placement test, 1B or consent of instructor.

*3 units, Win (Lin, N)*

**CHINLANG 3. First-Year Modern Chinese, Third Quarter**

Continuation of 2. Daily sections may be set at the beginning of the quarter to suit schedule requirements. Fulfills the University language requirement. Prerequisite: placement test, 2 or consent of instructor.

*5 units, Spr (Zeng, H)*

**CHINLANG 3B. First-Year Modern Chinese for Bilingual Students, Third Quarter**

Continuation of 2B. Continuation of 2B. For students with elementary comprehension and speaking skills who need work on conversation, grammar, reading, and composition. Prerequisite: placement test, 2B or consent of instructor.

*3 units, Spr (Lin, N)*

**CHINLANG 5. Intensive First-Year Modern Chinese**

Equivalent to 1,2,3 combined if taken together with the Beijing portion of the Summer Program. Five weeks at Stanford and four weeks at Peking University.

*8 units, Sum (Staff)*

**CHINLANG 6. Beginning Conversational Chinese, First Quarter**

Three quarter sequence. Basic language skills in Mandarin to function abroad.

*2 units, Aut (Rozelle, Y)*



**CHINLANG 7. Beginning Conversational Chinese, Second Quarter**

Continuation of 6. Basic language skills in Mandarin to function abroad. Prerequisite: 6 or consent of instructor.

2 units, Win (Rozelle, Y)

**CHINLANG 8. Beginning Conversational Chinese, Third Quarter**

Continuation of 7. Basic language skills in Mandarin to function abroad. Prerequisite: 7 or consent of instructor.

2 units, Spr (Rozelle, Y)

**CHINLANG 10. Beginning Southern Min (Taiwanese) Conversation, First Quarter**

Three quarter sequence. Basic language skills for everyday life situations.

2 units, Win (Staff)

**CHINLANG 11. Beginning Southern Min (Taiwanese) Conversation, Second Quarter**

Continuation of 10. Prerequisite: 10 or consent of instructor.

2 units, Win (Lin, N)

**CHINLANG 12. Beginning Southern Min (Taiwanese) Conversation, Third Quarter**

Continuation of 11. Prerequisite: 11 or consent of instructor.

2 units, Spr (Lin, N)

**CHINLANG 13A. Intermediate Southern Min (Taiwanese) Conversation, First Quarter**

Vocabulary including business-related terms, grammatical structures, and spontaneous conversations. Prerequisite: 12 or consent of instructor.

2 units, Aut (Lin, N)

**CHINLANG 13B. Intermediate Southern Min (Taiwanese) Conversation, Second Quarter**

Continuation of 13A. Vocabulary including business-related terms, grammatical structures, and spontaneous conversations. Prerequisite: 13A or consent of instructor.

2 units, Win (Lin, N)

**CHINLANG 13C. Intermediate Southern Min (Taiwanese) Conversation, Third Quarter**

Continuation of 13B. Vocabulary including business-related terms, grammatical structures, and spontaneous conversations. Prerequisite: 13A or consent of instructor.

2 units, Spr (Lin, N)

**CHINLANG 15. Beginning Conversational Cantonese, First Quarter**

Basic language skills for everyday life situations and for functioning abroad. Internet tools will be incorporated in this course.

2 units, Aut (Dennig, S)

**CHINLANG 15M. Beginning Conversational Cantonese for Mandarin Speakers, First Quarter**

Conversational skills and special written characters in Cantonese. Internet tools will be incorporated in this course.

2 units, Aut (Dennig, S)

**CHINLANG 16. Beginning Cantonese Conversation, Second Quarter**

Continuation of 15. Basic language skills for everyday life situations and for functioning abroad. Internet tools will be incorporated in this course. Prerequisite: 15 or consent of instructor.

2 units, Win (Dennig, S)

**CHINLANG 16M. Beginning Conversational Cantonese for Mandarin Speakers, Second Quarter**

Continuation of 15M. Conversational skills and special written characters in Cantonese. Internet tools will be incorporated in this course. Prerequisite: 15M or consent of instructor.

2 units, Win (Dennig, S)

**CHINLANG 17. Beginning Conversational Cantonese, Third Quarter**

Continuation of 16. Basic language skills for everyday life situations and for functioning abroad. Internet tools will be incorporated in this course. Prerequisite: 16 or consent of instructor.

2 units, Spr (Dennig, S)

**CHINLANG 17M. Beginning Conversational Cantonese for Mandarin Speakers, Third Quarter**

Continuation of 16M. Conversational skills and special written characters in Cantonese. Internet tools will be incorporated in this course. Prerequisite: 16M or consent of instructor.

2 units, Spr (Dennig, S)

**CHINLANG 18. Intermediate Cantonese Conversation, First Quarter**

Continuation of CHINLANG 17. Further develop students' conversational skills and expand their vocabulary and grammar for talking about a wide range of topics relevant to college students. Internet tools will be incorporated in this course. 17 or consent of instructor.

2 units, Aut (Dennig, S)

**CHINLANG 19. Intermediate Conversational Cantonese, Second Quarter**

Continuation of 18 or 18M.

2 units, Win (Dennig, S)

**CHINLANG 20. Intermediate Conversational Cantonese, Third Quarter**

Continuation of 19. Further develop students' conversational skills and expand their vocabulary and grammar for talking about a wide range of topics relevant to college students. Internet tools will be incorporated in this course. Prerequisite: 19, 19M or consent of instructor.

2 units, Spr (Dennig, S)

**CHINLANG 20A. Advanced Conversational Cantonese, First Quarter**

Viewing and discussion of authentic multimedia materials on cultural topics and current events: movies, video clips, radio, TV broadcasts, and Internet tools. Prerequisite 20 or consent of instructor.

2 units, Aut (Dennig, S)

**CHINLANG 20B. Advanced Conversational Cantonese, Second Quarter**

Continuation of 20A. Viewing and discussion of authentic multimedia materials on cultural topics and current events: movies, video clips, radio, TV broadcasts, and Internet tools. Prerequisite: 20A or consent of instructor.

2 units, Win (Dennig, S)

**CHINLANG 20C. Advanced Cantonese Conversation - Third Quarter**

Continuation of 20B. Improving Cantonese through Hong Kong movies. Prerequisite 20B or consent of instructor.

2 units, Spr (Dennig, S)

**CHINLANG 21. Second-Year Modern Chinese, First Quarter**

Grammar, reading, conversation, composition. Daily sections may be set at the beginning of the quarter to suit schedule requirements. Prerequisite: placement test, 3 or consent of instructor.

5 units, Aut (Chung, M)

**CHINLANG 21B. Second-Year Modern Chinese for Bilingual Students, First Quarter**

Continuation of 3B. For students with advanced comprehension and speaking skills, but lacking equivalent knowledge of grammar, reading, and writing Chinese characters. Equivalent to 21. Prerequisite: placement test, 3B or consent of instructor.

3 units, Aut (Tang, L)

**CHINLANG 22. Second-Year Modern Chinese, Second Quarter**

Continuation of 21. Grammar, reading, conversation, composition. Daily sections may be set at the beginning of the quarter to suit schedule requirements. Prerequisite: placement test, 21 or consent of instructor.

5 units, Win (Chung, M)

**CHINLANG 22B. Second-Year Chinese for Bilingual Students, Second Quarter**

Continuation of 21B. For students with advanced comprehension and speaking skills, but lacking equivalent knowledge of grammar, reading, and writing Chinese characters. Prerequisite: placement test, 21B or consent of instructor.

3 units, Win (Staff)

**CHINLANG 23. Second-Year Modern Chinese, Third Quarter**  
Continuation of 22. Grammar, reading, conversation, composition. Daily sections may be set at the beginning of the quarter to suit schedule requirements. Prerequisite: placement test, 22 or consent of instructor.

*5 units, Spr (Chung, M)*

**CHINLANG 23B. Second-Year Chinese for Bilingual Students, Third Quarter**

Continuation of 22B. For students with advanced comprehension and speaking skills, but lacking equivalent knowledge of grammar, reading, and writing Chinese characters. Prerequisite: placement test, 22B or consent of instructor.

*3 units, Spr (Staff)*

**CHINLANG 25. Intensive Second-Year Modern Chinese**

Equivalent to 21,22,23 combined if taken together with the Beijing portion of the Summer Program. Five weeks at Stanford and four weeks at Peking University. Prerequisite: 3 or equivalent.

*8 units, Sum (Staff)*

**CHINLANG 27. Intermediate Chinese Conversation, First Quarter**

Prerequisite: 3 or consent of instructor.

*2 units, Aut (Zhang, Y)*

**CHINLANG 28. Intermediate Chinese Conversation, Second Quarter**

Continuation of 27. Prerequisite: 27 or consent of instructor.

*2 units, Win (Zhang, Y)*

**CHINLANG 29. Intermediate Chinese Conversation, Third Quarter**

Continuation of 28. Prerequisite: 28 or consent of instructor.

*2 units, Spr (Zhang, Y)*

**CHINLANG 31E. Accelerated Beginning Mandarin for Engineering Students, First Quarter**

Restricted to engineering students participating in the China Internship Program. Prerequisite: consent of instructor. Grad students enroll in 331E.

*2-5 units, Spr (DiBello, M)*

**CHINLANG 41. Intermediate-to-Advanced Chinese Conversation, First Quarter**

Intermediate-to-Advanced Chinese Conversation, First Quarter Repeatable once for units. Prerequisite: 23 or consent of instructor.

*2 units, Aut (Chung, M)*

**CHINLANG 42. Intermediate-to-Advanced Chinese Conversation, Second Quarter**

Continuation of 41. Repeatable once for units. Prerequisite: 41 or consent of instructor.

*2 units, Win (Chung, M)*

**CHINLANG 43. Intermediate-to-Advanced Chinese Conversation, Third Quarter**

Continuation of 42. Repeatable once for units. Prerequisite: 42 or consent of instructor.

*2 units, Spr (Chung, M)*

**CHINLANG 99. Language Specials**

Prerequisite: consent of instructor. (Staff)

*1-5 units, Aut (Staff), Win (Staff), Spr (Staff)*

**CHINLANG 101. Third-Year Modern Chinese, First Quarter**

Written and spoken styles of modern Chinese. Reading and discussion of authentic writings on cultural topics; newspaper reports, radio, and TV broadcasts and films; online Chinese software and email network to facilitate study. Prerequisite: placement test, 23 or consent of instructor.

*5 units, Aut (Wang, H; Xie, F)*

**CHINLANG 101B. Third-Year Modern Chinese for Bilingual Students, First Quarter**

Equivalent to 101. For students with advanced listening and speaking abilities, but lacking equivalent knowledge in reading and writing. Prerequisite: placement test, 23B or consent of instructor.

*3 units, Aut (Wang, H; Xie, F)*

**CHINLANG 102. Third-Year Modern Chinese, Second Quarter**

Continuation of 101. Written and spoken styles of modern Chinese. Reading and discussion of authentic writings on cultural

topics; newspaper reports, radio, and TV broadcasts and films; online Chinese software and email network to facilitate study. Prerequisite: placement test, 101 or consent of instructor.

*5 units, Win (Staff)*

**CHINLANG 102B. Third-Year Modern Chinese for Bilingual Students, Second Quarter**

Continuation of 101B. Equivalent to 102. For students with advanced listening and speaking abilities, but lacking equivalent knowledge in reading and writing. Prerequisite: placement test, 101B or consent of instructor.

*3 units, Win (Wang, H)*

**CHINLANG 103. Third-Year Modern Chinese, Third Quarter**

Continuation of 102. Written and spoken styles of modern Chinese. Reading and discussion of authentic writings on cultural topics; newspaper reports, radio, and TV broadcasts and films; online Chinese software and email network to facilitate study. Prerequisite: placement test, 102 or consent of instructor.

*5 units, Spr (Staff)*

**CHINLANG 103B. Third-Year Modern Chinese for Bilingual Students, Third Quarter**

Continuation of 102B. Equivalent of 103. For students with advanced listening and speaking abilities, but lacking equivalent knowledge in reading and writing. Prerequisite: 102B or consent of instructor.

*3 units, Spr (Wang, H)*

**CHINLANG 105. Intensive Third-Year Modern Chinese**

Equivalent to 101,102,103 combined if taken together with the Beijing portion of the Summer Program. Five weeks at Stanford and four weeks at Peking University. Prerequisite: 23 or equivalent.

*8 units, Sum (Staff)*

**CHINLANG 121. Advanced Chinese Conversation, First Quarter**

Advanced conversation skills in everyday life and special situations. Prerequisite: placement test, 103 or consent of instructor.

*2 units, Aut (Zhou, X)*

**CHINLANG 122. Advanced Chinese Conversation, Second Quarter**

Advanced conversation skills in everyday life and special situations. Prerequisite: 121 or equivalent consent of instructor.

*2 units, Win (Chung, M)*

**CHINLANG 123. Advanced Chinese Conversation, Third Quarter**

Continuation of 122. Advanced conversation skills in everyday life and special situations. Prerequisite: 122 or consent of instructor.

*2 units, Spr (Zhou, X)*

**CHINLANG 131. Business Chinese, First Quarter**

Commercial, economic, and business-related vocabulary. Materials include formal business conversations, newspaper and journal articles, and TV news on trade and economic. Technical language and business etiquette. Student oral and written reports on their own research regarding recent economic developments, using sources in China. Prerequisite: 23 or equivalent.

*3-4 units, Aut (Wang, H)*

**CHINLANG 132. Business Chinese, Second Quarter**

Continuation of 131. Commercial, economic, and business-related vocabulary. Materials include formal business conversations, newspaper and journal articles, and TV news on trade and economic. Technical language and business etiquette. Student oral and written reports on their own research regarding recent economic developments, using sources in China. Prerequisite: 131 or consent of instructor.

*3-4 units, Win (Wang, H)*

**CHINLANG 133. Business Chinese, Third Quarter**

Continuation of 132. Commercial, economic, and business-related vocabulary. Materials include formal business conversations, newspaper and journal articles, and TV news on trade and economic. Technical language and business etiquette. Student oral and written reports on their own research regarding recent economic developments, using sources in China. Prerequisite: 132 or equivalent consent of instructor.

*3-4 units, Spr (Wang, H)*

**CHINLANG 200. Directed Reading**

May be repeated for credit. Prerequisite: consent of instructor.

*1-5 units, Aut (Staff), Win (Staff), Spr (Staff)*

**CHINLANG 211. Fourth-Year Modern Chinese, First Quarter**

Year-long sequence. Goal is to become functional speakers, readers, and writers of modern Chinese through articles and essays from newspapers, magazines, scholarly journals, and the Internet. Cultural and social science themes: students may take both themes for 5 units or one theme for reduced units. Prerequisite: placement test, 103 or consent of instructor.

*3-5 units, Aut (Zhou, X)*

**CHINLANG 211B. Fourth year Modern Chinese for Bilingual Students, First Quarter**

Designed as an advanced Modern Chinese class for bilingual students with emphasis on listening, speaking, reading, and writing. Special attention is given to moving student proficiency toward the superior level. The main textbook for the class is *Boya Hanyu: Feixiang pian*, which is comprised of well-crafted essays rich in vocabulary. With in-depth discussion on interesting topics, the course aims to help students develop a natural feel for advanced Chinese, including word choice, sentence structure, and paragraph organization. Prerequisite: 103B or consent of instructor.

*3 units, Aut (Zhou, X)*

**CHINLANG 212. Fourth-Year Modern Chinese, Second Quarter**

Continuation of 211. Year-long sequence. Goal is to become functional speakers, readers, and writers of modern Chinese through articles and essays from newspapers, magazines, scholarly journals, and the Internet. Cultural and social science themes: students may take both themes for 5 units or one theme for reduced units. Prerequisite: placement test, 211 or consent of instructor.

*3-5 units, Win (Zhou, X)*

**CHINLANG 212B. Fourth-Year Modern Chinese for Bilingual Students, Second Quarter**

Continuation of 211B. Designed as an advanced Modern Chinese class for bilingual students with emphasis on listening, speaking, reading, and writing. Special attention is given to moving student proficiency toward the superior level. The main textbook for the class is *Boya Hanyu: Feixiang pian*, which is comprised of well-crafted essays rich in vocabulary. With in-depth discussion on interesting topics, the course aims to help students develop a natural feel for advanced Chinese, including word choice, sentence structure, and paragraph organization. Prerequisite: 211B or consent of instructor.

*3 units, Win (Zhou, X)*

**CHINLANG 213. Fourth-Year Modern Chinese, Third Quarter**

Continuation of 212. Year-long sequence. Goal is to become functional speakers, readers, and writers of modern Chinese through articles and essays from newspapers, magazines, scholarly journals, and the Internet. Cultural and social science themes: students may take both themes for 5 units or one theme for reduced units. Prerequisite: placement test, 212 or consent of instructor.

*3-5 units, Spr (Zhou, X)*

**CHINLANG 213B. Fourth-Year Modern Chinese for Bilingual Students, Third Quarter**

Continuation of 212B. Designed as an advanced Modern Chinese class for bilingual students with emphasis on listening, speaking, reading, and writing. Special attention is given to moving student proficiency toward the superior level. The main textbook for the class is *Boya Hanyu: Feixiang pian*, which is comprised of well-crafted essays rich in vocabulary. With in-depth discussion on interesting topics, the course aims to help students develop a natural feel for advanced Chinese, including word choice, sentence structure, and paragraph organization. Prerequisite: 212B or consent of instructor.

*3 units, Spr (Zhou, X)*

**CHINLANG 231. Fifth-Year Modern Chinese: Cultural China, First Quarter**

Year-long sequence. Rhetorical devices through essays about China's cultural journey in relationship to geographical regions. Prerequisite: 213, 223B or consent of instructor.

*3 units, Aut (Tang, L)*

**CHINLANG 232. Fifth-Year Modern Chinese: Cultural China, Second Quarter**

Continuation of 231. Year-long sequence. Rhetorical devices through essays about China's cultural journey in relationship to geographical regions. Prerequisite: 231 or consent of instructor.

*3 units, Win (Staff)*

**CHINLANG 233. Fifth-Year Modern Chinese: Cultural China, Third Quarter**

Continuation of 232. Year-long sequence. Rhetorical devices through essays about China's cultural journey in relationship to geographical regions. Prerequisite: 232 or consent of instructor.

*3 units, Spr (Staff)*

**GRADUATE COURSES IN CHINESE LANGUAGE**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**CHINLANG 33G. Accelerated Beginning Mandarin III**

For GSB students only.

*4 units, Aut (Zhou, X)*

**CHINLANG 199. Individual Reading**

*1-5 units, Aut (Staff), Win (Staff), Spr (Staff)*

**CHINLANG 205S. Intensive Third-Year Modern Chinese**

Equivalent to 101, 102, 103 if taken together with the Beijing portion of the Summer Program. Five weeks at Stanford and four weeks at Peking University. Prerequisite: 23 or equivalent. Grads only.

*8 units, Sum (Staff)*

**CHINLANG 331E. Accelerated Beginning Mandarin for Engineering Students, First Quarter**

Restricted to graduate engineering students participating in the China Internship Program. Prerequisite: consent of instructor.

*2-5 units, Spr (DiBello, M)*

**CHINLANG 394. Graduate Studies in Chinese Conversation**

Prerequisite: consent of instructor.

*1-3 units, Aut (Staff), Win (Staff), Spr (Staff)*

**CHINLANG 395. Graduate Studies in Chinese**

Prerequisite: consent of instructor.

*2-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**CHINESE LITERATURE (CHINLIT) COURSES****UNDERGRADUATE COURSES IN CHINESE LITERATURE**

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**CHINLIT 125. Beginning Classical Chinese, First Quarter**

(Same as CHINLIT 205) Goal is reading knowledge of classical Chinese. Basic grammar and commonly used vocabulary. Students with no background in classical Chinese who are taking 127 to satisfy Chinese major requirements must begin with 125. Prerequisite: CHINLANG 23 or equivalent.

*2-5 units, Aut (Bartlett, T)*

**CHINLIT 126. Beginning Classical Chinese, Second Quarter**

(Same as CHINLIT 206) Goal is reading knowledge of classical Chinese. Basic grammar and commonly used vocabulary. Students with no background in classical Chinese who are taking 127/207 to satisfy Chinese major requirements must begin with 125/205. Prerequisite: CHINLANG 125/205 or equivalent.

*2-5 units, Win (Bartlett, T)*

**CHINLIT 127. Beginning Classical Chinese, Third Quarter**

(Same as CHINLIT 207) Goal is reading knowledge of classical Chinese. Basic grammar and commonly used vocabulary. Students with no background in classical Chinese who are taking 127/207 to satisfy Chinese major requirements must begin with 125/205. Prerequisite: CHINLANG 126/206 or equivalent.

*2-5 units, Spr (Bartlett, T)*

**CHINLIT 174. Modern Chinese Novel: Theory, Aesthetics, History**

(Same as CHINLIT 274, COMPLIT 254) From the May Fourth movement to the 40s. Themes include enlightenment, democracy, women's liberation, revolution, war, urban culture, and love. Prerequisite: advanced Chinese.

4 units, not given this year

**CHINLIT 189A. Honors Research**

2-5 units, Aut (Staff), Spr (Staff)

**CHINLIT 189B. Honors Research**

Open to senior honors students to write thesis.

5 units, Win (Staff)

**CHINLIT 190. Chinese Cultural Revolution: Performance, Politics, and Aesthetics**

(Same as CHINLIT 290, COMPLIT 135) Events, arts, films, and operas of the Chinese Cultural Revolution. Analysis of political passion, aesthetics, and psychology of mass movements. Places the Cultural Revolution in the long-range context of art, social movements, and politics. Chinese language is not required.

4 units, not given this year

**CHINLIT 191. The Structure of Modern Chinese**

(Same as CHINLIT 291) Focus is on syntax and semantics. Prerequisite: CHINLANG 3 or equivalent, or consent of instructor.

GER:DB-SocSci

2-4 units, not given this year

**CHINLIT 199. Individual Reading in Chinese**

Asian Language majors only. Prerequisite: CHINLANG 103 or consent of instructor. Units by arrangement.

1-4 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**GRADUATE COURSES IN CHINESE LITERATURE**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**CHINLIT 200. Directed Reading in Chinese**

1-12 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**CHINLIT 201. Proseminar: Bibliographic and Research Methods in Chinese Studies**

Bibliographic and research methods in Chinese studies. Prerequisite: 127/207 or equivalent.

3-5 units, not given this year

**CHINLIT 205. Beginning Classical Chinese, First Quarter**

(Same as CHINLIT 125) Goal is reading knowledge of classical Chinese. Basic grammar and commonly used vocabulary. Students with no background in classical Chinese who are taking 127 to satisfy Chinese major requirements must begin with 125. Prerequisite: CHINLANG 23 or equivalent.

2-5 units, Aut (Bartlett, T)

**CHINLIT 206. Beginning Classical Chinese, Second Quarter**

(Same as CHINLIT 126) Goal is reading knowledge of classical Chinese. Basic grammar and commonly used vocabulary. Students with no background in classical Chinese who are taking 127/207 to satisfy Chinese major requirements must begin with 125/205. Prerequisite: CHINLANG 125/205 or equivalent.

2-5 units, Win (Bartlett, T)

**CHINLIT 207. Beginning Classical Chinese, Third Quarter**

(Same as CHINLIT 127) Goal is reading knowledge of classical Chinese. Basic grammar and commonly used vocabulary. Students with no background in classical Chinese who are taking 127/207 to satisfy Chinese major requirements must begin with 125/205. Prerequisite: CHINLANG 126/206 or equivalent.

2-5 units, Spr (Bartlett, T)

**CHINLIT 221. Advanced Classical Chinese: Philosophical Texts**

Prerequisite: 207 or equivalent.

3-5 units, Aut (Lewis, M)

**CHINLIT 222. Advanced Classical Chinese: Historical Narration**

Prerequisite: 127/207 or equivalent.

2-5 units, Win (Wang, J)

**CHINLIT 223. Advanced Classical Chinese: Literary Essays**

Readings and grammatical analyses of literary essays throughout imperial China. Prerequisite: CHINLIT 127/207 or equivalent.

2-5 units, NEXTYEAR

**CHINLIT 232. Chinese Biographies of Women**

Generic and historical analysis of the two-millennia long biographical tradition inaugurated by Liu Xiang, ca. 79-8 B.C.E. Chinese women's history, intellectual history, historiography, and literary studies. Prerequisite: 127/207 or consent of instructor.

4 units, not given this year

**CHINLIT 261. Sources of Chinese Poetry**

The Book of Songs (ca. 1000-500 B.C.E.) and Songs of Chu (ca. 400 B.C.E.), the earliest anthologies of Chinese poetry.

4 units, not given this year

**CHINLIT 263. Lyric (Shih) I**

Han through Sui dynasties.

2-4 units, not given this year

**CHINLIT 265. Major Figures in Classical Chinese Shi Poetry**

Focus is on a major poet and relationships to previous and later poetry. Poetic form, including meter and rhyme schemes. Historical context. This year's poet is Tao Yuanming. May be repeated for credit. Prerequisites: 201, 207.

2-4 units, not given this year

**CHINLIT 266. Chinese Tz'u Poetry (Song Lyrics)**

Highlights from the Northern and Southern Sung periods. Patterns of generic development correlated to social changes in historical context. Prerequisite: classical Chinese.

4 units, not given this year

**CHINLIT 271. Traditional Chinese Fiction: Short Stories**

Early times to Qing. Prerequisite: 127/207 or consent of instructor.

2-4 units, Aut (Wang, J)

**CHINLIT 272. Traditional Chinese Fiction: Novels**

Major novels of late imperial China. Prerequisite: 127/207 or consent of instructor.

2-4 units, not given this year

**CHINLIT 273. Chinese Drama**

Yuan, Ming, and Qing periods emphasizing literary not theatrical qualities. Prerequisite: 127/207 or consent of instructor.

2-4 units, not given this year

**CHINLIT 274. Modern Chinese Novel: Theory, Aesthetics, History**

(Same as CHINLIT 174, COMPLIT 254) From the May Fourth movement to the 40s. Themes include enlightenment, democracy, women's liberation, revolution, war, urban culture, and love. Prerequisite: advanced Chinese.

4 units, not given this year

**CHINLIT 279. For Love of Country: National Narratives in Chinese Literature and Film**

Explores the nation as it is constructed, deconstructed, and continuously contested in novels, short stories, films, and other media from the second half of the 20th century in mainland China and Taiwan. Asks how the trope of the nation and the ideology of nationalism mediate the relationships between politics and aesthetics. Explores the nation's internal fault lines of gender, ethnicity, geography, language, and citizenship.

3-5 units, not given this year

**CHINLIT 289. The Poetics and Politics of Affect in Modern China**

The role of affect in modern Chinese aesthetics and politics. Cultural and social theories of affect (love, hate, fear, grief, resentment, rage, sympathy, sincerity, shame, and nostalgia); affective discourses across genres and media including fiction, poetry, film, journalism, and television; and mass social movements such as protest, uprising, and revolution. Advanced undergraduates requires consent of instructor. Recommended: reading knowledge of Chinese.

3-5 units, not given this year

**CHINLIT 290. Chinese Cultural Revolution: Performance, Politics, and Aesthetics**

(Same as CHINLIT 190, COMPLIT 135) Events, arts, films, and operas of the Chinese Cultural Revolution. Analysis of political passion, aesthetics, and psychology of mass movements. Places the

Cultural Revolution in the long-range context of art, social movements, and politics. Chinese language is not required.

4 units, not given this year

#### **CHINLIT 291. The Structure of Modern Chinese**

(Same as CHINLIT 191) Focus is on syntax and semantics. Prerequisite: CHINLANG 3 or equivalent, or consent of instructor.

2-4 units, not given this year

#### **CHINLIT 299. Master's Thesis or Translation**

A total of 5 units taken in one or more quarters.

1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

#### **CHINLIT 369. Late Imperial Chinese Fiction**

Primary works examined include Jin Ping Mei, Xingshi yinyuan zhuan, Hongloumeng, Qilu deng, Rulin waishi, and Ernu yingxiong zhuan. Secondary readings focus on social dimensions of the Chinese novel (ca. 1600-1850), but students may explore other aspects of the texts in their presentations and research papers. Comparisons with the English novel, particularly on the rise of the novel and the advent of modernity.

2-5 units, not given this year

#### **CHINLIT 371. Seminar in Chinese Literary Criticism**

(Same as COMPLIT 371) How aesthetics and politics intertwine and break apart in Western and Eastern traditions. Aesthetics for understanding culture, morality, and power in crosscultural contexts. Readings include Hegel, Kant, Marcuse, Lukacs, and Adorno; and Chinese thinkers Wang Guowei, Lu Xun, Li Zehou, and Mao. Prerequisite: CHINLIT 127/207 or consent of instructor.

2-5 units, not given this year

#### **CHINLIT 399. Dissertation Research**

1-12 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

#### **CHINLIT 400. Advanced Language Training**

For students in the Inter-University Program for Chinese Language Studies in Beijing or Taipei. For more information, contact the consortium office at UC Berkeley: (510) 642-3873, or see [http://ieas.berkeley.edu/iup/contact\\_iup.html](http://ieas.berkeley.edu/iup/contact_iup.html).

1-15 units, Aut (Staff), Win (Staff), Spr (Staff)

## CIVIL AND ENVIRONMENTAL ENGINEERING (CEE) COURSES

### UNDERGRADUATE COURSES IN CIVIL AND ENVIRONMENTAL ENGINEERING

Primarily for undergraduates; graduate students may enroll with consent of adviser.

#### **CEE 13SI. Introduction to Architectural Modeling**

Architecture is half design, half communicating design. In this course, students will gain the skills necessary to communicate architectural concepts through 3D modeling. From foam core to basswood to less known materials, students will gain a tactile understanding of material qualities and present their study models in portfolio format. Special focus will also be placed on techniques incorporating both computer-aided drafting and physical modeling through the laser cutter machine. No prior experience is necessary, but students will be expected to work in the studio outside of class time. Limited enrollment. Please contact Derek Ouyang at [derekouyang@gmail.com](mailto:derekouyang@gmail.com) for more info.. Class meets in PRL 36.

2 units, not given this year

#### **CEE 20. Elementary Surveying**

0-60 units

#### **CEE 31. Accessing Architecture Through Drawing**

Preference to Architectural Design and CEE majors; others by consent of instructor. Drawing architecture to probe the intricacies and subtleties that characterize contemporary buildings. How to dissect buildings and appreciate the formal elements of a building, including scale, shape, proportion, colors and materials, and the problem solving reflected in the design. Students construct conventional architectural drawings, such as plans, elevations, and perspectives. Limited enrollment. GER:DB-EngrAppSci

4 units, not given this year

#### **CEE 31B. Architectural Drawing and Rendering**

Course will expand on basics taught in CEE 31. Refresher on the basics of plans, sections, elevations, axonometrics, and perspectives. Students will be encouraged in conceptual thinking and translating concepts into Architecture. Introduction of computers for renderings and drafting as well as expanding on early model building. Field trip.

4 units, not given this year

#### **CEE 31Q. Accessing Architecture Through Drawing**

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Drawing architecture provides a deeper understanding of the intricacies and subtleties that characterize contemporary buildings. How to dissect buildings and appreciate the formal elements of a building, including scale, shape, proportion, colors and materials, and the problem solving reflected in the design. Students construct conventional architectural drawings, such as plans, elevations, and perspectives. Limited enrollment. GER:DB-EngrAppSci

4 units, Aut (Barton, J), Win (Barton, J)

#### **CEE 32A. Psychology of Architecture**

This course argues that architecture often neglects the interdisciplinary investigation of our internal psychological experience and the way it impacts our creation of space. How does our inner life influence external design? How are we impacted emotionally, physically, psychologically by the spaces we inhabit day to day? How might we intentionally imbue personal and public spaces with specific emotions? This seminar serves as a call to action for students interested in approaching architecture with a holistic understanding of the emotional impact of space. Sample topics addressed will include: conscious vs. unconscious design; the ego of architecture; psycho-spatial perspectives; ideas of home; integral/holistic architecture; phenomenology of inner and outer spaces; exploring archetypal architecture; and translating emotion through environment.

3 units, Aut (Larimer, A)

#### **CEE 32B. Design Theory**

This seminar focuses on the key themes, histories, and methods of architectural theory -- a form of architectural practice that establishes the aims and philosophies of architecture. Architectural theory is primarily written, but it also incorporates drawing, photography, film, and other media. One of the distinctive features of modern and contemporary architecture is its pronounced use of theory to articulate its aims. One might argue that modern architecture is modern because of its incorporation of theory. This course focuses on those early-modern, modern, and late-modern writings that have been and remain entangled with contemporary architectural thought and design practice. Rather than examine the development of modern architectural theory chronologically, it is explored architectural through thematic topics. These themes enable the student to understand how certain architectural theoretical concepts endure, are transformed, and can be furthered through his/her own explorat

4 units, Win (Beischer, T)

#### **CEE 32Q. Place: Making Space Now**

(S,Sem) (Same as ARTHIST 232Q) Stanford Introductory Seminar. This seminar argues that architects are ultimately placemakers, and questions what that means in the contemporary world. Part I investigates the meaning of the word place. Additional background for understanding contemporary place making will include a critique of the history of modern place-making through an examination of modern form. Part II examines two traditional notions of place by scale: from home to the city. What elements give these conceptions of space a sense of place? To answer this question, themes such as memory, mapping, and boundary, among others, will be investigated. Part III presents challenges to the traditional notions of place discussed in Part II. Topics addressed include: What does it mean to be out of place? What sense of place does a nomad have, and how is this represented? What are the non-places and how can architects design for these spaces? Part IV addresses the need to reconceptualize contemporary s

3 units, Spr (Barton, J; Beischer, T)

#### **CEE 44Q. Critical Thinking and Career Skills**

Factors required for successful careers. Guest speakers. Case studies. Participation in real world corporate interviews, testing and reviews conducted by industry trainers. Limited enrollment.

3 units, not given this year

### CEE 46Q. Fail Your Way to Success

Preference to sophomores. How to turn failures into successes; cases include minor personal failures and devastating engineering disasters. How personalities and willingness to take risks influence the way students approach problems. Field trips, case studies, and guest speakers applied to students day-to-day interactions and future careers. Goal is to redefine what it means to fail. GER:DB-EngrAppSci

3 units, not given this year

### CEE 48N. Organizing Global Projects

Preference to freshmen. Challenges associated with planning and managing both commercial and governmental/non-profit global projects; theory, methods, and tools to enhance global project outcomes. Students teams model and simulate crosscultural teams engaged in global projects. Opportunities to participate in research in the Collaboratory for Research on Global Projects involving faculty from Stanford departments and schools; see <http://crgp.stanford.edu>.

4 units, not given this year

### CEE 50N. From the Foothills to the Bay

(F,Sem) Stanford Introductory Seminar. Stanford University sits on the shores of one of the world's great estuaries, the San Francisco Bay/Delta, the connection of the inland river systems of the Central Valley to the Pacific Ocean. This course is intended to provide an introduction to the San Francisco Bay/Delta including its history, current scientific understanding of its physical and ecological functioning, descriptions and underpinnings of engineering manipulations of the system, and the intersection of science and engineering with policies designed to manage its resources. Because of the important effects that water resources development, most notably upstream diversions, have had on the system, Bay-Delta science, engineering and policy are completely intertwined with the management of the water supply of California. Thus, we will also examine relevant issues in California water that touch on the Bay Delta including an overall description of California hydrology, the State and Federal wa

3 units, Spr (Monismith, S)

### CEE 63. Weather and Storms

(Same as CEE 263C) Daily and severe weather and global climate. Topics: structure and composition of the atmosphere, fog and cloud formation, rainfall, local winds, wind energy, global circulation, jet streams, high and low pressure systems, inversions, el Niño, la Niña, atmosphere/ocean interactions, fronts, cyclones, thunderstorms, lightning, tornadoes, hurricanes, pollutant transport, global climate and atmospheric optics. GER: DB-NatSci

3 units, Aut (Ten Hoeve, J)

### CEE 64. Air Pollution and Global Warming: History, Science, and Solutions

(Same as CEE 263D) Survey of urban- through global-scale air pollution and climate change and their renewable energy solutions. Topics: evolution of the Earth's atmosphere, history of discovery of chemicals in the air, gases and particles in urban smog, visibility, indoor air pollution, acid rain, stratospheric and Antarctic ozone loss, the historic climate record, causes and effects of global warming, impacts of energy systems on pollution and climate, renewable energy solutions to air pollution and global warming. UG Reqs: GER: DBNatSci GER: DB-NatSci

3 units, Win (Jacobson, M)

### CEE 70. Environmental Science and Technology

(Same as ENGR 90) Introduction to environmental quality and the technical background necessary for understanding environmental issues, controlling environmental degradation, and preserving air and water quality. Material balance concepts for tracking substances in the environmental and engineering systems. GER:DB-EngrAppSci

3 units, Aut (Kopperud, R)

### CEE 70N. Water, Public Health, and Engineering

Preference to sophomores. Linkages between water, wastewater and public health, with an emphasis on engineering interventions. Topics include the history of water and wastewater infrastructure development in the U.S. and Europe; evolution of epidemiological approaches for water-related health challenges; biological and chemical contaminants in water and wastewater and their

management; and current trends and challenges in access to water and sanitation around the world. Identifying ways in which freshwater contributes to human health; exposure routes for water- and sanitation-illness. Classifying illnesses by pathogen type and their geographic distribution. Identifying the health and economic consequences of water- and sanitation-related illnesses; costs and benefits of curative and preventative interventions. Interpreting data related to epidemiological and environmental concepts. No previous experience in engineering is required. GER:DB-EngrAppSci

3 units, not given this year

### CEE 80N. The Art of Structural Engineering

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. The history of modern bridges, buildings, and other large-scale structures. Students learn about modern structures, the social context in which they are built and their symbolic value. Principles of structural engineering and calculating efficiency and safety taught through case studies. Field trip to Bay Area landmark and hands-on exercises including building and testing a model bridge. Students from all backgrounds welcome. GER:DB-EngrAppSci

4 units, Win (Billington, S)

### CEE 100. Managing Sustainable Building Projects

Managing the life cycle of buildings from the owner, designer, and contractor perspectives emphasizing sustainability goals; methods to define, communicate, coordinate, and manage multidisciplinary project objectives including scope, quality, life cycle cost and value, schedule, safety, energy, and social concerns; roles, responsibilities, and risks for project participants; virtual design and construction methods for product, organization, and process modeling; lifecycle assessment methods; individual writing assignment related to a real world project. GER:DB-EngrAppSci

4 units, Aut (Fischer, M)

### CEE 100A. Managing Sustainable Building Projects

Managing the life cycle of buildings from the owner, designer, and contractor perspectives emphasizing sustainability goals; methods to define, communicate, coordinate, and manage multidisciplinary project objectives including scope, quality, life cycle cost and value, schedule, safety, energy, and social concerns; roles, responsibilities, and risks for project participants; virtual design and construction methods for product, organization, and process modeling; lifecycle assessment methods; individual writing assignment related to a real world project.

4 units, Spr (Fischer, M), ONCEONLY

### CEE 101A. Mechanics of Materials

Introduction to beam and column theory. Normal stress and strain in beams under various loading conditions; shear stress and shear flow; deflections of determinate and indeterminate beams; analysis of column buckling; structural loads in design; strength and serviceability criteria. Lab experiments. Prerequisites: ENGR 14. GER:DB-EngrAppSci

4 units, Win (Baker, J)

### CEE 101B. Mechanics of Fluids

Physical properties of fluids and their effect on flow behavior; equations of motion for incompressible ideal flow, including the special case of hydrostatics; continuity, energy, and momentum principles; control volume analysis; laminar and turbulent flows; internal and external flows in specific engineering applications including pipes, open channels, estuaries, and wind turbines. Prerequisites: PHYSICS 41 (formerly 53), MATH 51. GER:DB-EngrAppSci

4 units, Spr (Koseff, J)

### CEE 101C. Geotechnical Engineering

Introduction to the principles of soil mechanics. Soil classification, shear strength and stress-strain behavior of soils, consolidation theory, analysis and design of earth retaining structures, introduction to shallow and deep foundation design, slope stability. Lab projects. Prerequisite: ENGR 14. Recommended: 101A. GER:DB-EngrAppSci

3-4 units, Aut (Borja, R)

### CEE 101D. Computations in Civil and Environmental Engineering

(Same as CEE 201D) Computational and visualization methods in the design and analysis of civil and environmental engineering systems. Focus is on applications of MATLAB. How to develop a

more lucid and better organized programming style.

3 units, Aut (Kitanidis, P), Sum (Staff)

### **CEE 102. Legal Aspects of Engineering and Construction**

Introduction to the U.S. legal system as it applies to civil engineering and construction. Fundamental concepts of contract and tort law, claims, risk management, business formation and licensing, agency, insurance and bonding, and real property. (London)

3 units, Win (London, M)

### **CEE 109. Creating a Green Student Workforce to Help Implement Stanford's Sustainability Vision**

(Same as EARTHSYS 109) Examination of program-based local actions that promote resource conservation and an educational environment for sustainability. Examination of building-level actions that contribute to conservation, lower utility costs, and generate understanding of sustainability consistent with Stanford's commitment to sustainability as a core value. Overview of operational sustainability including energy, water, buildings, waste, and food systems. Practical training to enable students to become sustainability coordinators for their dorms or academic units.

2 units, Win (Koseff, J; Ahmed, F)

### **CEE 110. Building Information Modeling**

(Same as CEE 210) (Graduate students register for 210.) Creation, management, and application of building information models. Process and tools available for creating 2D and 3D computer representations of building components and geometries. Organizing and operating on models to produce architectural views and construction documents, renderings and animations, and interface with analysis tools. Lab exercises, class projects. Limited enrollment.

2-4 units, Aut (Katz, G)

### **CEE 111. Multidisciplinary Modeling and Analysis**

(Same as CEE 211) (Graduate students register for 211.) Computer modeling, visualization, analysis, and graphical communication of building projects. Use of 3D models in laser scanning, rendering, animation, daylight, energy, cost, structural, lighting analysis, and computer controlled fabrication. Underlying 3D computer representations, and analysis tools and their applications. Guest lectures, lab exercises, class project. Prerequisite: 110 or CAD experience. GER:DB-EngrAppSci

4 units, Win (Kunz, J)

### **CEE 112A. Industry Applications of Virtual Design & Construction**

Building upon the concept of VDC Scorecard, CEE 112A/212A investigates in the management of Virtual Design and Construction (VDC) programs and projects in the building industry. Interacting with experts and professionals in real estate, architecture, engineering, construction and technology providers, students will learn from the industry applications of Building Information Modeling and its relationship with Integrated Project Delivery, Sustainable Design and Construction. Students will conduct case studies to evaluate the maturity of VDC planning, adoption, technology and performance in practice. Students taking 3 or 4 units will be paired up with independent research or case study projects on the industry applications of VDC. No prerequisite. See CEE112B/212B in the Winter Quarter and CEE 112C/212C in the Spring Quarter.

2-4 units, Aut (Kam, C)

### **CEE 112B. Industry Applications of Virtual Design & Construction**

(Same as CEE 212B) As a continuation of the Autumn-quarter course, CEE 112B/212B furthers the study of the VDC scorecard and investigates in the management of Virtual Design and Construction (VDC) programs and projects in the building industry. Students will be paired up with industry-based VDC projects with public owners and private developers, such as GSA Public Buildings Service, the Hong Kong Mass Transit Railway, Optima, Walt Disney Imagineering, Microsoft facilities and/or other CIFE International members. Independently, students will conduct case studies and/or develop VDC building information models (BIM) using off-the-shelf technologies for project analysis, collaboration, communication and optimization. Students will gain insights and develop skills that are essential for academic research,

internships or industry practice in VDC. Prerequisite: CEE 112A/212A, CEE 159C/259C, CEE 159D/259D, or Instructor's approval. See CEE 112C/212C in the Spring Quarter.

2-4 units, Win (Kam, C)

### **CEE 112C. Industry Applications of Virtual Design & Construction**

(Same as CEE 212C) Following the Autumn- and Winter-quarter course series, CEE 112C/212C is an industry-focused and project-based practicum that focuses on the industry applications of Virtual Design and Construction (VDC). Students will be paired up with industry-based VDC projects with public owners and private developers, such as GSA Public Buildings Service, the Hong Kong Mass Transit Railway, Optima, Walt Disney Imagineering, Microsoft facilities and/or other CIFE International members. Independently, students will conduct case studies and/or develop VDC and building information models (BIM) using off-the-shelf technologies for project analysis, collaboration, communication and optimization. Students will gain insights and develop skills that are essential for academic research, internships or industry practice in VDC. Prerequisite: CEE 112A/212A, CEE 112B/212B, CEE 159C/259C, CEE 159D/259D, or Instructor's Approval.

2-4 units, Spr (Kam, C)

### **CEE 115. Goals and Methods of Sustainable Building Projects**

(Same as CEE 215) (Graduate students register for 215.) Goals related to sustainable sites, water efficiency, energy and atmosphere, materials and resources, indoor environmental quality, and economic and social sustainability. Methods to integrate these goals and enhance the economic, ecological, and equitable value of building projects. Industry and academic rating systems, project case studies, guest lecturers, and group project.

3 units, not given this year

### **CEE 122A. Computer Integrated Architecture/Engineering/Construction (A/E/C)**

Undergraduates serve as apprentices to graduate students in the AEC global project teams in CEE 222A. Apprentices participate in all activities of the AEC team, including the goals, objectives, constraints, tasks, and process of a crossdisciplinary global AEC teamwork in the concept development phase of a comprehensive building project. Prerequisite: consent of instructor.

2 units, Win (Fruchter, R)

### **CEE 122B. Computer Integrated A/E/C**

Undergraduates serve as apprentices to graduate students in the AEC global project teams in CEE 222B. Project activity focuses on modeling, simulation, life-cycle cost, and cost benefit analysis in the project development phase. Prerequisite: CEE 122A.

2 units, Spr (Fruchter, R)

### **CEE 124. Sustainable Development Studio**

(Graduate students register for 224A.) Project-based. Sustainable design, development, use and evolution of buildings; connections of building systems to broader resource systems. Areas include architecture, structure, materials, energy, water, air, landscape, and food. Projects use a cradle-to-cradle approach focusing on technical and biological nutrient cycles and information and knowledge generation and organization. May be repeated for credit.

1-5 units, Aut (Staff), Win (Staff), Spr (Staff)

### **CEE 127E. Infrastructure, Disruptive Technologies and Entrepreneurship.**

(Same as CEE 227E) Silicon Valley provides a dynamic environment perfectly suited for developing the disruptive technologies that are changing the faces of today's mainstream infrastructure systems and essential service industries. This course will provide an overview of the most exciting technologies emerging from Silicon Valley right now and the potential that exists to disrupt mainstream transportation, electricity, intelligence gathering, and banking infrastructure systems that were dominant in the 20th Century. Guest speakers include prominent CEOs, visionaries, investors, and serial entrepreneurs who are building game changing companies.

1 unit, Win (Orr, R)

### **CEE 129. Climate Change Adaptation for Seaports: Engineering and Policy for a Sustainable Future**

(Same as CEE 229) Interdisciplinary. Exploration of impacts of



climate change on coastal ports and harbors around the world. The research team will utilize a broad range of tools to assess the engineering, construction, and policy responses necessary to protect ports and harbors from significant sea-level rise and storm surge. Collaborations with national and international experts. Consideration of economic, social and environmental implications. Independent and team projects will contribute to ongoing research. Guest speakers, case studies and field trips. [www.groupspaces.com/seaports2100](http://www.groupspaces.com/seaports2100). Recommended: CEE 129S/229S seminar series.

*3 units, Aut (Fischer, M; Becker, A; Schwegler, B), Win (Fischer, M; Schwegler, B; Becker, A), Spr (Fischer, M; Becker, A; Schwegler, B)*

**CEE 129S. Climate Change Adaptation in the Coastal Built Environment**

(Same as CEE 229S) How will climate change impact coastal ports and harbors around the world? Leading experts discuss the latest science, policy, and engineering research on this important issue, including the necessary response to protect ports and harbors from significant sea-level rise and storm surge. Focus is on the built environment. Guest speakers. CEE 229/129 for research option. See [www.groupspaces.com/seaports2100](http://www.groupspaces.com/seaports2100).

*1 unit, Aut (Staff), Win (Fischer, M; Becker, A), Spr (Staff)*

**CEE 130. Architectural Design: 3-D Modeling, Methodology, and Process**

Preference to Architectural Design majors; others by consent of instructor. Projects investigate conceptual approaches to the design of key architectural elements, such as wall and roof. Functional and structural considerations. Focus is on constructing 3-D models in a range of materials; 3-D computer modeling. Students keep a graphic account of the evolution of their design process. Final project entails design of a simple structure. Limited enrollment. Pre- or corequisite: CEE 31 or 31Q.

*4 units, Win (Walters, P)*

**CEE 131. Architectural Design Process**

Preference to Architectural Design and CEE majors; others by consent of instructor. Issues in the architectural profession including programming, site analysis, design process, and professional practice concerns. Building/landscape design case study project using architectural graphics and models. Limited enrollment.

*4 units, not given this year*

**CEE 131A. Professional Practice: Mixed-Use Design in an Urban Setting**

The delivery of a successful building design program involves unique collaboration between architect and client. This course will endeavor to teach the skills necessary for a designer to identify, evaluate, conceptualize and fully document a complex mixed-use urban design. Students will complete the course with a detailed knowledge of the consultants, engineers and other professionals needed for a complete program. Course deliverables will include three short assignments and a final project consisting of basic schematic drawings for the selected project. Guest presenters will cover topics of interest. Lectures, discussions, in-class studio-work and an oral presentation.

*3 units, Spr (Staff)*

**CEE 132. Interplay of Architecture and Engineering**

(Same as CEE 232) The range of requirements that drive a building's design including architecture, engineering, constructability, building codes, and budget. Case studies illustrate how structural and mechanical systems are integrated into building types including residential, office, commercial, and retail. In-class studio work.

*4 units, not given this year*

**CEE 133F. Principles of freehand Drawing**

By studying traditional drawing techniques, students learn the basic principles of academic drawing using charcoal as the primary medium. Value, proportion, modeling, edge and composition are introduced in lectures, demonstrations and drawing assignments. Emphasis is placed on still life and photographic references, allowing students to refine their rendering skills and develop their freehand drawing portfolio.

*1 unit, not given this year*

**CEE 134A. Site and Space**

Preference to Architectural Design and CEE majors; others by consent of instructor. An architectural design studio exploring the Stanford Green Dorm project. Initial sessions develop a working definition of sustainable design and strategies for greening the built environment in preparation for design studio work. Enrollment limited to 14. Prerequisites: 31 or 31Q, and 110 and 130.

*4 units, not given this year*

**CEE 134B. Intermediate Arch Studio**

This studio offers students experience in working with a real site and a real client program to develop a community facility. Students will develop site analysis, review a program for development and ultimately design their own solutions that meet client and community goals. Sustainability, historic preservation, community needs and materials will all play a part in the development of students final project. Students will also gain an understanding of graphic conventions, verbal and presentation techniques.

*4 units, Win (Wasney, C; Anderson, M)*

**CEE 135A. Parametrics: Applications in Architecture and Product Design**

(Same as CEE 235A) Precedents in architecture and product design; methods for modeling, prototyping, and fabrication. How to combine design intentions and digital logics with physical and material constraints. Students develop a case study and small design projects using a parametric approach at the scales of architecture and product.

*4 units, Win (Flager, F)*

**CEE 136. Green Architecture**

(Same as CEE 236) Preference to Architectural Design and CEE majors; others by consent of instructor. An architectural design studio exploring green design and green design processes. Initial sessions develop a working definition of sustainable design and strategies for greening the built environment in preparation for design studio work. Prerequisites: 31 or 31Q, and 110 and 130. Enrollment is limited to 14 (or possibly 16) students. Please do not enroll in the class until after attending the first class meeting. If the number of students interested in taking the class is greater than 14 (or possibly 16), space will be assigned based on requirements for graduation. GER:DB-EngrAppSci

*4 units, Win (Sperry, R)*

**CEE 137A. Form and Structure**

Preference to Architectural Design and CEE majors; others by consent of instructor. Intermediate architectural studio. The integration of structure, form, site, and program. Emphasis is on developing a schematic design in the context of site topography and structural systems. Limited enrollment. Prerequisites: 31 or 31Q, and 130.

*4 units, not given this year*

**CEE 137B. Advanced Architecture Studio**

This course will focus on the topic of interdisciplinary collaboration and its role in the development of design concepts. Specifically, the integration of structural with architectural considerations to produce a unified urban, spatial, tectonic and structural proposition will be our field of investigation. This course is an architecture studio course where class time will be spent primarily in individual or group desk critiques and pin-up sessions. Additionally, there will be lectures, case study presentations and a field trip. Prerequisites: required: CEE 31 (or 31Q) Drawing, CEE 110 BIM and CEE 130 Design.

*5 units, Spr (Sarkisian, M)*

**CEE 138A. Contemporary Architecture: Materials, Structures, and Innovations**

Structural and material bases for contemporary architecture; its roots in modern innovations. Recent technological developments; new materials and structural expressions. Sources include specific buildings and construction techniques. How to think critically about design strategies, material properties, and structural techniques.

*3 units, not given this year*

**CEE 139. Design Portfolio Methods**

Students present designs completed in other studio courses to communicate design intentions and other aspects of their work. Instruction in photography; preparation of a design portfolio; and short essays that characterize portfolio contents. Oral presentation



workshops offered through the Center for Teaching and Learning. Limited enrollment. Prerequisites: two Art or Architecture studio courses, or consent of instructor.

*2 units, Spr (Larimer, A)*

**CEE 140. Field Surveying Laboratory**

(Same as CEE 225) Graduate students register for 225. Friday afternoon laboratory provides practical surveying experience. Additional morning classes to prepare for the afternoon sessions. Hands-on operation of common traditional field survey tools ; introduction to the newest generation of digital measuring, positioning, and mapping tools. Emphasis is on the concept of using the data collected in the field as the basis for subsequent engineering and economic decisions.

*3 units, not given this year*

**CEE 141A. Infrastructure Project Development**

(Same as CEE 241A) Infrastructure is critical to the economy, global competitiveness and quality of life. Topics include energy, transportation, water, public facilities, and communications sectors. Analysis of the condition of the nation's infrastructure and how projects are planned and financed. Focus is on public works in the U.S. The role of public and private sectors through a step-by-step study of the project development process. Case studies of real infrastructure projects. Industry guest speakers. Student teams prepare project environmental impact statements.

*3 units, Aut (Griggs, G)*

**CEE 141B. Infrastructure Project Delivery**

(Same as CEE 241B) Infrastructure is critical to the economy, global competitiveness and quality of life. Topics include energy, transportation, water, public facilities, and communications sectors. Analysis of how projects are designed, constructed, operated, and maintained. Focus is on public works projects in the U.S. Alternative project delivery approaches and organizational strategies. Case studies of real infrastructure projects. Industry guest speakers. Student teams prepare finance/design/build/operate/maintain project proposals.

*3 units, Win (Griggs, G)*

**CEE 141C. Global Infrastructure Projects Seminar**

(Same as CEE 241C) Infrastructure is critical to the economy, global competitiveness, and quality of life. Course analyzes and compares the development and delivery of mega-projects around the world. Alternative project delivery methods, the role of public and private sector, different project management strategies, and lessons learned. Case studies of real infrastructure projects. Industry guest speakers. Field trips to local projects.

*1-2 units, Spr (Griggs, G)*

**CEE 142A. Negotiating Sustainable Development**

(Same as CEE 242A, EARTHSYS 142A, EARTHSYS 242A) How to be effective at achieving sustainability by learning the skills required to negotiate differences between stakeholders who advocate for their own interests. How ecological, social, and economic interests can be effectively balanced and managed. How to be effective actors in the sustainability movement, and use frameworks to solve complex, multiparty processes. Case study analysis of domestic and international issues. Students negotiate on behalf of different interest groups in a variety of arenas including energy, climate, land use, and the built environment. One Saturday all day field trip. No prerequisites.

*3 units, Win (Christensen, S)*

**CEE 147. Cases in Personality, Leadership, and Negotiation**

(Same as CEE 247) Case studies target personality issues, risk willingness, and life skills essential for real world success. Failures, successes, and risk willingness in individual and group tasks based on the professor's experience as small business owner and construction engineer. Required full afternoon field trips to local sites. Application downloaded from coursework must be submitted before first class; mandatory first class attendance. No auditors.

*3 units, not given this year*

**CEE 151. Negotiation**

(Same as CEE 251, EARTHSCI 251) Students learn to prepare for and conduct negotiations in a variety of arenas including getting a job, managing workplace conflict, negotiating transactions, and managing personal relationships. Interactive class. The internationally travelled instructor who has mediated cases in over

75 countries will require students to negotiate real life case studies and discuss their results in class. Application required before first day of class; see Coursework.

*3 units, Aut (Christensen, S), Spr (Christensen, S)*

**CEE 154. Cases in Estimating Costs**

(Same as CEE 254) Students participate in bidding contests requiring cost determination in competitive markets. Monetary forces driving the construction industry as general principles applicable to any competitive business. Cases based on field trips and professor's experience as small business owner and construction engineer. Required full afternoon field trips to local sites. Limited enrollment; no auditors. Prerequisites: consent or instructor and application downloaded from CourseWork prior to start of class. GER:DB-EngrAppSci

*3 units, not given this year*

**CEE 155. Introduction to Sensing Networks for CEE**

Introduce the design and implementation of sensor networks for monitoring the built and natural environment. Emphasis on the integration of modern sensor and communication technologies, signal processing and statistical models for network data analysis and interpretation to create practical deployments to enable sustainable systems, in areas such as energy, weather, transportation and buildings. Students will be involved in a practical project that may involve deploying a small sensor system, data models and analysis and signal processing. Limited enrollment.

*4 units, Win (Staff)*

**CEE 156. Building Systems**

(Same as CEE 256) HVAC, lighting, and envelope systems for commercial and institutional buildings, with a focus on energy efficient design. Knowledge and skills required in the development of low-energy buildings that provide high quality environment for occupants. GER:DB-EngrAppSci

*4 units, Spr (Kolderup, E)*

**CEE 160. Mechanics of Fluids Laboratory**

Lab experiments illustrate conservation principles and flows of real fluids, analysis of error and modeling of simple fluid systems. Corequisite: 101B. Prerequisite: CEE 101D or CME 102, or familiarity with Matlab.

*2 units, Spr (Monismith, S)*

**CEE 161A. Rivers, Streams, and Canals**

(Same as CEE 264A) Introduction to the movement of water through natural and engineered channels, streams, and rivers. Basic equations and theory (mass, momentum, and energy equations) for steady and unsteady descriptions of the flow. Application of theory to the design of flood- control and canal systems. Flow controls such as weirs and sluice gates; gradually varied flow; Saint-Venant equations and flood waves; and method of characteristics. Open channel flow laboratory experiments: controls such as weirs and gates, gradually varied flow, and waves. Limited enrollment in lab section. GER:DB-EngrAppSci

*3-4 units, Aut (Fong, D), Sum (Staff)*

**CEE 164. Introduction to Physical Oceanography**

(Same as CEE 262D, EESS 148) The dynamic basis of oceanography. Topics: physical environment; conservation equations for salt, heat, and momentum; geostrophic flows; wind-driven flows; the Gulf Stream; equatorial dynamics and ENSO; thermohaline circulation of the deep oceans; and tides. Prerequisite: PHYSICS 41 (formerly 53). GER: DB-NatSci

*4 units, Win (Fong, D)*

**CEE 165C. Water Resources Management**

(Same as CEE 265C) Focus is on the basic principles of surface and ground water resources management in the context of water scarcity and hydrologic uncertainty. Topics include reservoir, river basin, and aquifer management, conjunctive use of surface and ground water, wastewater reuse, and demand management. Considers technical, economic, social, and political elements of water management. Open to undergraduates (juniors and seniors) as CEE 165C.

*3 units, Sum (Staff)*

**CEE 166A. Watersheds and Wetlands**

(Same as CEE 266A) Introduction to the occurrence and movement of water in the natural environment and its role in creating and maintaining terrestrial, wetland, and aquatic habitat.

Hydrologic processes, including precipitation, evaporation, transpiration, snowmelt, infiltration, subsurface flow, runoff, and streamflow. Rivers and lakes, springs and swamps. Emphasis is on observation and measurement, data analysis, modeling, and prediction. Prerequisite: 101B or equivalent. (Freyberg) GER:DB-EngrAppSci

3 units, Aut (Freyberg, D)

#### CEE 166B. Floods and Droughts, Dams and Aqueducts

(Same as CEE 266B) Sociotechnical systems associated with human use of water as a resource and the hazards posed by too much or too little water. Potable and non-potable water use and conservation. Irrigation, hydroelectric power generation, rural and urban water supply systems, storm water management, flood damage mitigation, and water law and institutions. Emphasis is on engineering design. Prerequisite: 166A or equivalent. (Freyberg) GER:DB-EngrAppSci

3 units, Win (Freyberg, D)

#### CEE 166D. Water Resources and Water Hazards Field Trips

(Same as CEE 266D) Introduction to water use and water hazards via weekly field trips to local and regional water resources facilities (dams, reservoirs, fish ladders and hatcheries, pumping plants, aqueducts, hydropower plants, and irrigation systems) and flood damage mitigation facilities (storm water detention ponds, channel modifications, flood control dams, and reservoirs). Each trip preceded by an orientation lecture.

2 units, Win (Freyberg, D)

#### CEE 169. Environmental and Water Resources Engineering Design

Application of fluid mechanics, hydrology, water resources, environmental sciences, and engineering economy fundamentals to the design of a system addressing a complex problem of water in the natural and constructed environment. Problem changes each year, generally drawn from a challenge confronting the University or a local community. Student teams prepare proposals, progress reports, oral presentations, and a final design report. Prerequisite: senior in Civil Engineering or Environmental Engineering; 166B.

5 units, Spr (Freyberg, D)

#### CEE 171. Environmental Planning Methods

For juniors and seniors. Use of microeconomics and mathematical optimization theory in the design of environmental regulatory programs; tradeoffs between equity and efficiency in designing regulations; techniques for predicting adverse effects in environmental impact assessments; information disclosure requirements; and voluntary compliance of firms with international regulating norms. Prerequisites: MATH 51. Recommended: 70. GER:DB-EngrAppSci

3 units, Win (Ortolano, L)

#### CEE 171E. Environmental Challenges and Policies in Europe

(Same as CEE 271E) Current and future environmental challenges in Europe and related public policies in the European Union (EU). State of the European environment and human development, European environmental policy-making (multi-level ecological governance), global ecological role of the EU. Specific challenges include climate change adaptation, mitigation (carbon taxes, carbon market), climate change and European cities, biodiversity and ecosystems preservation (economics of biodiversity), energy management. Specific policies include environmental justice (environmental inequalities), human development and environmental sustainability indicators (beyond GDP) and absolute and relative decoupling (carbon intensity and resource productivity improvement). Open to undergraduates (freshmen, sophomores, juniors and seniors) as CEE 171E.

3 units, Sum (Staff)

#### CEE 172. Air Quality Management

Quantitative introduction to the engineering methods used to study and seek solutions to current air quality problems. Topics: global atmospheric changes, urban sources of air pollution, indoor air quality problems, design and efficiencies of pollution control devices, and engineering strategies for managing air quality. Prerequisites: 70, MATH 51. GER:DB-EngrAppSci

3 units, Win (Hildemann, L)

#### CEE 172A. Indoor Air Quality

(Same as CEE 278C) Factors affecting the levels of air pollutants in the built indoor environment. The influence of ventilation, office

equipment, floor coverings, furnishings, cleaning practices, and human activities on air quality including carbon dioxide, VOCs, resuspended dust, and airborne molds and fungi. Recommended: 172 or 278A.

2-3 units, Spr (Hildemann, L)

#### CEE 172S. Technology and business strategies to reduce greenhouse gas emissions

(Same as CEE 272S) This course will introduce the main concepts of greenhouse gas (GHG) emissions measurement and management, and it will explore the main mitigation options for reducing emissions or sequestering carbon dioxide. It will address technical aspects of GHG mitigation via energy efficiency and demand-side management, energy in high-technology industry, distributed power and co-generation, the role of renewable energy in GHG management, carbon sequestration in forestry, agriculture, and geological formations. The course explores policy options, carbon trading and business strategies for GHG mitigation.

1-3 units, Spr (Swisher, J)

#### CEE 173A. Energy Resources

(Same as CEE 207A, EARTHSYS 103) Comprehensive overview of fossil and renewable energy resources and energy efficiency. Topics covered for each resource: resource abundance, location, recovery, conversion, consumption, end-uses, environmental impacts, economics, policy, and technology. Applied lectures in specific energy sectors: buildings, transportation, the electricity industry, and energy in the developing world. Required field trips to local energy facilities. Optional discussion section for extra unit. GER:DB-EngrAppSci

3-5 units, Aut (Woodward, J; Knapp, K)

#### CEE 175A. California Coast: Science, Policy, and Law

(Same as CEE 275A, EARTHSYS 175, EARTHSYS 275) Same as LAW 514. Interdisciplinary. The legal, science, and policy dimensions of managing California's coastal resources. Coastal land use and marine resource decision making. The physics, chemistry, and biology of the coastal zone, tools for exploring data from the coastal ocean, and the institutional framework that shapes public and private decision making. Field work: how experts from different disciplines work to resolve coastal policy questions. Primarily for graduate students; upper-level undergraduates may enroll with permission of instructor. Students will be expected to participate in at least three mandatory field trips.

3-4 units, alternate years, not given this year

#### CEE 176A. Energy Efficient Buildings

Analysis and design. Thermal analysis of building envelope, heating and cooling requirements, HVAC, and building integrated PV systems. Emphasis is on residential passive solar design and solar water heating. Lab. GER:DB-EngrAppSci

3-4 units, Win (Masters, G)

#### CEE 176B. Electric Power: Renewables and Efficiency

Renewable and efficient electric power systems emphasizing analysis and sizing of photovoltaic arrays and wind turbines. Basic electric power generation, transmission and distribution, distributed generation, combined heat and power, fuel cells. End use demand, including lighting and motors. Lab. GER:DB-EngrAppSci

3-4 units, Spr (Masters, G)

#### CEE 176F. Energy Systems Field Trips: China Energy Systems

(Same as CEE 276F) Energy resources and policies in use and under development in China. 12-day field trip to China during Spring Break 2012. One unit for seminar and readings; one unit for field trip. Tuesday section is required for all students, Thursday section is also required for students attending the field trip. Prerequisite: consent of instructor for field trip.

1-2 units, Win (Knapp, K)

#### CEE 176S. Instrumental Analysis of Microconstituents in the Environment

(Same as CEE 276S) Current research, practice, and thinking in environmental engineering and science. Featuring presentations by invited faculty, researchers and professionals to share their insight and perspectives on environmental issues. Students will prepare brief summaries of seminar presentations and associated readings. For 2-unit option, students will also prepare and give a short presentation on a relevant environmental topic.

3 units, Sum (Staff)

**CEE 177. Aquatic Chemistry and Biology**

Introduction to chemical and biological processes in the aqueous environment. Basic aqueous equilibria; the structure, behavior, and fate of major classes of chemicals that dissolve in water; redox reactions; the biochemistry of aquatic microbial life; and biogeochemical processes that govern the fate of nutrients and metals in the environment and in engineered systems. Prerequisite: CHEM 31. GER:DB-EngrAppSci

4 units, Aut (Criddle, C)

**CEE 177P. Sustainability in Theory and Practice**

The multidimensional concept of sustainable development. Students evaluate engineered systems using tools such as cost-benefit analysis, trade-off analysis, and lifecycle analysis. How to make judgments about sustainable and unsustainable courses of action. Case studies dealing with contemporary environmental and economic challenges.

3 units, not given this year

**CEE 177S. Design for a Sustainable World**

(Same as CEE 277S) Technology-based problems faced by developing communities worldwide. Student groups partner with organizations abroad to work on concept, feasibility, design, implementation, and evaluation phases of various projects. Past projects include a water and health initiative, a green school design, seismic safety, and medical device. Admission based on written application and interview. See <http://esw.stanford.edu> for application. (Staff)

1-5 units, Spr (Tsoufakis, C)

**CEE 177X. Current Topics in Sustainable Engineering**

(Same as CEE 277X) Weekly seminar course run by Engineers for Sustainable World (ESW) student group in conjunction with faculty advisors. Speakers come in weekly to orient students to the science and engineering that is the foundation for current ESW projects. Instructor consent required.

1 unit, not given this year

**CEE 178. Introduction to Human Exposure Analysis**

(Same as CEE 276) (Graduate students register for 276.) Scientific and engineering issues involved in quantifying human exposure to toxic chemicals in the environment. Pollutant behavior, inhalation exposure, dermal exposure, and assessment tools. Overview of the complexities, uncertainties, and physical, chemical, and biological issues relevant to risk assessment. Lab projects. Recommended: MATH 51. Apply at first class for admission. GER:DB-EngrAppSci

3 units, Spr (Kopperud, R), Sum (Staff)

**CEE 179A. Water Chemistry Laboratory**

(Same as CEE 273A) (Graduate students register for 273A.) Laboratory application of techniques for the analysis of natural and contaminated waters, emphasizing instrumental techniques.

3 units, Win (Robertson, A)

**CEE 179C. Environmental Engineering Design**

Application of engineering fundamentals including environmental engineering, hydrology, and engineering economy to a design problem. Enrollment limited; preference to seniors in Civil and Environmental Engineering.

5 units, Spr (Robertson, A; Leckie, J)

**CEE 179S. Environmental Engineering Seminar**

(Same as CEE 279S) Current research, practice, and thinking in environmental engineering and science. Special summer edition features presentations by invited speakers and enrolled students. Students will prepare and give two short presentations, and will be provided feedback on presentation skills. For 2-unit option, students will write seminar summaries of presentations by two invited speakers.

1-2 units, Sum (Staff)

**CEE 180. Structural Analysis**

Analysis of beams, trusses, frames; method of indeterminate analysis by consistent displacement, least work, superposition equations, moment distribution. Introduction to matrix methods and computer methods of structural analysis. Prerequisite: 101A and ENGR 14. GER:DB-EngrAppSci

4 units, Aut (Kiremidjian, A)

**CEE 181. Design of Steel Structures**

Concepts of the design of steel structures with a load and

resistance factor design (LRFD) approach; types of loading; structural systems; design of tension members, compression members, beams, beam-columns, and connections; and design of trusses and frames. Prerequisite: 180. GER:DB-EngrAppSci

4 units, Aut (Law, K)

**CEE 182. Design of Reinforced Concrete Structures**

Properties of concrete and reinforcing steel; behavior of structural elements subject to bending moments, shear forces, torsion, axial loads, and combined actions; design of beams, slabs, columns and footings; strength design and serviceability requirements; design of simple structural systems for buildings. Prerequisite: 180. GER:DB-EngrAppSci

3-4 units, Win (Lepech, M)

**CEE 183. Integrated Civil Engineering Design Project**

Studio format. Design concepts for civil engineering facilities from schematic design through construction, taking into account sustainable engineering issues. Design exercises culminating in the design of a civil engineering facility, emphasizing structural systems and materials and integration with construction and other project requirements. Prerequisites: CEE 180, 181, 182; civil engineering major; architectural design major with instructor consent.

4 units, Spr (Deierlein, G)

**CEE 195. Fundamentals of Structural Geology**

(Same as GES 111) Techniques for mapping using GPS and differential geometry to characterize structures; dimensional analysis and scaling relations; kinematics of deformation and flow; measurement and analysis of stress; elastic deformation and properties of rock; brittle deformation including fracture and faulting; linear viscous flow including folding and magma dynamics; model development and methodology. Models of tectonic processes are constructed and solutions visualized using MATLAB. Prerequisites: GES 1, MATH 51, 52

3 units, Win (Pollard, D)

**CEE 196. Engineering Geology and Global Change**

(Same as GES 115) The application of geology and global change to the planning, design, and operation of engineering projects. Case histories taught in a seminar setting and field trips emphasize the impact of geology and global change on both individual engineering works and the built environment by considering Quaternary history and tectonics, anthropogenic sea level rise, active geologic processes, engineering properties of geologic deposits, site exploration, and professional ethics. Prerequisite: GES 1 or consent of instructor. GER: DB-NatSci

3 units, Spr (Holzer, T)

**CEE 198. Directed Reading or Special Studies in Civil Engineering**

Written report or oral presentation required. Students must obtain a faculty sponsor.

1-4 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**CEE 199. Undergraduate Research in Civil and Environmental Engineering**

Written report or oral presentation required. Students must obtain a faculty sponsor.

1-4 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**CEE 199A. Special Projects in Architecture**

Faculty-directed study or internship. May be repeated for credit. Prerequisite: consent of instructor.

1-4 units, Aut (Staff), Win (Staff), Spr (Staff)

**CEE 199B. Directed Studies in Architecture**

Projects may include studio-mentoring activities, directed reading and writing on topics in the history and theory of architectural design, or investigations into design methodologies.

1-4 units, Aut (Staff), Win (Katz, G), Spr (Staff)

**CEE 199H. Undergraduate Honors Thesis**

For students who have declared the Civil Engineering B.S. honors major and have obtained approval of a topic for research under the guidance of a CEE faculty adviser. Letter grade only. Written thesis or oral presentation required. (Staff)

2-3 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

## GRADUATE COURSES IN CIVIL AND ENVIRONMENTAL ENGINEERING

Primarily for graduate students; undergraduates may enroll with consent of instructor.

### CEE 200A. Teaching of Civil and Environmental Engineering

Required of CEE Ph.D. students. Strategies for effective teaching and introduction to engineering pedagogy. Topics: problem solving techniques and learning styles, individual and group instruction, the role of TAs, balancing other demands, grading. Teaching exercises. Register for quarter of teaching assistantship. 200A. Aut, 200B. Win, 200C. Spr

*1 unit, Aut (Tucker, A)*

### CEE 200B. Teaching of Civil and Environmental Engineering

Required of CEE Ph.D. students. Strategies for effective teaching and introduction to engineering pedagogy. Topics: problem solving techniques and learning styles, individual and group instruction, the role of TAs, balancing other demands, grading. Teaching exercises. Register for quarter of teaching assistantship. May be repeated for credit. 200A. Aut, 200B. Win, 200C. Spr

*1 unit, Win (Chui, T)*

### CEE 200C. Teaching of Civil and Environmental Engineering

Required of CEE Ph.D. students. Strategies for effective teaching and introduction to engineering pedagogy. Topics: problem solving techniques and learning styles, individual and group instruction, the role of TAs, balancing other demands, grading. Teaching exercises. Register for quarter of teaching assistantship. May be repeated for credit. 200A. Aut, 200B. Win, 200C. Spr

*1 unit, Spr (Chui, T)*

### CEE 201D. Computations in Civil and Environmental Engineering

(Same as CEE 101D) Computational and visualization methods in the design and analysis of civil and environmental engineering systems. Focus is on applications of MATLAB. How to develop a more lucid and better organized programming style.

*3 units, Aut (Kitanidis, P), Sum (Staff)*

### CEE 202. Construction Claims Analysis and Resolution

Concepts include cost overrun and schedule delay analysis, contracts and other legal topics, and resolution of construction disputes. Introduction to construction law. Requires attendance of the first five weeks of CEE 102 for basic legal background.

*3-4 units, Win (Groves, R; Tucker, A; London, M)*

### CEE 203. Probabilistic Models in Civil Engineering

Introduction to probability modeling and statistical analysis in civil engineering. Emphasis is on the practical issues of model selection, interpretation, and calibration. Application of common probability models used in civil engineering including Poisson processes and extreme value distributions. Parameter estimation. Linear regression.

*3-4 units, Aut (Shahi, S)*

### CEE 204. Structural Reliability

Procedures for evaluating the safety of structural components and systems. First- and second-order estimates of failure probabilities of engineered systems. Sensitivity of failure probabilities to assumed parameter values. Measures of the relative importance of random variables. Reliability of systems with multiple failure modes. Reliability updating. Simulation methods and variance reduction techniques. Prerequisite: 203 or equivalent.

*3-4 units, Spr (Baker, J)*

### CEE 205A. Structural Materials Testing and Simulation

Hands-on laboratory experience with fabrication, computer simulation, and experimental testing of material and small-scale structural components. Comparison of innovative and traditional structural materials. Behavior and application of high-performance fiber reinforced concrete materials for new design, fiber-reinforced polymeric materials for structural retrofits and introduction to sustainable, bio-based composites. Prerequisites: basic course in reinforced concrete design CEE 182 or equivalent.

*3-4 units, Spr (Staff)*

### CEE 205B. Advanced Topics in Structural Concrete

Concepts and application of strut and tie modeling including deep beams, design for torsion resistance, beam-column joints, bridge components, and post-tensioned anchor zones. Course project

integrating computer simulation and physical experimentation of a structural concrete component. Prerequisites: CEE 285A or equivalent.

*3 units, NEXTYEAR*

### CEE 206. Decision Analysis for Civil and Environmental Engineers

Current challenges in selecting an appropriate site, alternate design, or retrofit strategy based on environmental, economic, and social factors can be best addressed through applications of decision science. Basics of decision theory, including development of decision trees with discrete and continuous random variables, expected value decision making, utility theory value of information, and elementary multi-attribute decision making will be covered in the class. Examples will cover many areas of civil and environmental engineering problems. Prerequisite: CEE 203 or equivalent.

*3 units, Spr (Kiremidjian, A)*

### CEE 206A. Decision Models in Civil Engineering

For advanced graduate students in CEE. Applications of decision science to address current challenges in selecting an appropriate site and appropriate design or retrofit strategy based on environmental, economic, and social factors. Examples from everyday civil and environmental engineering problems. Prerequisite: CEE 203 or equivalent.

*2 units, not given this year*

### CEE 207A. Energy Resources

(Same as CEE 173A, EARTHSYS 103) Comprehensive overview of fossil and renewable energy resources and energy efficiency. Topics covered for each resource: resource abundance, location, recovery, conversion, consumption, end-uses, environmental impacts, economics, policy, and technology. Applied lectures in specific energy sectors: buildings, transportation, the electricity industry, and energy in the developing world. Required field trips to local energy facilities. Optional discussion section for extra unit.

*3-5 units, Aut (Woodward, J; Knapp, K)*

### CEE 208. Structural Health Monitoring Using Statistical Methods

Structural health monitoring systems, which enables us to automatically diagnose structural damage, are important to ensure safe and functional built environment. This course provides theoretical background on damage diagnosis algorithms using model-based and signal-based methods for civil structures with an emphasis on the underlying physical interpretations and their practical usage.

*2 units, Aut (Noh, H)*

### CEE 210. Building Information Modeling

(Same as CEE 110) (Graduate students register for 210.) Creation, management, and application of building information models. Process and tools available for creating 2D and 3D computer representations of building components and geometries. Organizing and operating on models to produce architectural views and construction documents, renderings and animations, and interface with analysis tools. Lab exercises, class projects. Limited enrollment.

*2-4 units, Aut (Katz, G)*

### CEE 211. Multidisciplinary Modeling and Analysis

(Same as CEE 111) (Graduate students register for 211.) Computer modeling, visualization, analysis, and graphical communication of building projects. Use of 3D models in laser scanning, rendering, animation, daylight, energy, cost, structural, lighting analysis, and computer controlled fabrication. Underlying 3D computer representations, and analysis tools and their applications. Guest lectures, lab exercises, class project. Prerequisite: 110 or CAD experience.

*4 units, Win (Kunz, J)*

### CEE 212A. Industry Applications of Virtual Design & Construction

Building upon the concept of the VDC Scorecard, CEE 112A/212A investigates in the management of Virtual Design and Construction (VDC) programs and projects in the building industry. Interacting with experts and professionals in real estate, architecture, engineering, construction and technology providers, students will learn from the industry applications of Building Information Modeling and its relationship with Integrated Project

Delivery, Sustainable Design and Construction, and Virtual Design and Construction. Students will conduct case studies to evaluate the maturity of VDC planning, adoption, technology and performance in practice. Students taking 3 or 4 units will be paired up with independent research or case study projects on the industry applications of VDC. No prerequisite. See CEE 112B/212B in the Winter Quarter and CEE 112C/212C in the Spring Quarter.

*2-4 units, Aut (Kam, C)*

### **CEE 212B. Industry Applications of Virtual Design & Construction**

(Same as CEE 112B) As a continuation of the Autumn-quarter course, CEE 112B/212B furthers the study of the VDC scorecard and investigates in the management of Virtual Design and Construction (VDC) programs and projects in the building industry. Students will be paired up with industry-based VDC projects with public owners and private developers, such as GSA Public Buildings Service, the Hong Kong Mass Transit Railway, Optima, Walt Disney Imagineering, Microsoft facilities and/or other CIFE International members. Independently, students will conduct case studies and/or develop VDC building information models (BIM) using off-the-shelf technologies for project analysis, collaboration, communication and optimization. Students will gain insights and develop skills that are essential for academic research, internships or industry practice in VDC. Prerequisite: CEE 112A/212A, CEE 159C/259C, CEE 159D/259D, or Instructor's approval. See CEE 112C/212C in the Spring Quarter.

*2-4 units, Win (Kam, C)*

### **CEE 212C. Industry Applications of Virtual Design & Construction**

(Same as CEE 112C) Following the Autumn- and Winter-quarter course series, CEE 112C/212C is an industry-focused and project-based practicum that focuses on the industry applications of Virtual Design and Construction (VDC). Students will be paired up with industry-based VDC projects with public owners and private developers, such as GSA Public Buildings Service, the Hong Kong Mass Transit Railway, Optima, Walt Disney Imagineering, Microsoft facilities and/or other CIFE International members. Independently, students will conduct case studies and/or develop VDC and building information models (BIM) using off-the-shelf technologies for project analysis, collaboration, communication and optimization. Students will gain insights and develop skills that are essential for academic research, internships or industry practice in VDC. Prerequisite: CEE 112A/212A, CEE 112B/212B, CEE 159C/259C, CEE 159D/259D, or Instructor's Approval.

*2-4 units, Spr (Kam, C)*

### **CEE 214. Introduction to Modeling and Analysis in CEE**

Introduces students to modeling of products, processes and organizations in the AEC industry. Modeling and analysis purposes include support of technical, social, psychological and ethical decision making for different stakeholders. Different purposes and levels of detail for different models. CEM/DCI integrated approach to building using physical, mathematical, graphical and computer models of products, organizations and processes.

*3 units, not given this year*

### **CEE 215. Goals and Methods of Sustainable Building Projects**

(Same as CEE 115) (Graduate students register for 215.) Goals related to sustainable sites, water efficiency, energy and atmosphere, materials and resources, indoor environmental quality, and economic and social sustainability. Methods to integrate these goals and enhance the economic, ecological, and equitable value of building projects. Industry and academic rating systems, project case studies, guest lecturers, and group project.

*3 units, not given this year*

### **CEE 217. Renewable Energy Infrastructure**

coming later

*3 units, Win (Fischer, M)*

### **CEE 222A. Computer Integrated**

#### **Architecture/Engineering/Construction (AEC) Global Teamwork**

AEC students engage in a crossdisciplinary, collaborative, geographically distributed, and multicultural project-based teamwork. AEC teams exercise their domain knowledge and

information technologies in a multidisciplinary context focusing on the design and construction concept development phase of a comprehensive building project. Prerequisite: interview with Instructor in Autumn Quarter.

*3 units, Win (Fruchter, R)*

### **CEE 222B. Computer Integrated**

#### **Architecture/Engineering/Construction (AEC) Global Teamwork**

Global AEC student teams continue their project activity focusing on the most challenging concept developed in 222A and chosen jointly with their client. Comprehensive team project focusing on design and construction, including: project development and documentation; detailing, 3D and 4D modeling, simulation, sustainable concepts, cost benefit analysis, and life-cycle cost analysis; and final project presentation of product and process. Prerequisite: CEE 222A.

*2 units, Spr (Fruchter, R)*

### **CEE 224A. Sustainable Development Studio**

(Undergraduates, see 124.) Project-based. Sustainable design, development, use and evolution of buildings; connections of building systems to broader resource systems. Areas include architecture, structure, materials, energy, water, air, landscape, and food. Projects use a cradle-to-cradle approach focusing on technical and biological nutrient cycles and information and knowledge generation and organization. May be repeated for credit.

*1-5 units, Aut (Staff), Win (Staff), Spr (Debbas, C; Katz, G), Sum (Staff)*

### **CEE 225. Field Surveying Laboratory**

(Same as CEE 140) Graduate students register for 225. Friday afternoon laboratory provides practical surveying experience. Additional morning classes to prepare for the afternoon sessions. Hands-on operation of common traditional field survey tools ; introduction to the newest generation of digital measuring, positioning, and mapping tools. Emphasis is on the concept of using the data collected in the field as the basis for subsequent engineering and economic decisions.

*3 units, not given this year*

### **CEE 226. Life Cycle Assessment for Complex Systems**

Life cycle modeling of products, industrial processes, and infrastructure/building systems; material and energy balances for large interdependent systems; environmental accounting; and life cycle costing. These methods, based on ISO 14000 standards, are used to examine emerging technologies, such as biobased products, building materials, building integrated photovoltaics, and alternative design strategies, such as remanufacturing, dematerialization, LEED, and Design for Environment: DfE. Student teams complete a life cycle assessment of a product or system chosen from industry.

*3-4 units, Aut (Lepech, M)*

### **CEE 226E. Advanced Topics in Integrated, Energy-Efficient Building Design**

Innovative methods and systems for the integrated design and evaluation of energy efficient buildings. Guest practitioners and researchers in energy efficient buildings. Student initiated final project.

*2 units, Spr (Rumsey, P)*

### **CEE 227. Global Project Finance**

Public and private sources of finance for large, complex, capital-intensive projects in developed and developing countries. Benefits and disadvantages, major participants, risk sharing, and challenges of project finance in emerging markets. Financial, economic, political, cultural, and technological elements that affect project structures, processes, and outcomes. Case studies. Limited enrollment.

*3-5 units, Win (Orr, R)*

### **CEE 227E. Infrastructure, Disruptive Technologies and Entrepreneurship.**

(Same as CEE 127E) Silicon Valley provides a dynamic environment perfectly suited for developing the disruptive technologies that are changing the faces of today's mainstream infrastructure systems and essential service industries. This course will provide an overview of the most exciting technologies emerging from Silicon Valley right now and the potential that

exists to disrupt mainstream transportation, electricity, intelligence gathering, and banking infrastructure systems that were dominant in the 20th Century. Guest speakers include prominent CEOs, visionaries, investors, and serial entrepreneurs who are building game changing companies.

1 unit, *Win (Orr, R)*

#### **CEE 228. Innovative Global Construction Technology**

(Formerly 245T.) Five-week class. How innovative companies invent new construction processes based on relative local labor, and materials and equipment cost, availability, and capabilities, and developed from experience and knowledge of construction technology in bridge, tunnel, and high-rise building. The process of generating new ideas. Industry guest speakers address the link between product/process innovation and construction technology.

2 units, *Win (Staff)*

#### **CEE 228C. Design and Construction for Sustainability in Extreme Environments**

Course focuses on multi-disciplinary conceptual design of self-sustaining facilities in remote, extreme environments. Through this learn-by-doing course, students will apply an integrated sustainable design methodology for facility planning and operations. Research into environmental design criteria, opportunities, and constraints to logically guide facility form, shape, systems, and operational requirements. Additional independent study unit available for participation in process experiment. Guest lectures, discussion section, class project. Graduate only.

2 units, *Spr (Buckley, R)*

#### **CEE 229. Climate Change Adaptation for Seaports: Engineering and Policy for a Sustainable Future**

(Same as CEE 129) Interdisciplinary. Exploration of impacts of climate change on coastal ports and harbors around the world. The research team will utilize a broad range of tools to assess the engineering, construction, and policy responses necessary to protect ports and harbors from significant sea-level rise and storm surge. Collaborations with national and international experts. Consideration of economic, social and environmental implications. Independent and team projects will contribute to ongoing research. Guest speakers, case studies and field trips. [www.groupspaces.com/seaports2100](http://www.groupspaces.com/seaports2100). Recommended: CEE 129S/229S seminar series.

3 units, *Aut (Fischer, M; Becker, A; Schwegler, B), Win (Fischer, M; Schwegler, B; Becker, A), Spr (Fischer, M; Becker, A; Schwegler, B)*

#### **CEE 229S. Climate Change Adaptation in the Coastal Built Environment**

(Same as CEE 129S) How will climate change impact coastal ports and harbors around the world? Leading experts discuss the latest science, policy, and engineering research on this important issue, including the necessary response to protect ports and harbors from significant sea-level rise and storm surge. Focus is on the built environment. Guest speakers. CEE 229/129 for research option. See [www.groupspaces.com/seaports2100](http://www.groupspaces.com/seaports2100).

1 unit, *Aut (Staff), Win (Fischer, M; Becker, A), Spr (Staff)*

#### **CEE 232. Interplay of Architecture and Engineering**

(Same as CEE 132) The range of requirements that drive a building's design including architecture, engineering, constructability, building codes, and budget. Case studies illustrate how structural and mechanical systems are integrated into building types including residential, office, commercial, and retail. In-class studio work.

4 units, *not given this year*

#### **CEE 235A. Parametrics: Applications in Architecture and Product Design**

(Same as CEE 135A) Precedents in architecture and product design; methods for modeling, prototyping, and fabrication. How to combine design intentions and digital logics with physical and material constraints. Students develop a case study and small design projects using a parametric approach at the scales of architecture and product.

4 units, *Win (Flager, F)*

#### **CEE 236. Green Architecture**

(Same as CEE 136) Preference to Architectural Design and CEE majors; others by consent of instructor. An architectural design

studio exploring green design and green design processes. Initial sessions develop a working definition of sustainable design and strategies for greening the built environment in preparation for design studio work. Prerequisites: 31 or 31Q, and 110 and 130. Enrollment is limited to 14 (or possibly 16) students. Please do not enroll in the class until after attending the first class meeting. If the number of students interested in taking the class is greater than 14 (or possibly 16), space will be assigned based on requirements for graduation.

4 units, *Win (Sperry, R)*

#### **CEE 241. Managing Fabrication and Construction**

Methods to manage the physical production of construction projects; design, analysis, and optimization of the fabricate-assemble process including performance metrics. Project management techniques and production system design including: push versus pull methods; master scheduling and look-ahead scheduling; scope, cost, and schedule control; earned value analysis; critical path method; location-based scheduling; 4D modeling; workflow; trade coordination; methods to understand uncertainty and reduce process variability; and supply chain systems including made-to-stock, engineered-to-order, and made-to-order. Prerequisite: 100 or consent of instructor. Recommended corequisite: 240.

4 units, *Aut (Rischmoller Delgado, L)*

#### **CEE 241A. Infrastructure Project Development**

(Same as CEE 141A) Infrastructure is critical to the economy, global competitiveness and quality of life. Topics include energy, transportation, water, public facilities, and communications sectors. Analysis of the condition of the nation's infrastructure and how projects are planned and financed. Focus is on public works in the U.S. The role of public and private sectors through a step-by-step study of the project development process. Case studies of real infrastructure projects. Industry guest speakers. Student teams prepare project environmental impact statements.

3 units, *Aut (Griggs, G)*

#### **CEE 241B. Infrastructure Project Delivery**

(Same as CEE 141B) Infrastructure is critical to the economy, global competitiveness and quality of life. Topics include energy, transportation, water, public facilities, and communications sectors. Analysis of how projects are designed, constructed, operated, and maintained. Focus is on public works projects in the U.S. Alternative project delivery approaches and organizational strategies. Case studies of real infrastructure projects. Industry guest speakers. Student teams prepare finance/design/build/operate/maintain project proposals.

3 units, *Win (Griggs, G)*

#### **CEE 241C. Global Infrastructure Projects Seminar**

(Same as CEE 141C) Infrastructure is critical to the economy, global competitiveness, and quality of life. Course analyzes and compares the development and delivery of mega-projects around the world. Alternative project delivery methods, the role of public and private sector, different project management strategies, and lessons learned. Case studies of real infrastructure projects. Industry guest speakers. Field trips to local projects.

1-2 units, *Spr (Griggs, G)*

#### **CEE 242. Organization Design for Projects and Companies**

Introduction to organizational behavior and organizational design for construction projects and companies. Class incorporates readings, individual, small group and large group case study assignments. Students use computer simulation to design real-world project organizations.

3-4 units, *Win (Levitt, R)*

#### **CEE 242A. Negotiating Sustainable Development**

(Same as CEE 142A, EARTHSYS 142A, EARTHSYS 242A) How to be effective at achieving sustainability by learning the skills required to negotiate differences between stakeholders who advocate for their own interests. How ecological, social, and economic interests can be effectively balanced and managed. How to be effective actors in the sustainability movement, and use frameworks to solve complex, multiparty processes. Case study analysis of domestic and international issues. Students negotiate on behalf of different interest groups in a variety of arenas including energy, climate, land use, and the built environment. One Saturday all day field trip. No prerequisites.

3 units, Win (Christensen, S)

### CEE 243. Predicting and Measuring Building Energy Use

Energy modeling has entered commercial use and can help evaluate the impact of potential energy-saving interventions in commercial building design. Methods to create building information models to enable energy analysis, use energy analysis tools and interpret their results for commercial buildings, analyze measured building performance and relate prediction to measurement, and develop guidance for owners on how to use these methods in practice. May be repeated for credit. Prerequisites: Revit or Digital Project competence or CEE 210, CEE 211, or CEE 135 with equivalent experience. Recommended: energy modeling experience, CEE 176A, CEE 226E, or CEE 256.

2-3 units, Spr (Kunz, J)

### CEE 244. Fundamentals of Construction Accounting and Finance

Concepts of financial accounting and economics emphasizing the construction industry. Financial statements, accounting concepts, project accounting methods, and the nature of project costs. Case study of major construction contractor. Ownership structure, working capital, and the sources and uses of funds.

2 units, Aut (Tucker, A; Meyer, P)

### CEE 245A. Global Project Seminar

Issues related to large, complex, global development projects including infrastructure development, urban and rural development, and the development of new cities. Guest presentations by industry practitioners and academics, including: Sabeer Bhatia, founder of Hotmail and architect of NanoCity; Ian Bremmer, CEO of the Eurasia Group, and Greg Huger, managing director of AirliePartners. May be repeated for credit.

3 units, not given this year

### CEE 246. Entrepreneurship in Civil & Environmental Engineering

Developing and implementing successful strategies for all kinds of companies in the architecture-engineering-construction industry. Develop a strategy for, and play different management roles in, a simulated construction company. Develop business plans for a new company or new business activity within an existing company in this industry. Prerequisites: introductory engineering economy course such as E60 or CEE 246a; introductory accounting course such as CEE 244A, or MS&E 140 (on-line class available to meet prerequisites -- contact instructor)

3-4 units, Spr (Levitt, R)

### CEE 246A. Engineering Economy Primer

Satisfies the engineering economy prerequisite for 246 or 253. Application of engineering economy concepts and principles to the construction industry. Equivalence concept; interest formulas; value of money across time; present value, annual cash flow, internal rate of return and benefit-cost methods; retirement and replacement; depreciation; capital budgeting; and sensitivity and risk analysis.

2 units, Aut (Koen Cohen, N)

### CEE 246B. Real Estate Finance Seminar

Real estate principles and process. Financial modeling. Feasibility analysis. Sources and uses of funds. Cash flow projections. Profit and loss reports. Financing issues for different types of real estate projects. Redevelopment projects. Financing green projects and technologies. Current challenges in financial markets. Group project and presentation. Limited enrollment with priority to CEM, DCI, and SDC students not enrolled in CEE 248. Prerequisites: CEE 246A or equivalent, ENGR 60. Recommended: knowledge of spreadsheets.

1 unit, Spr (Koen Cohen, N)

### CEE 247. Cases in Personality, Leadership, and Negotiation

(Same as CEE 147) Case studies target personality issues, risk willingness, and life skills essential for real world success. Failures, successes, and risk willingness in individual and group tasks based on the professor's experience as small business owner and construction engineer. Required full afternoon field trips to local sites. Application downloaded from coursework must be submitted before first class; mandatory first class attendance. No auditors.

3 units, not given this year

### CEE 248. Real Estate Development

Critical activities and key participants. Topics: conceptual and feasibility studies, market perspectives, the public roles, steps for project approval, project finance, contracting and construction, property management, and sales. Group projects focus on actual developments now in the planning stage. Enrollment limited to 24; priority to graduate majors in the department's CEM and GSB programs. Prerequisites: 241, 244A or equivalent, ENGR 60.

3 units, Spr (Kroll, M)

### CEE 248G. Certifying Green Buildings

Open to all disciplines. Goal is prepare students for the United States Green Building Council's professional accreditation exam. Basic metrics for project certification via USGBC's LEED rating system. Recommended: familiarity with design and construction terminology.

1 unit, not given this year

### CEE 249. Labor and Industrial Relations: Negotiations, Strikes, and Dispute Resolution

Labor/management negotiations, content of a labor agreement, strikes, dispute resolution, contemporary issues affecting labor and management, and union versus open shop competitiveness in the marketplace. Case studies; presentations by union leaders, legal experts, and contractor principals. Simulated negotiation session with union officials and role play in an arbitration hearing.

2 units, Win (Walton, M)

### CEE 251. Negotiation

(Same as CEE 151, EARTHSCI 251) Students learn to prepare for and conduct negotiations in a variety of arenas including getting a job, managing workplace conflict, negotiating transactions, and managing personal relationships. Interactive class. The internationally travelled instructor who has mediated cases in over 75 countries will require students to negotiate real life case studies and discuss their results in class. Application required before first day of class; see Coursework.

3 units, Aut (Christensen, S), Spr (Christensen, S)

### CEE 252. Construction Methods for Concrete and Steel Structures

Providing technical support for concrete and steel construction operations on buildings or infrastructure projects. Concrete materials, construction properties of fresh concrete. Resources and operations for batching, transporting, placing, finishing, and curing concrete. Design, fabrication, and use of formwork. Special operations and formwork systems. Detailing, fabricating, erecting, and connecting structural steel. Lifting equipment and lift planning. Welding processes, operations, and quality control. Readings, exercises and course projects.

3 units, not given this year

### CEE 252P. Construction Engineering Practicum

Discussion and group exercises related to technical fundamentals, resources, and field construction operations for earthwork, concrete and steel construction. Introduces construction engineering and prepares students for courses related to CEM and SDC degrees. Required: advance queries related to reading, class sessions, group exercises, summary paper. Time: prior to start of Autumn quarter

1 unit, Aut (Tatum, C)

### CEE 253A. Earthwork Construction

Construction properties of soil. Technical fundamentals of operations and equipment for earthwork. Description of systems and machine forms for construction equipment. Application of modeling techniques in planning, selecting equipment, estimating production rates. Field trip to infrastructure contractor.

1 unit, not given this year

### CEE 254. Cases in Estimating Costs

(Same as CEE 154) Students participate in bidding contests requiring cost determination in competitive markets. Monetary forces driving the construction industry as general principles applicable to any competitive business. Cases based on field trips and professor's experience as small business owner and construction engineer. Required full afternoon field trips to local sites. Limited enrollment; no auditors. Prerequisites: consent or instructor and application downloaded from CourseWork prior to start of class.

3 units, not given this year



**CEE 256. Building Systems**

(Same as CEE 156) HVAC, lighting, and envelope systems for commercial and institutional buildings, with a focus on energy efficient design. Knowledge and skills required in the development of low-energy buildings that provide high quality environment for occupants.

4 units, Spr (Kolderup, E)

**CEE 257. Building Systems Practice**

Technical fundamentals, major components, connecting elements, field operations for active building systems: HVAC, electric power, water and waste, fire protection, control and instrumentation and vertical transportation. Integration, coordination and commissioning of systems. Field trip to HVAC specialty contractor.

1 unit, Spr (Tatum, C)

**CEE 258. Donald R. Watson Seminar in Construction Engineering and Management**

Panel discussions with speakers from various segments of industry and government who clarify career options. Students interact with panelists in group discussions at dinner after class.

1 unit, Aut (Kunz, J)

**CEE 258B. Donald R. Watson Seminar in Construction Engineering and Management**

Weekly seminars and field trips focusing on technical aspects of concrete and steel construction. Submission of abstract and paper required.

1 unit, not given this year

**CEE 259A. Construction Problems**

Group-selected problems in construction techniques, equipment, or management; preparation of oral and written reports. Guest specialists from the construction industry. See 299 for individual studies. Prerequisites: graduate standing in CEM program and consent of instructor.

1-3 units, Aut (Staff)

**CEE 259B. Construction Problems**

Group-selected problems in construction techniques, equipment, or management; preparation of oral and written reports. Guest specialists from the construction industry. See 299 for individual studies. Prerequisites: graduate standing in CEM program and consent of instructor.

1-3 units, Win (Staff)

**CEE 260A. Physical Hydrogeology**

(Same as EESS 220) (Formerly GES 230.) Theory of underground water occurrence and flow, analysis of field data and aquifer tests, geologic groundwater environments, solution of field problems, and groundwater modeling. Introduction to groundwater contaminant transport and unsaturated flow. Lab. Prerequisite: elementary calculus.

4 units, Aut (Gorelick, S)

**CEE 260B. Surface and Near-Surface Hydrologic Response**

(Same as GES 237) Quantitative review of process-based hydrology and geomorphology. Introduction to finite-difference and finite-element methods of numerical analysis. Topics: biometeorology, unsaturated and saturated subsurface fluid flow, overland and open channel flow, and physically-based simulation of coupled surface and near-surface hydrologic response. Links hydrogeology, soil physics, and surface water hydrology.

3 units, Aut (Loague, K)

**CEE 260C. Contaminant Hydrogeology**

(Same as EESS 221) (Formerly GES 231.) For earth scientists and engineers. Environmental and water resource problems involving contaminated groundwater. The processes affecting contaminant migration through porous media including interactions between dissolved substances and solid media. Conceptual and quantitative treatment of advective-dispersive transport with reacting solutes. Predictive models of contaminant behavior controlled by local equilibrium and kinetics. Modern methods of contaminant transport simulation and optimal aquifer remediation. Prerequisite: GES 230 or CEE 260A or equivalent.

4 units, Win (Gorelick, S)

**CEE 262A. Hydrodynamics**

The flow of incompressible viscous fluid; emphasis is on developing an understanding of fluid dynamics that can be applied

to environmental flows. Topics: kinematics of fluid flow; equations of mass and momentum conservation (including density variations); some exact solutions to the Navier-Stokes equations; appropriate analysis of fluid flows including Stokes flows, potential flows, and laminar boundary layers; and an introduction to the effects of rotation and stratification through scaling analysis of fluid flows. Prerequisites: 101B or consent of instructor; and some knowledge of vector calculus and differential equations.

3-4 units, Aut (Fringer, O)

**CEE 262B. Transport and Mixing in Surface Water Flows**

Application of fluid mechanics to problems of pollutant transport and mixing in the water environment. Mathematical models of advection, diffusion, and dispersion. Application of theory to problems of transport and mixing in rivers, estuaries, and lakes and reservoirs. Recommended: 262A and CME 102 (formerly ENGR 155A), or equivalents.

3-4 units, Win (Woodson, C)

**CEE 262C. Modeling Environmental Flows**

Introduction to numerical methods for modeling surface water flows in rivers, lakes, estuaries and the coastal ocean. Topics include stability and accuracy analysis, curvilinear and unstructured grids, implicit/explicit methods, transport and diffusion, shallow water equations, nonhydrostatic equations, Navier-Stokes solvers, turbulence modeling. Prerequisites: CEE262A, CME206, or consent of instructor, CME206 can be taking concurrently.

3 units, Spr (Fringer, O)

**CEE 262D. Introduction to Physical Oceanography**

(Same as CEE 164, EESS 148) The dynamic basis of oceanography. Topics: physical environment; conservation equations for salt, heat, and momentum; geostrophic flows; wind-driven flows; the Gulf Stream; equatorial dynamics and ENSO; thermohaline circulation of the deep oceans; and tides. Prerequisite: PHYSICS 41 (formerly 53).

4 units, Win (Fong, D)

**CEE 262E. Lakes and Reservoirs**

Physics and water quality dynamics in lakes and reservoirs. Implementation of physical and biogeochemical processes in 1-D models. Recommended: 262B.

2-3 units, not given this year

**CEE 262F. Ocean Waves**

The fluid mechanics of surface gravity waves in the ocean of relevance to engineers and oceanographers. Topics include irrotational waves, wave dispersion, wave spectra, effects of bathymetry (shoaling), mass transport, effects of viscosity, and mean currents driven by radiation stresses. Prerequisite: CEE 262A or a graduate class in fluid mechanics.

3 units, Spr (Staff)

**CEE 263A. Air Pollution Modeling**

The numerical modeling of urban, regional, and global air pollution focusing on gas chemistry and radiative transfer. Stratospheric, free-tropospheric, and urban chemistry. Methods for solving stiff systems of chemical ordinary differential, including the multistep implicit-explicit method, Gear's method with sparse-matrix techniques, and the family method. Numerical methods of solving radiative transfer, coagulation, condensation, and chemical equilibrium problems. Project involves developing a basic chemical ordinary differential equation solver. Prerequisite: CS 106A or equivalent.

3-4 units, Spr (Jacobson, M)

**CEE 263B. Numerical Weather Prediction**

Numerical weather prediction. Continuity equations for air and water vapor, the thermodynamic energy equation, and momentum equations derived for the atmosphere. Numerical methods of solving partial differential equations, including finite-difference, finite-element, semi-Lagrangian, and pseudospectral methods. Time-stepping schemes: the forward-Euler, backward-Euler, Crank-Nicolson, Heun, Matsuno, leapfrog, and Adams-Bashforth schemes. Boundary-layer turbulence parameterizations, soil moisture, and cloud modeling. Project developing a basic weather prediction model. Prerequisite: CS 106A or equivalent.

3-4 units, not given this year

**CEE 263C. Weather and Storms**

(Same as CEE 63) Daily and severe weather and global climate.



Topics: structure and composition of the atmosphere, fog and cloud formation, rainfall, local winds, wind energy, global circulation, jet streams, high and low pressure systems, inversions, el Niño, la Niña, atmosphere/ocean interactions, fronts, cyclones, thunderstorms, lightning, tornadoes, hurricanes, pollutant transport, global climate and atmospheric optics.

3 units, Aut (Ten Hoeve, J)

**CEE 263D. Air Pollution and Global Warming: History, Science, and Solutions**

(Same as CEE 64) Survey of urban- through global-scale air pollution and climate change and their renewable energy solutions. Topics: evolution of the Earth's atmosphere, history of discovery of chemicals in the air, gases and particles in urban smog, visibility, indoor air pollution, acid rain, stratospheric and Antarctic ozone loss, the historic climate record, causes and effects of global warming, impacts of energy systems on pollution and climate, renewable energy solutions to air pollution and global warming. UG Reqs: GER: DBNatSci

3 units, Win (Jacobson, M)

**CEE 264. Sediment Transport Modeling**

Mechanics of sediment transport in rivers, estuaries and coastal oceans, with an emphasis on development of models and application of three-dimensional software tools. Topics include bottom boundary layers in steady and wave-driven flows, bedform dynamics, suspended and bedload transport, cohesive sediments. Prerequisites: CEE262A or consent of instructor

3 units, Win (Fringer, O)

**CEE 264A. Rivers, Streams, and Canals**

(Same as CEE 161A) Introduction to the movement of water through natural and engineered channels, streams, and rivers. Basic equations and theory (mass, momentum, and energy equations) for steady and unsteady descriptions of the flow. Application of theory to the design of flood- control and canal systems. Flow controls such as weirs and sluice gates; gradually varied flow; Saint-Venant equations and flood waves; and method of characteristics. Open channel flow laboratory experiments: controls such as weirs and gates, gradually varied flow, and waves. Limited enrollment in lab section.

3-4 units, Aut (Fong, D), Sum (Staff)

**CEE 265A. Sustainable Water Resources Development**

Alternative criteria for judging the sustainability of projects. Application of criteria to evaluate sustainability of water resources projects in several countries. Case studies illustrate the role of political, social, economic, and environmental factors in decision making. Influence of international aid agencies and NGOs on water projects. Evaluation of benefit-cost analysis and environmental impact assessment as techniques for enhancing the sustainability of future projects. Limited enrollment. Prerequisite: graduate standing in Environmental and Water Studies, or consent of instructor.

3 units, Aut (Ortolano, L), Spr (Ortolano, L)

**CEE 265C. Water Resources Management**

(Same as CEE 165C) Focus is on the basic principles of surface and ground water resources management in the context of water scarcity and hydrologic uncertainty. Topics include reservoir, river basin, and aquifer management, conjunctive use of surface and ground water, wastewater reuse, and demand management. Considers technical, economic, social, and political elements of water management. Open to undergraduates (juniors and seniors) as CEE 165C.

3 units, Sum (Staff)

**CEE 265D. Water and Sanitation in Developing Countries**

Economic, social, political, and technical aspects of sustainable water supply and sanitation service provision in developing countries. Case studies from Asia, Africa, and Latin America. Service pricing, alternative institutional structures including privatization, and the role of consumer demand and community participation in the planning process. Environmental and public health considerations, and strategies for serving low-income households. Limited enrollment. Prerequisite: consent of instructor.

1-3 units, Win (Davis, J)

**CEE 266A. Watersheds and Wetlands**

(Same as CEE 166A) Introduction to the occurrence and

movement of water in the natural environment and its role in creating and maintaining terrestrial, wetland, and aquatic habitat. Hydrologic processes, including precipitation, evaporation, transpiration, snowmelt, infiltration, subsurface flow, runoff, and streamflow. Rivers and lakes, springs and swamps. Emphasis is on observation and measurement, data analysis, modeling, and prediction. Prerequisite: 101B or equivalent. (Freyberg)

3 units, Aut (Freyberg, D)

**CEE 266B. Floods and Droughts, Dams and Aqueducts**

(Same as CEE 166B) Sociotechnical systems associated with human use of water as a resource and the hazards posed by too much or too little water. Potable and non-potable water use and conservation. Irrigation, hydroelectric power generation, rural and urban water supply systems, storm water management, flood damage mitigation, and water law and institutions. Emphasis is on engineering design. Prerequisite: 166A or equivalent. (Freyberg)

3 units, Win (Freyberg, D)

**CEE 266C. Advanced Topics in Hydrology and Water Resources**

Graduate seminar. Focus is on one or more hydrologic processes or water resources systems. Topics vary based on student and instructor interest. Examples include freshwater wetland hydrology, watershed-scale hydrologic modeling, renaturalization of stream channels, reservoir sediment management, and dam removal. Enrollment limited. Prerequisites: 266A,B, or equivalents. Recommended: 260A or equivalent.

3 units, not given this year

**CEE 266D. Water Resources and Water Hazards Field Trips**

(Same as CEE 166D) Introduction to water use and water hazards via weekly field trips to local and regional water resources facilities (dams, reservoirs, fish ladders and hatcheries, pumping plants, aqueducts, hydropower plants, and irrigation systems) and flood damage mitigation facilities (storm water detention ponds, channel modifications, flood control dams, and reservoirs). Each trip preceded by an orientation lecture.

2 units, Win (Freyberg, D)

**CEE 268. Groundwater Flow**

Flow and mass transport in porous media. Applications of potential flow theory and numerical modeling methods to practical groundwater problems: flow to and from wells, rivers, lakes, drainage ditches; flow through and under dams; streamline tracing; capture zones of wells; and mixing schemes for in-situ remediation. Prerequisites: calculus and introductory fluid mechanics.

3-4 units, not given this year

**CEE 269. Environmental Fluid Mechanics and Hydrology Seminar**

Problems in all branches of water resources. Talks by visitors, faculty, and students. May be repeated two times for credit.

1 unit, Aut (Staff), Win (Staff), Spr (Kitanidis, P)

**CEE 270. Movement and Fate of Organic Contaminants in Waters**

Transport of chemical constituents in surface and groundwater including advection, dispersion, sorption, interphase mass transfer, and transformation; impacts on water quality. Emphasis is on physicochemical processes and the behavior of hazardous waste contaminants. Prerequisites: undergraduate chemistry and calculus. Recommended: 101B.

3 units, Aut (Luthy, R), Sum (Staff)

**CEE 271A. Physical and Chemical Treatment Processes**

Physical and chemical unit operations for water treatment, emphasizing process combinations for drinking water supply. Application of the principles of chemistry, rate processes, fluid dynamics, and process engineering to define and solve water treatment problems by flocculation, sedimentation, filtration, disinfection, oxidation, aeration, and adsorption. Investigative paper on water supply and treatment. Prerequisites: 101B, 270. Recommended: 273.

3 units, Win (Luthy, R)

**CEE 271B. Environmental Biotechnology**

Stoichiometry, kinetics, and thermodynamics of microbial processes for the transformation of environmental contaminants. Design of dispersed growth and biofilm-based processes. Applications include treatment of municipal and industrial waste

waters, detoxification of hazardous chemicals, and groundwater remediation. Prerequisites: 270; 177 or 274A or equivalents.

*4 units, Win (Criddle, C)*

**CEE 271D. Introduction to Wastewater Treatment Process Modeling**

The course will present a structured protocol for simulator application comprising project definition, data collection and reconciliation, model set-up, calibration and validation, and simulation and result interpretation. This course will include a series of guided simulation exercises evaluating resource consumption (e.g., electrical energy, natural gas, chemicals) and resource recovery (e.g., biogas, struvite, biosolids, recycled water) from a variety of treatment plant configurations. Coursework for all students will comprise guided simulation exercises begun in class. Students may elect to take the course for 2 units by completing a group project evaluating an assigned plant configuration and presenting the results before the class.

*2-3 units, Spr (Appleton, A; Ong, C)*

**CEE 271E. Environmental Challenges and Policies in Europe**

(Same as CEE 171E) Current and future environmental challenges in Europe and related public policies in the European Union (EU). State of the European environment and human development, European environmental policy-making (multi-level ecological governance), global ecological role of the EU. Specific challenges include climate change adaptation, mitigation (carbon taxes, carbon market), climate change and European cities, biodiversity and ecosystems preservation (economics of biodiversity), energy management. Specific policies include environmental justice (environmental inequalities), human development and environmental sustainability indicators (beyond GDP) and absolute and relative decoupling (carbon intensity and resource productivity improvement). Open to undergraduates (freshmen, sophomores, juniors and seniors) as CEE 171E.

*3 units, Sum (Staff)*

**CEE 271M. Transport Phenomena: Momentum, heat and mass transport**

(Same as CEE 371M) Heat, mass and momentum transfer theory from the viewpoint of basic transport equations. Steady and unsteady state; laminar and turbulent flow; boundary layer theory. Prerequisites: fluid mechanics, ordinary differential equations.

*3 units, Win (Staff)*

**CEE 272. Coastal Contaminants**

Coastal pollution and its effects on ecosystems and human health. The sources, fate, and transport of human pathogens and nutrients. Background on coastal ecosystems and coastal transport phenomena including tides, waves, and cross shelf transport. Introduction to time series analysis with MATLAB. Undergraduates require consent of instructor.

*3-4 units, Aut (de Sieres, N; Null, K)*

**CEE 272R. Modern Power Systems Engineering**

Focus is on Power Engineering from a systems point of view. Topics covered may include modeling of generation, transmission and distribution systems, load flow analysis, transient and steady-state stability analysis. Special emphasis given to modern market operations and dispatch, modeling intermittent controllable power sources, storage technologies, mechanisms for demand response, sensing the grid and the role of market mechanisms for deep integration. Course content may vary year to year.

*3 units, Spr (Rajagopal, R)*

**CEE 272S. Technology and business strategies to reduce greenhouse gas emissions**

(Same as CEE 172S) This course will introduce the main concepts of greenhouse gas (GHG) emissions measurement and management, and it will explore the main mitigation options for reducing emissions or sequestering carbon dioxide. It will address technical aspects of GHG mitigation via energy efficiency and demand-side management, energy in high-technology industry, distributed power and co-generation, the role of renewable energy in GHG management, carbon sequestration in forestry, agriculture, and geological formations. The course explores policy options, carbon trading and business strategies for GHG mitigation.

*1-3 units, Spr (Swisher, J)*

**CEE 272W. Wind Power project Development**

Introduction to wind power resource assessment and project

development. Topics include the dynamics of large-scale and small-scale wind systems, vertical scaling of winds in the boundary layer, measurement instruments used for resource assessments, wind turbine technology, and wind farm siting, planning and economics. Analysis methods of wind data, use of industry-standard software for optimizing turbine siting and project feasibility studies. Project work using existing resource assessment from local areas. Prerequisite: Math41/42 or equivalent. Limited enrollment.

*1 unit, not given this year*

**CEE 273. Aquatic Chemistry**

Chemical principles and their application to the analysis and solution of problems in aqueous geochemistry (temperatures near 25° C and atmospheric pressure). Emphasis is on natural water systems and the solution of specific chemical problems in water purification technology and water pollution control. Prerequisites: CHEM 31 and 33, or equivalents.

*3 units, Aut (Leckie, J)*

**CEE 273A. Water Chemistry Laboratory**

(Same as CEE 179A) (Graduate students register for 273A.) Laboratory application of techniques for the analysis of natural and contaminated waters, emphasizing instrumental techniques.

*3 units, Win (Robertson, A)*

**CEE 273C. Introduction to Membrane Technology for Water/Wastewater Treatment**

Membrane separation processes focusing on their use for water and wastewater purification. Topics will include membrane types and materials; transport across and rejection by membranes; membrane fouling, cleaning and degradation; and design and operation of membrane systems.

*1 unit, not given this year*

**CEE 273S. Chemical Transformation of Environmental Organic Compounds**

This course provides an introduction to the chemistry of organic compounds focusing on chemical transformation and the application of this knowledge to understand and predict the fate of environmentally relevant organic chemicals. The course will cover fundamental rules that govern chemical transformations of organic compounds and will familiarize students with the major physical/chemical factors influencing the kinetics of organic reactions in nature. Prerequisites: CEE 270

*3 units, not given this year*

**CEE 274A. Environmental Microbiology I**

(Same as CHEMENG 174, CHEMENG 274) Basics of microbiology and biochemistry. The biochemical and biophysical principles of biochemical reactions, energetics, and mechanisms of energy conservation. Diversity of microbial catabolism, flow of organic matter in nature: the carbon cycle, and biogeochemical cycles. Bacterial physiology, phylogeny, and the ecology of microbes in soil and marine sediments, bacterial adhesion, and biofilm formation. Microbes in the degradation of pollutants. Prerequisites: CHEM 33, 35, and BIOSCI 41, CHEMENG 181 (formerly 188), or equivalents.

*3 units, Aut (Spormann, A), Sum (Staff)*

**CEE 274B. Metabolic Biochemistry of Microorganisms**

(Same as CHEMENG 456) Microbial metabolism, biochemical and metabolic principles, unity and diversity of metabolic pathways, evolution of enzymes and metabolic pathways, microbial degradation of natural and anthropogenic organic compounds, predicting biodegradation, and metabolic origin of life.

*3 units, Win (Spormann, A)*

**CEE 274C. Microbial Ecology and Evolution**

(Same as CHEMENG 457) Structure/function relationship of microbial communities; metabolic and ecological basis of interactions in microbial communities; microbial ecology and population biology in natural and human host systems; and evolution of microbial life. Prerequisite: CEE 274A, CHEMENG 281 (formerly 288), or equivalent.

*3 units, not given this year*

**CEE 274D. Pathogens and Disinfection**

Introduction to epidemiology, major pathogens and infectious diseases, the immune system, movement and survival of pathogens in the environment, transfer of virulence and antibiotic resistance

genes, and pathogen control, with an emphasis on public health engineering measures (disinfection). Prerequisite: 274A.

*3 units, Spr (Criddle, C)*

#### **CEE 274E. Pathogens in the Environment**

Sources, fates, movement, and ecology of waterborne pathogens in the natural environment and disinfection systems; epidemiology and microbial risk assessment. No microbiology background required; undergraduates may enroll with consent of instructor.

*3 units, not given this year*

#### **CEE 274P. Environmental Health Microbiology Lab**

Microbiology skills including culture-, microscope-, and molecular-based detection techniques. Focus is on standard and EPA-approved methods to enumerate and isolate organisms used to assess risk of enteric illnesses, such as coliforms, enterococci, and coliphage, in drinking and recreational waters including lakes, streams, and coastal waters. Student project to assess the microbial water quality of a natural water. Limited enrollment; priority to CEE graduate students. An application form must be filed and approved before admission to the class.

*4 units, Spr (Boehm, A)*

#### **CEE 274S. Hopkins Microbiology Course**

(Same as BIO 274S, BIOHOPK 274, EESS 253S) (Formerly GES 274S.) Four-week, intensive. The interplay between molecular, physiological, ecological, evolutionary, and geochemical processes that constitute, cause, and maintain microbial diversity. How to isolate key microorganisms driving marine biological and geochemical diversity, interpret culture-independent molecular characterization of microbial species, and predict causes and consequences. Laboratory component: what constitutes physiological and metabolic microbial diversity; how evolutionary and ecological processes diversify individual cells into physiologically heterogeneous populations; and the principles of interactions between individuals, their population, and other biological entities in a dynamically changing microbial ecosystem. Prerequisites: CEE 274A,B, or equivalents.

*9-12 units, Sum (Staff)*

#### **CEE 275A. California Coast: Science, Policy, and Law**

(Same as CEE 175A, EARTHSYS 175, EARTHSYS 275) Same as LAW 514. Interdisciplinary. The legal, science, and policy dimensions of managing California's coastal resources. Coastal land use and marine resource decision making. The physics, chemistry, and biology of the coastal zone, tools for exploring data from the coastal ocean, and the institutional framework that shapes public and private decision making. Field work: how experts from different disciplines work to resolve coastal policy questions. Primarily for graduate students; upper-level undergraduates may enroll with permission of instructor. Students will be expected to participate in at least three mandatory field trips.

*3-4 units, alternate years, not given this year*

#### **CEE 275B. Process Design for Environmental Biotechnology**

Use of microbial bioreactors for degradation of contaminants and recovery of clean water, clean energy and/or green materials. Student teams design, operate, and analyze bioreactors and learn to write consulting style reports. Limited enrollment. Prerequisites: 271B

*3 units, not given this year*

#### **CEE 276. Introduction to Human Exposure Analysis**

(Same as CEE 178) (Graduate students register for 276.) Scientific and engineering issues involved in quantifying human exposure to toxic chemicals in the environment. Pollutant behavior, inhalation exposure, dermal exposure, and assessment tools. Overview of the complexities, uncertainties, and physical, chemical, and biological issues relevant to risk assessment. Lab projects. Recommended: MATH 51. Apply at first class for admission.

*3 units, Spr (Kopperud, R), Sum (Staff)*

#### **CEE 276E. Environmental Toxicants**

Chemicals in the environment that pose toxicity risk. Introduction to environmental toxicology principles for identifying and characterizing toxicants based on sources, properties, pathways, and toxic action. Past and present environmental toxicant issues.

*2-3 units, not given this year*

#### **CEE 276F. Energy Systems Field Trips: China Energy Systems**

(Same as CEE 176F) Energy resources and policies in use and under development in China. 12-day field trip to China during

Spring Break 2012. One unit for seminar and readings; one unit for field trip. Tuesday section is required for all students, Thursday section is also required for students attending the field trip. Prerequisite: consent of instructor for field trip.

*1-2 units, Win (Knapp, K)*

#### **CEE 276S. Instrumental Analysis of Microconstituents in the Environment**

(Same as CEE 176S) Current research, practice, and thinking in environmental engineering and science. Featuring presentations by invited faculty, researchers and professionals to share their insight and perspectives on environmental issues. Students will prepare brief summaries of seminar presentations and associated readings. For 2-unit option, students will also prepare and give a short presentation on a relevant environmental topic.

*3 units, Sum (Staff)*

#### **CEE 277A. Teaching Science Literacy for a Sustainable Society**

Teaching science to nontechnical audiences emphasizing technologies and science for the sustainable use of water. Guest lecturers. Learning styles, and the role of engineers and scientists in K-12 and media communication. Students develop teaching modules to be used in educational settings involving nontechnical audiences.

*2-4 units, not given this year*

#### **CEE 277C. Environmental Governance**

Interaction between private, public and civil sectors in decision making that effects environmental sustainability. Governance on global to local scales, US and international case studies. Theoretical concepts of environmental policy design and implementation: common property and collective action, social movements and locally unwanted land uses, sustainable cities, ecological modernization, shifts in corporate environmental norms, ISO 14001 and green supply chains, and global institutions for constraining carbon emissions. Limited enrollment.

*3 units, alternate years, not given this year*

#### **CEE 277D. Water, Health & Development in Africa**

Graduate seminar focused on emerging research in the areas of water supply, sanitation, hygiene and health in developing countries. Limited enrollment; instructor permission required.

*1 unit, Spr (Boehm, A; Davis, J)*

#### **CEE 277E. Advanced Field Methods in Water, Health and Development**

Field methods for assessing household stored water quality, hand contamination, behaviors, and knowledge related to water, sanitation and health. Limited enrollment. Instructor consent required.

*10-15 units, Aut (Staff), Win (Davis, J), Spr (Staff)*

#### **CEE 277K. Environmental Information Engineering**

The role of information technology (IT) in enabling mankind to understand its impact on the planet and balance that with improving the quality of life of a rapidly growing population. After surveying the field, the course will examine the specific impacts that IT may have, by reference to case studies from energy, transportation, water and urban design fields. While some specific information technologies will be examined, this will be from a business perspective - detailed technical knowledge of IT not required.

*2-3 units, Sum (Staff)*

#### **CEE 277S. Design for a Sustainable World**

(Same as CEE 177S) Technology-based problems faced by developing communities worldwide. Student groups partner with organizations abroad to work on concept, feasibility, design, implementation, and evaluation phases of various projects. Past projects include a water and health initiative, a green school design, seismic safety, and medical device. Admission based on written application and interview. See <http://esw.stanford.edu> for application. (Staff)

*1-5 units, Spr (Tsoufakis, C)*

#### **CEE 277X. Current Topics in Sustainable Engineering**

(Same as CEE 177X) Weekly seminar course run by Engineers for Sustainable World (ESW) student group in conjunction with faculty advisors. Speakers come in weekly to orient students to the science and engineering that is the foundation for current ESW projects. Instructor consent required.

*1 unit, not given this year*

**CEE 278A. Air Pollution Physics and Chemistry**

The sources and health effects of pollutants. The influence of meteorology on pollution: atmospheric energy balance, temperature profiles, stability classes, inversion layers, turbulence. Atmospheric diffusion equations, downwind dispersion of emissions from point and line sources. Tropospheric chemistry: mechanisms for ozone formation, photochemical reactions, radical chain mechanisms, heterogeneous chemical reactions. Prerequisites: MATH 51, CHEM 31, or equivalents. Recommended: 101B, 273 or CHEM 135, or equivalents.

*3 units, Aut (Hildemann, L)*

**CEE 278B. Atmospheric Aerosols**

The characterization of atmospheric particulate matter: size distributions, chemical composition, health effects. Atmospheric diffusion and transport of particles: removal by convection, impaction, gravitational settling. Effect of aerosols on visibility: light scattering and absorption, reduction of visual range. Mechanics influencing ambient size distributions: Brownian coagulation, laminar shear flow, homogeneous nucleation, heterogeneous condensation. Prerequisite: MATH 51, or equivalent. Recommended: 101B or equivalent.

*3 units, alternate years, not given this year*

**CEE 278C. Indoor Air Quality**

(Same as CEE 172A) Factors affecting the levels of air pollutants in the built indoor environment. The influence of ventilation, office equipment, floor coverings, furnishings, cleaning practices, and human activities on air quality including carbon dioxide, VOCs, resuspended dust, and airborne molds and fungi. Recommended: 172 or 278A.

*2-3 units, Spr (Hildemann, L)*

**CEE 279. Environmental Engineering Seminar**

Current research, practice, and thinking in environmental engineering and science. Attendance at seminars is self-directed, and may be accrued throughout the school year.

*1 unit, Aut (Hildemann, L), Win (Hildemann, L), Spr (Hildemann, L)*

**CEE 279S. Environmental Engineering Seminar**

(Same as CEE 179S) Current research, practice, and thinking in environmental engineering and science. Special summer edition features presentations by invited speakers and enrolled students. Students will prepare and give two short presentations, and will be provided feedback on presentation skills. For 2-unit option, students will write seminar summaries of presentations by two invited speakers.

*1-2 units, Sum (Staff)*

**CEE 280. Advanced Structural Analysis**

Theoretical development and computer implementation of direct stiffness method of structural analysis; virtual work principles; computation of element stiffness matrices and load vectors; direct assembly procedures; equation solution techniques. Analysis of two- and three-dimensional truss and frame structures, thermal loads, and substructuring and condensation techniques for large systems. Practical modeling techniques and programming assignments. Introduction to nonlinear analysis concepts. Prerequisites: elementary structural analysis and matrix algebra.

*3-4 units, Aut (Deierlein, G)*

**CEE 281. Mechanics and Finite Elements**

Fluid conduction and solid deformation; conservation laws: balance of mass and balance of momentum; generalized Darcy's law and Hooke's law in 3D; the use of tensors in mechanics; finite element formulation of boundary-value problems; variational equations and Galerkin approximations; basic shape functions, numerical integration, and assembly operations.

*3 units, Win (Borja, R)*

**CEE 282. Nonlinear Structural Analysis**

Introduction to methods of geometric and material nonlinear analysis, emphasizing modeling approaches for framed structures. Large-displacement analysis, concentrated and distributed plasticity models, and nonlinear solution methods. Applications to frame stability and performance-based seismic design. Assignments emphasize computer implementation and applications. Prerequisites: 280, 286 or equivalent.

*3-4 units, Win (Deierlein, G)*

**CEE 283. Structural Dynamics**

Vibrations and dynamic response of simple structures under time dependent loads; dynamic analysis of single and multiple degrees of freedom systems; support motion; response spectra.

*3-4 units, Win (Law, K)*

**CEE 284. Finite Element and Computational Methods in Structural Dynamics**

Computational methods for structural dynamics analysis of discrete and continuous systems in free and forced vibration; finite element formulation; modal analysis; numerical methods; introduction to nonlinear dynamics; advanced topics. Prerequisites: 280, 283.

*3-4 units, Spr (Law, K)*

**CEE 285. Behavior of Structural Systems for Buildings**

Basic design concepts, performance criteria, loading, methods of design, types of structural systems, behavior under gravity and lateral loads, approximate methods of analysis, preliminary conceptual design, performance assessment, behavior of structural elements. Prerequisites: basic courses in design of steel and reinforced concrete structures.

*3-4 units, not given this year*

**CEE 285A. Advanced Structural Concrete Behavior and Design**

Behavior and design of reinforced and prestressed concrete for building and bridge design. Emphasis on flexural behavior, prestressed concrete design, slender columns, and two-way slab design & analysis.

*3-4 units, Aut (Billington, S)*

**CEE 285B. Advanced Structural Steel Behavior and Design**

Advanced topics in structural steel design. Topics include composite floor systems; bolted and welded connections; beam-column connections; innovative lateral load resisting systems. As part of this course students design a 15-story steel building. Prerequisite: basic course in structural steel design CEE181 or equivalent.

*3-4 units, Aut (Miranda, E)*

**CEE 286. Behavior and Design of Structural Systems**

Basic design concepts, performance criteria, loading, methods of design, behavior of various types of structural systems under gravity and lateral loads, approximate methods of analysis, preliminary conceptual design of structural elements. Prerequisites: CEE 280. Recommended: CEE 285A and/or CEE 285B.

*3-4 units, Win (Miranda, E)*

**CEE 287. Earthquake Resistant Design and Construction**

Evaluation, design, and construction of structures in seismic regions. Factors influencing earthquake ground motions, design spectra, design of linear and nonlinear single- and multiple-degree-of-freedom-system structures, force-based and displacement-based design methods, capacity design, detailing and construction of steel and reinforced concrete structures, introduction to performance-based design, seismic isolation, and energy dissipation. Prerequisites: 283, 285. Recommended: 282, 288.

*3-4 units, Spr (Miranda, E)*

**CEE 288. Earthquake Hazard and Risk Analysis**

Earthquake phenomena, faulting, ground motion, earthquake hazard formulation, effects of earthquakes on manmade structures, response spectra, Fourier spectra, soil effects on ground motion and structural damage, methods for structural damage evaluation, and formulation of the performance-based earthquake engineering problems. Prerequisites: 203, 283.

*3-4 units, Win (Kiremidjian, A)*

**CEE 289. Random Vibrations**

Introduction to random processes. Correlation and power spectral density functions. Stochastic dynamic analysis of multi-degree-of-freedom structures subjected to stationary and non-stationary random excitations. Crossing rates, first-excursion probability, and distributions of peaks and extremes. Applications in earthquake, wind, and ocean engineering. Prerequisite: 203 or equivalent.

*3-4 units, not given this year*

**CEE 290. Structural Performance and Failures**

Basic concepts in the definition of satisfactory structural performance; key elements in structural performance; types of failures, ranging from reduced serviceability to total collapse;

failure sources and their root cause allocation, emphasizing design/construction process failures; failure prevention mechanisms; illustration with real life examples.

2 units, Spr (Moncarz, P)

### CEE 293. Foundation Engineering

Types, characteristics, analysis, and design of shallow and deep foundations; rigid and flexible retaining walls; braced excavations; settlement of footings in sands and clays; slope stability analysis by method of slices including search algorithms for the critical slip surface. Prerequisite: 101C or equivalent.

3 units, Win (Wren, J)

### CEE 294. Computational Poromechanics

Continuum and finite element formulations of steady-state and transient fluid conduction problems on geomechanics; elliptic, parabolic, and hyperbolic systems; variational inequality and free-boundary problems; three-dimensional consolidation theory; undrained condition, mesh locking, B-bar and strain projection methods; finite element formulations of multiphase dynamic problems. Computing assignments. Prerequisite: CEE 281 or equivalent.

3 units, Spr (Borja, R)

### CEE 295. Plasticity Modeling and Computation

Theory of plasticity; micromechanical basis; classical yield models; return-mapping algorithm; multi-surface and bounding surface models; material instabilities; localization and bifurcation. Prerequisite: CEE 281 or equivalent.

3 units, not given this year

### CEE 296. Special Topics in Fluid-Solid Interactions

Civil, mechanical, and biomedical engineering. Topics include surge and wave impact on structures, tsunami induced sediment transport and scour, wave-soil interactions, dam-reservoir-foundation interactions, shock and blast loads on composite structures, hydroelastic tailoring of composite structures, and blood-vessel interactions. Term project.

2 units, not given this year

### CEE 297. Issues in Geotechnical and Environmental Failures

Causes and consequences of the failure of buildings, earth structures, waste storage, and high hazard facilities in contact with the environment; technical, ethical, economic, legal, and business aspects; failure analysis and forensic problems; prevention, liability, and dispute management. Case histories including earthquake, flood, and hazardous waste facilities. Student observation, participation in active lawsuits where possible.

3 units, not given this year

### CEE 297M. Managing Critical Infrastructure Seminar

Safe and effective performance of infrastructure systems is critical to our economy, quality of life and safety. The seminar will present and discuss topics associated with risk analysis and management of critical civil infrastructure systems, including notions of acceptable risk. Discuss lessons learned from Hurricane Katrina and elsewhere which dictate the need for changes to how infrastructure systems are analyzed, designed and operated. Guest speakers. Student presentations.

1 unit, Spr (McCann, M)

### CEE 297R. Structural Geology and Rock Mechanics

(Same as GES 215, GEOPHYS 251) Quantitative field and laboratory data integrated with solutions to boundary value problems of continuum mechanics to understand tectonic processes in Earth's crust that lead to the development of geological structures including folds, faults, fractures and fabrics. Topics include: techniques and tools for structural mapping; differential geometry to characterize structures; dimensional analysis and scaling relations; kinematics of deformation and flow; traction and stress analysis, conservation of mass and momentum in a deformable continuum; linear elastic deformation and elastic properties; brittle deformation including fracture and faulting; model development and methodology. Data sets analyzed using MATLAB. Prerequisites: GES 1, MATH 53, MATLAB or equivalent.

4 units, Aut (Pollard, D)

### CEE 298. Structural Engineering and Geomechanics Seminar

Recommended for all graduate students. Lectures on topics of current interest in professional practice and research.

1 unit, Win (Baker, J)

### CEE 299. Independent Study in Civil Engineering

Directed study for graduate students on subjects of mutual interest to students and faculty. Student must obtain faculty sponsor.

1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### CEE 299S. Independent Project in Civil and Environmental Engineering

Prerequisite: consent of instructor.

1-4 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### CEE 300. Thesis (Engineer Degree)

Research by Engineer candidates.

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### CEE 301. The Energy Seminar

(Same as ENERGY 301) Interdisciplinary exploration of current energy challenges and opportunities, with talks by faculty, visitors, and students. May be repeated for credit.

1 unit, Aut (Benson, S), Win (Benson, S), Spr (Benson, S)

### CEE 305. Damage and Failure Mechanics of Structural Systems

Examine the mechanics and failure mechanisms of structural deterioration mechanisms and hazards. Overview of fracture mechanics concepts as a general basis for analyzing brittle failure modes in steel and concrete structures. Analysis and design theory for corrosion, fatigue, fire and other damage mechanisms in steel and concrete structures. New methods for mitigation of these failure modes and hazards will be introduced, including new construction materials, structural designs and protection methods.

3-4 units, Spr (Lepech, M)

### CEE 316. Sustainable Built Environment Research

Covers Ph.D. candidacy requirements of industry problem analysis and critical literature review for post-MS students conducting research on sustainable planning, design, management, and operation of buildings and infrastructure. Identify industry problems and related research questions. Design experiments and research methods for: ethnographies, case studies, surveys, classical experiments mathematical and computational simulations. Overview of statistical methods for data analysis. Publication strategies.

3-4 units, not given this year

### CEE 320. Integrated Facility Engineering

Individual and group presentations on goals, research, and state-of-practice of virtual design and construction in support of integrated facility engineering, including objectives for the application and further development of virtual design and construction technologies. May be repeated for credit.

1 unit, Aut (Kunz, J), Win (Fischer, M; Kunz, J), Spr (Kunz, J)

### CEE 321. Formal Models for Design

Theories, methods, and formal systems to support the design of buildings. Academic and industrial frameworks to represent and manage the products, organizations, and processes of building projects. May be repeated for credit.

3 units, not given this year

### CEE 342. Computational Modeling of Organizations

For post-M.S. students interested in formal techniques for organization design. Computer simulations of organizations are used to conduct virtual experiments for developing organization theory or to analyze the performance of virtual organizations with different structures and decision support and communication technologies. Research on computational modeling and design of real-world organizations. Paper serves as a research proposal. Prerequisite: 242 or equivalent introductory organization design class.

4 units, not given this year

### CEE 345. Game Theory Modeling in Engineering

Game theory involves the analysis of conflict, cooperation and communication, and is a novel and powerful tool for analyzing important issues in engineering management and engineering policy. Class will develop students' game theory skills in an applied context. Learn how to set up and solve fundamental game models and apply these skills to building new theories in engineering management through game theory modeling. Class illustrates the arts of game modeling by applying game theory in: (1) contracting and opportunistic bidding; (2) renegotiation in public-private partnerships; (3) partner selection strategies in

global projects; and (4) knowledge management and sharing. Students are encouraged to apply game theory to their own research issues or disciplines, and extend their term projects into research papers or theses. Limited class size. Priority for CEE, IPER and MS&E students.

*2-3 units, not given this year*

#### **CEE 362. Numerical Modeling of Subsurface Processes**

Numerical modeling including: problem formulation, PDEs and weak formulations, and choice of boundary conditions; solution using the finite-element code COMSOL Multiphysics with a variety of solvers and pre- and postprocessing of data; and interpretation of results. Problems include: flow in saturated porous media with complex boundaries and heterogeneities; solute transport with common reaction models; effects of heterogeneity on dispersion, dilution, and mixing of solutes; variable-density flow and seawater intrusion; upscaling or coarsening of scale; and biofilm modeling. Enrollment limited to 5.

*3-4 units, alternate years, not given this year*

#### **CEE 362G. Stochastic Inverse Modeling and Data Assimilation Methods**

Stochastic methods for the solution of inverse problems that are algebraically underdetermined or have solutions that are sensitive to data. Emphasis is on geostatistical methods that, in addition to using data, incorporate information about structure such as spatial continuity and smoothness. Methods for real-time processing of new data. Prerequisite: consent of instructor.

*3-4 units, alternate years, not given this year*

#### **CEE 362H. Heterogeneity and Scale in Groundwater**

Geologic materials are complex and composite media, in the microscale, but modeled as continua at the macroscale. We examine how our understanding of processes and heterogeneity at the microscale support laws that describe fluxes and change of state variables at the macroscale. We study Darcy's law for porous media, Fickian dispersion, non-Fickian dispersion, dilution of solutes, and mixing of reactants under mass transfer (diffusional) limitations. We use mathematical tools such as homogenization theories and stochastic analysis to find relations among macroscopic quantities. To be taught in Winter, alternate years starting 2011-2012.

*3-4 units, Win (Kitanidis, P)*

#### **CEE 363A. Mechanics of Stratified Flows**

The effects of density stratification on flows in the natural environment. Basic properties of linear internal waves in layered and continuous stratification. Flows established by internal waves. Internal hydraulics and gravity currents. Turbulence in stratified fluids. Prerequisites: 262A,B, CME 204.

*3 units, Aut (Fong, D)*

#### **CEE 363C. Ocean and Estuarine Modeling**

Advanced topics in modeling for ocean and estuarine environments, including methods for shallow water, primitive, and nonhydrostatic equations on Cartesian, curvilinear, and unstructured finite-volume grid systems. Topics include free-surface methods, nonhydrostatic solvers, and advanced Eulerian and Lagrangian advection techniques. Focus is on existing techniques and code packages, and their methodologies, including POM, ROMS, TRIM, ELCOM, and SUNTANS. Prerequisites: CME 200, 206, or equivalents.

*3 units, not given this year*

#### **CEE 363F. Oceanic Fluid Dynamics**

(Same as EESS 363F) Dynamics of rotating stratified fluids with application to oceanic flows. Topics include: inertia-gravity waves; geostrophic and cyclogeostrophic balance; vorticity and potential vorticity dynamics; quasi-geostrophic motions; planetary and topographic Rossby waves; inertial, symmetric, barotropic and baroclinic instability; Ekman layers; and the frictional spin-down of geostrophic flows. Prerequisite: CEE 262A or a graduate class in fluid mechanics.

*3 units, Spr (Thomas, L)*

#### **CEE 363G. Field Techniques in Coastal Oceanography**

This course focuses on the design and implementation of coastal oceanographic field studies from implementation through analysis. A wide range of field instrumentation and techniques, including AUVs and scientific diving is covered. Field studies. Data collection and analysis under instructor guidance.

*3 units, Spr (Woodson, C)*

#### **CEE 363H. Topics in Stratified Turbulence**

An exploration of classical and current papers dealing with the behavior of turbulence in stratified environments. This is a seminar-style class where each student will be expected to make presentations and lead discussions during the course of the quarter. Enrollment is limited and is based on the consent of the instructor. Prerequisites -- graduate coursework in turbulence and stratified flows.

*2 units, Win (Koseff, J)*

#### **CEE 364Y. Advanced Topics in Coastal Oceanography**

The dynamics and transport implications of features in estuaries and coastal oceans characterized by sharp gradients: fronts, interfaces, and layers. Analytic framework to describe the formation, maintenance, and dissipation of such features. Examples include tidal mixing fronts, buoyant plume fronts and tidal intrusions, biological thin layers, and axial convergent fronts. Second unit for students who give a presentation.

*1-2 units, not given this year*

#### **CEE 365A. Advanced Topics in Environmental Fluid Mechanics and Hydrology**

Students must obtain a faculty sponsor.

*2-6 units, Aut (Staff)*

#### **CEE 365B. Advanced Topics in Environmental Fluid Mechanics and Hydrology**

Students must obtain a faculty sponsor.

*2-6 units, Win (Staff)*

#### **CEE 365C. Advanced Topics in Environmental Fluid Mechanics and Hydrology**

Students must obtain a faculty sponsor.

*2-6 units, Spr (Staff)*

#### **CEE 365D. Advanced Topics in Environmental Fluid Mechanics and Hydrology**

Students must obtain a faculty sponsor.

*2-6 units, Sum (Staff)*

#### **CEE 370A. Environmental Research**

Introductory research experience for first-year Ph.D. students in the Environmental Engineering and Science program. 15-18 hours/week on research over three quarters. 370A requires written literature survey on a research topic; 370B requires oral presentation on experimental techniques and research progress; 370C requires written or oral presentation of preliminary doctoral research proposal. Students must obtain a faculty sponsor.

*5-6 units, Aut (Staff)*

#### **CEE 370B. Environmental Research**

Introductory research experience for first-year Ph.D. students in the Environmental Engineering and Science program. 15-18 hours/week on research over three quarters. 370A requires written literature survey on a research topic; 370B requires oral presentation on experimental techniques and research progress; 370C requires written or oral presentation of preliminary doctoral research proposal. Students must obtain a faculty sponsor.

*5-6 units, Win (Staff)*

#### **CEE 370C. Environmental Research**

Introductory research experience for first-year Ph.D. students in the Environmental Engineering and Science program. 15-18 hours/week on research over three quarters. 370A requires written literature survey on a research topic; 370B requires oral presentation on experimental techniques and research progress; 370C requires written or oral presentation of preliminary doctoral research proposal. Students must obtain a faculty sponsor.

*5-6 units, Spr (Staff)*

#### **CEE 370D. Environmental Research**

Introductory research experience for first-year Ph.D. students in the Environmental Engineering and Science program. 15-18 hours/week on research over three quarters. 370A requires written literature survey on a research topic; 370B requires oral presentation on experimental techniques and research progress; 370C requires written or oral presentation of preliminary doctoral research proposal. Students must obtain a faculty sponsor.

*3-6 units, Sum (Staff)*

**CEE 371. Frontiers in Environmental Research**

How to evaluate environmental research.

1-2 units, Aut (Staff), Win (Staff), Spr (Staff)

**CEE 371M. Transport Phenomena: Momentum, heat and mass transport**

(Same as CEE 271M) Heat, mass and momentum transfer theory from the viewpoint of basic transport equations. Steady and unsteady state; laminar and turbulent flow; boundary layer theory. Prerequisites: fluid mechanics, ordinary differential equations.

3 units, Win (Staff)

**CEE 374A. Introduction to Physiology of Microbes in Biofilms**

Diversification of biofilm populations, control of gene expression in biofilm environments, and evolution of novel genetic traits in biofilms.

1-6 units, Aut (Spormann, A)

**CEE 374B. Introduction to Physiology of Microbes in Biofilms**

Diversification of biofilm populations, control of gene expression in biofilm environments, and evolution of novel genetic traits in biofilms.

1-6 units, Win (Staff)

**CEE 374C. Introduction to Physiology of Microbes in Biofilms**

Diversification of biofilm populations, control of gene expression in biofilm environments, and evolution of novel genetic traits in biofilms.

1-6 units, Spr (Staff)

**CEE 374D. Introduction to Physiology of Microbes in Biofilms**

Diversification of biofilm populations, control of gene expression in biofilm environments, and evolution of novel genetic traits in biofilms.

1-6 units, Sum (Staff)

**CEE 374S. Advanced Topics in Microbial Pollution**

May be repeated for credit. Prerequisite: consent of instructor.

1-5 units, Aut (Boehm, A), Win (Boehm, A), Spr (Boehm, A), Sum (Staff)

**CEE 374T. Advanced Topics in Coastal Pollution**

May be repeated for credit. Prerequisite: consent of instructor.

1-5 units, Aut (Boehm, A), Win (Boehm, A), Spr (Boehm, A), Sum (Staff)

**CEE 374U. Advanced Topics in Submarine Groundwater Discharge**

May be repeated for credit. Prerequisite: consent of instructor.

1-5 units, Aut (Boehm, A), Win (Boehm, A), Spr (Boehm, A), Sum (Staff)

**CEE 374V. Advanced Topics in Microbial Source Tracking**

May be repeated for credit. Prerequisite: consent of instructor.

1-5 units, Aut (Boehm, A), Win (Boehm, A), Spr (Boehm, A), Sum (Staff)

**CEE 374W. Advanced Topics in Water, Health and Development**

Advanced topics in water, health and development. Emphasis on low-and-middle-income countries. Class content varies according to interests of students. Instructor consent required.

1-6 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**CEE 374X. Advanced Topics in Multivariate Statistical Analysis**

Analysis of experimental and non-experimental data using multivariate modeling approaches. May be repeated for credit. Permission of instructor required for enrollment.

1-6 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**CEE 375. Advanced Methods in Pathogen Detection**

Molecular and culture-based techniques for pathogen detection in water.

2 units, not given this year

**CEE 377. Research Proposal Writing in Environmental Engineering and Science**

For first- and second-year post-master's students preparing for thesis defense. Students develop progress reports and agency-style research proposals, and present a proposal in oral form. Prerequisite: consent of thesis adviser.

1-3 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**CEE 378. Statistical Analysis of Environmental Data: Tools****and Applications**

Preference to Environmental Engineering and Science Ph.D. students. Practical data analysis techniques applicable to environmental engineering. The role of statistics in data collection, experimental design, data exploration, and effective communication of results. Use of statistical packages such as Excel, Matlab, and R. Discussions partially based on student interest and available datasets. Topics may include summarizing data, hypothesis testing, nonparametric statistics, regression analysis, classification and regression trees, cluster analysis, and computationally intensive methods. Limited enrollment.

2-3 units, not given this year

**CEE 378D. Seminar of Statistical Analysis of Multidisciplinary Primary Data**

Practical management and analysis techniques for primary data collected in multidisciplinary projects. Selection of appropriate statistical tests, interpretation of results, and effective communication of findings to lay audiences. Univariate, bivariate and multivariate techniques, including hypothesis testing, nonparametric statistics, regression analysis and matching. Use of SPSS statistical package. Limited enrollment. Prerequisite: consent of instructor.

1-3 units, not given this year

**CEE 381. Advanced Engineering Informatics**

1-4 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**CEE 385. Performance-Based Earthquake Engineering**

Synthesis and application of approaches to performance-based design and assessment that recently have been developed or are under development. Emphasis is on quantitative decision making based on life-cycle considerations that incorporate direct losses, downtime losses, and collapse, and the associated uncertainties. Hazard analysis, response simulation, damage and loss estimation, collapse prediction. Case studies. Prerequisites: 282, 287, and 288.

2-3 units, Aut (Krawinkler, H)

**CEE 398. Report on Civil Engineering Training**

On-the-job training under the guidance of experienced, on-site supervisors; meets the requirements for Curricular Practical Training for students on F-1 visas. Students submit a concise report detailing work activities, problems worked on, and key results. Prerequisite: qualified offer of employment and consent of adviser as per I-Center procedures.

1 unit, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**CEE 399. Advanced Engineering Problems**

Individual graduate work under the direction of a faculty member on a subject of mutual interest. Student obtain faculty sponsor. May be repeated for credit.

1-10 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**CEE 400. Thesis (Ph.D. Degree)**

For students who have successfully completed the department general qualifying examination. Research and dissertation for the Ph.D. degree.

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**CEE 801. TGR Project (Engineer Degree)**

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**CEE 802. TGR Dissertation (PhD degree)**

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

## CLASSICS ART/ARCHAEOLOGY (CLASSART) COURSES

### UNDERGRADUATE COURSES IN CLASSICS ART/ARCHAEOLOGY

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**CLASSART 21Q. Eight Great Archaeological Sites in Europe**

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Focus is on excavation, features and finds, arguments over interpretation, and the place of each site in understanding the archaeological history of Europe. Goal is to introduce the latest



archaeological and anthropological thought, and raise key questions about ancient society. The archaeological perspective foregrounds interdisciplinary study: geophysics articulated with art history, source criticism with analytic modeling, statistics interpretation. A web site with resources about each site, including plans, photographs, video, and publications, is the basis for exploring. GER:DB-Hum

3-5 units, Aut (Shanks, M), Spr (Shanks, M)

**CLASSART 101. Archaic Greek Art**

(Same as ARTHIST 101, ARTHIST 301, CLASSART 201) The development of Greek art and culture from protogeometric beginnings to the Persian Wars, 1000-480 B.C.E. The genesis of a native Greek style; the orientalizing phase during which contact with the Near East and Egypt transformed Greek art; and the synthesis of East and West in the 6th century B.C.E. GER:DB-Hum

4 units, Aut (Maxmin, J)

**CLASSART 102. Empire and Aftermath: Greek Art from the Parthenon to Praxiteles**

(Same as ARTHIST 102, ARTHIST 302) The course explores the art and architecture of the Athenian Empire in the age of Pericles, and then considers the effects of civil war and plague on Greek art and society in the later 5th and early 4th centuries. GER:DB-Hum

4 units, Win (Maxmin, J)

**CLASSART 109. Greek Art In and Out of Context**

(Same as ARTHIST 203) The cultural contexts in which art served religious, political, commercial, athletic, sympotic, and erotic needs of Greek life.

4-5 units, Aut (Maxmin, J)

**CLASSART 110. Appropriations of Greek Art**

(Same as ARTHIST 204A) Upper division seminar. The history of the appropriation of Greek art by Rome, the Renaissance, Lord Elgin, and Manet. Enrollment limited to 6. Prerequisite: ARTHIST 102 or consent of instructor.

4-5 units, Spr (Maxmin, J)

**CLASSART 112. Ancient Urbanism**

(Same as CLASSART 212) Greek, Roman and early Islamic urbanisms are connected in important and revealing ways, though these three are not usually studied together. All three took shape in the same part of the world, the Mediterranean and western Asia. They emerged in succession, with the earlier cities and ideas still very much part of the landscape: Greek urbanism shaped Roman cities, many of which then became Islamic cities, with major features still intact and thriving. These three urbanisms were also very different, ranging from the ideals of the polis in ancient Greece, to the spread of cities all over the Roman Empire, to shared urban patterns in farflung parts of the Islamic world. Our goals in this course are 1) to learn about Greek, Roman and Islamic cities, primarily through archaeological evidence; including what cities looked like in each society and why, and what it was like to live in them; 2) to compare and contrast urban components in each society, and understand why these cities were si

4-5 units, Aut (Trimble, J)

**CLASSART 113. Ten Things: An Archaeology of Design**

(Same as CLASSART 213, STS 112) Connections among science, technology, society and culture by examining the design of a prehistoric hand axe, Egyptian pyramid, ancient Greek perfume jar, medieval castle, Wedgewood teapot, Edison's electric light bulb, computer mouse, Sony Walkman, supersonic aircraft, and BMW Mini. Interdisciplinary perspectives include archaeology, cultural anthropology, science studies, history and sociology of technology, cognitive science, and evolutionary psychology. GER:DB-SocSci

3-5 units, Aut (Shanks, M)

**CLASSART 114. Ceramics: Art and Science**

(Same as ARCHLGY 117) From clay to culture. Design, technology, manufacture, and consumption of ceramics. Guest lecturers, site visits, and hands-on studio work.

3-5 units, Spr (Shanks, M)

**GRADUATE COURSES IN CLASSICS ART/ARCHAEOLOGY**

Primarily for graduate students; undergraduates may enroll with

consent of instructor.

**CLASSART 201. Archaic Greek Art**

(Same as ARTHIST 101, ARTHIST 301, CLASSART 101) The development of Greek art and culture from protogeometric beginnings to the Persian Wars, 1000-480 B.C.E. The genesis of a native Greek style; the orientalizing phase during which contact with the Near East and Egypt transformed Greek art; and the synthesis of East and West in the 6th century B.C.E.

4 units, Aut (Maxmin, J)

**CLASSART 212. Ancient Urbanism**

(Same as CLASSART 112) Greek, Roman and early Islamic urbanisms are connected in important and revealing ways, though these three are not usually studied together. All three took shape in the same part of the world, the Mediterranean and western Asia. They emerged in succession, with the earlier cities and ideas still very much part of the landscape: Greek urbanism shaped Roman cities, many of which then became Islamic cities, with major features still intact and thriving. These three urbanisms were also very different, ranging from the ideals of the polis in ancient Greece, to the spread of cities all over the Roman Empire, to shared urban patterns in farflung parts of the Islamic world. Our goals in this course are 1) to learn about Greek, Roman and Islamic cities, primarily through archaeological evidence; including what cities looked like in each society and why, and what it was like to live in them; 2) to compare and contrast urban components in each society, and understand why these cities were si

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3-5 units, Aut (Shanks, M)

**CLASSART 322. Reception and Literacy in Roman Art**

(Same as ARTHIST 200C) Beyond a focus on artists and patrons: how Roman art was seen and understood by its contemporary viewers. Themes include memory, performance, gender, replication, and constructions of space. Goal is to draft a differentiated model of viewing and literacy, with attention to collective experience, hierarchy, access, and subversion.

5 units, Win (Trimble, J)

**CLASSICS GENERAL (CLASSGEN) COURSES**

**UNDERGRADUATE COURSES IN CLASSICS GENERAL**

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**CLASSGEN 6N. Antigone: From Ancient Democracy to Contemporary Dissent**

(F,Sem) (Same as DRAMA 12N) Stanford Introductory Seminar. Preference to freshmen. Tensions inherent in the democracy of ancient Athens; how the character of Antigone emerges in later drama, film, and political thought as a figure of resistance against illegitimate authority; and her relevance to contemporary struggles for women's and workers' rights and national liberation. Readings and screenings include versions of Antigone by Sophocles, Anouilh, Brecht, Fugard/Kani/Ntshona, Paulin, Glowacki, Gurney, and von Trotta. GER:DB-Hum, EC-Gender

4 units, Aut (Rehm, R; Miller, D)

**CLASSGEN 9. Greek and Latin Roots of English**

Goal is to improve vocabulary, comprehension of written English, and standardized test scores through learning the Greek and Latin components of English. Focus is on patterns and processes in the formation of the lexicon. Terminology used in medicine, business,



education, law, and humanities; introduction to principles of language history and etymology. Greek or Latin not required.

3 units, *Sum (Staff)*

**CLASSGEN 15. The Bible and Archaeology**

(Same as JEWISHST 15A, RELIGST 15A) An introduction to how archaeology has been used to illumine the Bible and biblical history. Did Abraham exist? Was there an Exodus? Did Joshua really conquer Canaan? What does archaeology reveal about ancient Israel beyond what is recorded in the Bible? This course will address such questions as it seeks to introduce biblical archaeology to students with no prior introduction to either the Bible or to archaeology.

4 units, *Spr (Lederman, Z)*

**CLASSGEN 18. Greek Mythology**

The heroic and divine in the literature, mythology, and culture of ancient Greece, together with its subsequent Roman versions. Illustrated lectures, with some attention to later receptions. Readings (in translation) include Homer, Hesiod, Euripides and Ovid. GER:DB-Hum

3-5 units, *Aut (Parker, G)*

**CLASSGEN 20N. Mapping the Mediterranean**

A sample of premodern material from among the various ways the Mediterranean sea and adjacent lands have been represented over the centuries. This will involve both maps in the conventional sense and also texts and documents (inscriptions and papyri). Much of the material involves actual travel. What kinds of power dynamics have been implicated in such representations? Texts will include extracts from Homer's *Odyssey*; the Hebrew Bible; ancient Egyptian literature; and the Hereford Mappa Mundi. GER:DB-Hum

4-5 units, *not given this year*

**CLASSGEN 24N. Sappho: Erotic Poetess of Lesbos**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Sappho's surviving fragments in English; traditions referring to or fantasizing about her disputed life. How her poetry and legend inspired women authors and male poets such as Swinburne, Baudelaire, and Pound. Paintings inspired by Sappho in ancient and modern times, and composers who put her poetry to music. GER:DB-Hum, EC-Gender

4-5 units, *Spr (Peponi, A)*

**CLASSGEN 35. Becoming Like God: An Introduction to Greek Ethical Philosophy**

This course investigates key ethical philosophies in classical Greece. After reading several Greek tragedies (representing traditional Greek values), we examine the Greek philosophers' rejection of this tradition and their radically new ethical theories. Socrates, Plato, and Aristotle offered different ethical theories, but they shared basic conceptions of goodness and happiness. They argued that we could become like gods by achieving philosophic wisdom. What kind of wisdom is this? How does it make us ethically good and supremely happy people? GER:DB-Hum, EC-EthicReas

3-5 units, *Spr (Nightingale, A)*

**CLASSGEN 37N. Socrates: Philosopher and Trickster**

(F,Sem) Stanford Introductory Seminar. Socrates claimed that he was not wise but always seeking for wisdom. Socrates aimed to achieve ethical knowledge. What kind of knowledge is this? We examine Greek myth, religion, and society in order to locate Socrates' philosophy in its cultural context. We investigate the trial and death of Socrates, his philosophic method, and his cunning philosophic strategies. We read Plato's dialogues, Greek tragedies and comedies to understand this cagey and complex philosopher. GER:DB-Hum, EC-EthicReas

3-5 units, *Win (Nightingale, A)*

**CLASSGEN 66. Herodotus**

For Ancient History field of study majors; others by consent of instructor. Close reading technique. Historical background to the Greco-Persian Wars; ancient views of empire, culture, and geography; the wars and their aftermath; ancient ethnography and historiography, including the first narrative of ancient Egypt. GER:DB-Hum

4-5 units, *OCCASIONAL*

**CLASSGEN 81. Philosophy and Literature**

(Same as COMPLIT 181, ENGLISH 81, FREGEN 181,

ITALGEN 181, GERGEN 181) Required gateway course for Philosophical and Literary Thought; crosslisted in departments sponsoring the Philosophy and Literature track: majors should register in their home department; non-majors may register in any sponsoring department. Introduction to major problems at the intersection of philosophy and literature. Issues may include authorship, selfhood, truth and fiction, the importance of literary form to philosophical works, and the ethical significance of literary works. Texts include philosophical analyses of literature, works of imaginative literature, and works of both philosophical and literary significance. Authors may include Plato, Montaigne, Nietzsche, Borges, Beckett, Barthes, Foucault, Nussbaum, Walton, Nehamas, Pavel, and Pippin. GER:DB-Hum

4-5 units, *Win (Staff)*

**CLASSGEN 106. Priests, Prophets, and Kings: Religion and Society in Late Antique Iran**

(Same as CLASSGEN 206, RELIGST 209, RELIGST 309) From India to the Levant and from the Caspian Sea to the Arabian Peninsula, the Sasanian Empire (224-651 CE) was the dominant power in the Middle East till the advent of Islam. Diverse religious institutions and social practices of the Zoroastrians, Manicheans, Jews, and Christians in late antique Iran. Complex relationships between the Zoroastrian priesthood, the Sasanian monarchs, and these minority religions within the context of imperial rule. Profound religious and social changes that occurred with the Islamic conquests of Iran as well as examine the rich cultural continuities that survived from the Pre-Islamic past. GER:DB-Hum

4-5 units, *Aut (Vevaina, Y)*

**CLASSGEN 107. The Black Mediterranean: Greece, Rome and Antiquity**

(Same as AFRICAAM 107C, CSRE 107) Explore problems of race and ethnicity as viable criteria in studying ancient societies and consider the question, What is the Mediterranean?, in relation to premodern evidence. Investigate the role of blackness as a marker of ethnicity; the demography of slavery and its roles in forming social identities; and environmental determinism as a factor in ethnic and racial thinking. Consider Greek and Roman perspectives and behavior, and their impact on later theories of race and ethnicity as well as the Mediterranean as a whole. GER:EC-GlobalCom

4-5 units, *not given this year*

**CLASSGEN 109. Emperor, Explorer, and God: Alexander the Great in the Global Imagination**

(Same as RELIGST 109) Survey of the image of Alexander the Great from the Hellenistic world to the contemporary. We shall discuss the appropriation of Alexander's life and legend and examine his reception as both a divine and a secular figure in a variety of cultures both East and West. Students will engage with a variety of media including texts (primary and secondary) and images (statues, coins, mosaics, illuminated manuscripts, film, and TV) in the Hellenistic, Roman, Byzantine, Jewish, Islamic, Medieval, Renaissance, and Early Modern contexts. Finally, we will evaluate contemporary representations of Alexander in TV, film and popular culture, such as William Shatner's and Adam West's 1968 TV pilot, Oliver Stone's 2004 film, and Andy Warhol's Pop art. GER:DB-Hum

3 units, *Aut (Vevaina, Y)*

**CLASSGEN 117. Gender, Violence, and the Body in Ancient Religion**

The sex-gender system of ancient Greece. How did polarization of the sexes become a master metaphor for power struggles between husbands and wives, among men, and among parts of the self? How did religious activity, including drama, mitigate or intensify the stresses of living in a society polarized along gender lines? GER:DB-Hum, EC-Gender

3-4 units, *Spr (Gleason, M; Stephens, S)*

**CLASSGEN 123. Urban Sustainability: Long-Term Archaeological Perspectives**

(Same as CLASSGEN 223, URBANST 115) Comparative and archaeological view of urban design and sustainability. How fast changing cities challenge human relationships with nature. Innovation and change, growth, industrial development, the consumption of goods and materials. Five millennia of city life including Near Eastern city states, Graeco-Roman antiquity, the

Indus Valley, and the Americas.

3-5 units, *Aut (Shanks, M)*

**CLASSGEN 126. Judaism and Christianity in the Mediterranean World: Contact, Competition, and Conflict**

(Same as CLASSGEN 226, JEWISHST 226B, JEWISHST 326B, RELIGST 226B, RELIGST 326B) Jewish beginnings of Christianity in the first century C.E.; process of differentiation between various Jewish and Christian groups; effect of Roman-Jewish wars on Jewish and Christian identity formation; Jewish Christians, Christian Jews, and other heretics; rise of the discourse of orthodoxy and heresy; the emergence of the *Adversus Iudaeos* tradition; theology as a realm of mutual attraction and conflict. Readings include Epistles of Paul in the New Testament, Christian authors from Justin through Augustine, excerpts from Rabbinic Texts (Mishnah, Midrash and Talmud), along with current literature on religion, ethnicity, and identity in the Roman world. GER:DB-Hum

5 units, *not given this year*

**CLASSGEN 126B. Jewish-Christian Relations in Antiquity**

(Same as JEWISHST 226D, RELIGST 226D) Constructions of identity, community, ethnicity: these considerations frame the investigation of ancient Christian rhetoric and theology contra Iudaeos. This historical project will be set within the larger intellectual and cultural context of a) learned Graeco-Roman traditions of ethnic stereotyping; b) forensic rhetoric; and c) philosophical *paideia*; and these traditions will be considered within their larger social context of the Mediterranean city (I-III). Specifically, various Christian, and especially Latin traditions contra Iudaeos (IV-VI) will be studied.

1-2 units, *not given this year*

**CLASSGEN 131. Culture and Thought in the Late Roman Republic**

This course explores some of the most dynamic literary achievements of the later Roman Republic. It addresses the intellectual and cultural community of Rome, with a focus on a series of major themes in Roman views of identity, morality, politics, and religion. We will examine works of poetry, philosophy, oratory, and historiography; we explore the poems of Catullus on myth, sex, and politics, and a selection of passages from Lucretius's great poem on atomic physics, Cicero's defense speeches, and Sallust's war narrative.

3-5 units, *Win (Yansen de Skipper, L)*

**CLASSGEN 132. Early Christian Gospels**

(Same as RELIGST 132D) An exploration of Christian gospels of the first and second century. Emphasis on the variety of images and interpretations of Jesus and the good news, the broader Hellenistic and Jewish contexts of the gospels, the processes of developing and transmitting gospels, and the creation of the canon. Readings include the Gospel of John, the Gospel of Mark, the Gospel of Thomas, the Gospel of Mary and other canonical and non-canonical gospels. GER:DB-Hum

4 units, *not given this year*

**CLASSGEN 133. Invention of Science**

Does science have to be the way it is? Does it have to be at all? The creation of science in the ancient Greek world; its invention of concepts such as nature, rationality, and proof; and its invention of fields from biology to geometry. Comparison with the Chinese invention of a different kind of science. The extent to which contemporary science is still Greek science. GER:DB-Hum

3-5 units, *Spr (Netz, R)*

**CLASSGEN 134. Early Christianity, Early Judaism, and Gender**

(Same as JEWISHST 122B, RELIGST 132B) An exploration of gender in Early Christianity and Early Judaism. Possible topics include: an examination of Pre-Christian writings which are indicative of the foundational social contexts in which early Christian and Jewish writers operated; how women's preaching was portrayed in Paul's letters and the implications for what was actually going on in the community in Corinth; later interpretations of Paul's attitudes towards women and marriage, which diverge between a pro-marriage and further restrictive understanding of women's involvement in the Church in the pastorals (1 and 2 Timothy and Titus) and a pro-ascetic, cross-dressing, understanding of greater women's freedom in the Acts of Paul and

Thecla; female Christian martyrs who had visions of themselves as men entering battle and male Rabbis who understood themselves as female virgins and who hid in whorehouses to avoid martyrdom; and a survey of early Rabbinic laws pertaining to men and women and what they reveal about early Jew GER:DB-Hum

4 units, *Win (Copeland, K)*

**CLASSGEN 139. Ancient Medicine**

Contemporary medical practice traces its origins to the creation of scientific medicine by Greek doctors such as Hippocrates and Galen. Is this something of which modern medicine can be proud? The scientific achievements and ethical limitations of ancient medicine when scientific medicine was no more than another form of alternative medicine. Scientific medicine competed in a marketplace of ideas where the boundaries between scientific and social aspects of medicine were difficult to draw. GER:DB-Hum

3-4 units, *Spr (Gleason, M)*

**CLASSGEN 141. Ovid Metamorphoses**

Ovid's *Metamorphoses* is his most delightful and ambitious poem, an unbroken narrative that unfolds an alternative story of the world from Chaos to the Age of Augustus. Explore this multi-layered text through readings of selected episodes. Discover how themes of metamorphosis and metaphor and questions of identity, responsibility, and victimization are wrapped up in Ovid's world of sentient plants, trapped beasts, and hostile gods. Sample the rich afterlife of the *Metamorphoses* in two millennia of literature and art.

3-5 units, *Aut (Gowers, E)*

**CLASSGEN 144. The Journey Beyond**

(Same as CLASSGEN 244) Between 270 and 240 BC, Apollonius, in the newly established city of Ptolemaic Alexandria, wrote a four-book hexameter poem (the *Argonautica*) in the manner of Homer on the subject of Jason and the Argonauts. This seminar will consider the social, political, intellectual, and geographic dimensions of the poem, its literary antecedents, lyric and tragic in addition to epic, its engagement with contemporary Alexandrian poetics, as well as several aspects of its reception in later Greek and Roman poetry. GER:DB-Hum

4-5 units, *Aut (Stephens, S)*

**CLASSGEN 148. Critical Approaches to Latin Literature: Roman Love Elegy**

(Same as CLASSGEN 248) For many, Roman elegy is the poetry of unrequited love. But closer reading of the genre and its modes shows that the concept of elegiac love can be seen as a rhetorical ploy to picture the world from a unique and contesting perspective. Often speaking from eccentric, dislocated, and rebellious stances, the alternative poets of love elegy offer contrasting outlooks on themes as wide-ranging as urbanity, politics and war, sex and leisure, art and knowledge, male and female, mind and spirit, death, and even the occult. Through a reading of select elegies of Tibullus, Propertius, and Ovid's *Amores*, we shall explore these issues together with questions of canon, genre, gender, narratology, and psychology, amongst others. There will be also an opportunity for both close textual criticism, and discussion of the broader analysis of the socio-cultural and literary history of the genre.

4-5 units, *Spr (Yansen de Skipper, L)*

**CLASSGEN 159. Winged Bulls and Sun Disks: Religion and Politics in the Persian Empire**

(Same as CLASSGEN 259, RELIGST 229, RELIGST 329) Since Herodotus in the 5th century BCE, the Persian Empire has been represented as the exemplar of oriental despotism and imperial arrogance, a looming presence and worthy foil for the West and Greek democracy. History of the Achaemenid Empire, beginning with the rise of the Medes in the 7th century BCE to the fall of the Achaemenids to Alexander the Great's armies in 331 BCE. Focus on the intimate relationship between religion and empire and will also survey the diverse cultural institutions and religious practices found within the Empire. Evaluate contemporary representations of the Persians in politics and popular culture, such as the recent film *300* and the graphic novel on which it is based, in an attempt to better appreciate the enduring cultural legacy of the Greco-Persian wars. GER:DB-Hum

3 units, *not given this year*

**CLASSGEN 160. Directed Readings (Undergraduate)**

May be repeated for credit.

*1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**CLASSGEN 165R. Theater and Memory**

(Same as DRAMA 165R) The course explores the extraordinary ways memory works in the theater and in film. Have you ever left a performance wondering, How did the actor learn all those lines? But that's only the beginning. When Hamlet promises that \* will As long as Memory holds a seat / In this distracted Globe, he refers not only to his own powers of memory, but also links his troubled psyche to Shakespeare's own theater (the Globe), suggesting the interplay between memory and the theater audience. Even in a film like *The Social Network*, memory plays an important role. At the end, the founder of Facebook logs onto his own invention to find the girl he insulted and lost as a freshman, a billionaire haunted by the memory of a human connection he yearns to recover.

*3-5 units, Sum (Staff)*

**CLASSGEN 167. Julius Caesar**

The transformative position of Julius Caesar within Roman history. Topics include ancient ideas about individual power and heroism, Roman imperialism, Iron Age Gaul, Egypt, religious practice, civil war, long-term results of Caesar's assassination. Cast of characters includes Pompey the Great, Vercingetorix, Mark Antony, Cleopatra. Ancient biography is compared to the reception of Julius Caesar in later literature and film. Analytical focus is on interactions of long-term history, institutions and events. Under what circumstances can individuals sometimes shape history? To what extent did Julius Caesar change Rome? GER:DB-Hum

*3-5 units, Aut (Trimble, J)*

**CLASSGEN 168. The Ethical Universe: Cosmology and the Goal of Human Life**

How is our picture of the universe and humans' place within it connected to our understanding of the purpose of our lives and the attainment of happiness? Does cosmology influence our ethics, and ethics in turn influence our cosmology? Poets and philosophers of the ancient world tended to treat cosmological and metaphysical ideas in close connection with normative ethical demands and claims about human psychology. This course will explore diverse ancient cosmologies, their metaphysical foundations, and their ethical implications from archaic Greece through early Roman imperial times, including the views of Hesiod, Presocratic natural scientists, Plato, Aristotle, Epicureans and Stoics, and the Skeptical challenge to the possibility of physics and metaphysics. The latter part of the course will bring in some comparisons and contrasts with modern literature and philosophy, especially in connection with the Stoic and Epicurean theories of eternal recurrence, and the skeptical position. GER:DB-Hum

*3-5 units, Aut (Slatin, P)*

**CLASSGEN 174. Martyrdom in the Ancient World**

(Same as RELIGST 174) Jewish, pagan and Christian groups under Roman rule all told tales of persecution and resistance. How did they use these stories, and the historical experiences behind them, to form group identity? Emphasis is on ancient documents in translation, and modern scholarly interpretations, to examine the competing agendas of parties involved, group dynamics, individual motivation, symbolic violence, and the body as a locus of power and control. GER:DB-Hum

*4 units, not given this year*

**CLASSGEN 176. Majors Seminar**

Required of Classics majors and minors in junior or senior year; students contemplating honors should take this course in junior year. Advanced skills course involving close reading, critical thinking, editing, and writing. In-class and take-home writing and revising exercises. Final paper topic may be on any subject related to Classics. WIM

*4-5 units, Win (Trimble, J)*

**CLASSGEN 182. In Search of David and Solomon**

(Same as CLASSGEN 282, JEWISHST 182A, JEWISHST 382A, RELIGST 182A, RELIGST 382A) In recent years, the existence of King David and Solomon has become a hotly contested subject, with some scholars questioning whether they were real-life historical figures and others claiming to have found evidence that corroborates their existence. Drawing on the most recent archaeological research, this course will involve students in the

quest for the historical David and Solomon as a way to introduce them to the challenges of using the Bible as an historical source.

*4 units, Spr (Lederman, Z)*

**CLASSGEN 199. Undergraduate Thesis: Senior Research**

*2-10 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**GRADUATE COURSES IN CLASSICS GENERAL**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**CLASSGEN 205A. The Semantics of Grammar**

Supplements CLASSLAT/CLASSGRK 275. Introduction to the grammatical encoding of semantic and pragmatic meaning. 205A: morphology-semantics interface (gender, tense, aspect, case). 205B: syntax-pragmatics interface (Latin word order). Begins in Autumn Quarter and continues through 5th week of Winter Quarter.

*2 units, Aut (Devine, A)*

**CLASSGEN 205B. The Semantics of Grammar**

Supplements CLASSLAT/CLASSGRK 275. Introduction to the grammatical encoding of semantic and pragmatic meaning. 205A: morphology-semantics interface (gender, tense, aspect, case). 205B: syntax-pragmatics interface (Latin word order). Begins in Autumn Quarter and continues through 5th week of Winter Quarter.

*2 units, Win (Devine, A)*

**CLASSGEN 206. Priests, Prophets, and Kings: Religion and Society in Late Antique Iran**

(Same as CLASSGEN 106, RELIGST 209, RELIGST 309) From India to the Levant and from the Caspian Sea to the Arabian Peninsula, the Sasanian Empire (224-651 CE) was the dominant power in the Middle East till the advent of Islam. Diverse religious institutions and social practices of the Zoroastrians, Manicheans, Jews, and Christians in late antique Iran. Complex relationships between the Zoroastrian priesthood, the Sasanian monarchs, and these minority religions within the context of imperial rule. Profound religious and social changes that occurred with the Islamic conquests of Iran as well as examine the rich cultural continuities that survived from the Pre-Islamic past.

*4-5 units, Aut (Vevaina, Y)*

**CLASSGEN 207A. Survey of Greek and Latin Literature: Literature of the Roman Republic**

First course in a required two-year sequence. Focus is on the origins, development, and interaction of Greek and Latin literature, history, and philosophy. Greek and Latin material taught in alternate years. Focus is on translation, textual criticism, genre, the role of Greece in shaping Roman literature, and oral versus written discourse.

*3-5 units, NEXTYEAR*

**CLASSGEN 207B. Survey of Greek and Latin Literature: Augustan Age Latin**

Required two-year sequence focusing on the origins, development, and interaction of Greek and Latin literature, history, and philosophy. Texts of Augustan literature required by the graduate syllabus, emphasizing poetry and major authors.

*3-5 units, NEXTYEAR*

**CLASSGEN 207C. Survey of Greek and Latin Literature: Imperial Latin**

Required two-year sequence focusing on the origins, development, and interaction of Greek and Latin literature, history, and philosophy. Greek and Latin material taught in alternate years.

*4-5 units, NEXTYEAR*

**CLASSGEN 208A. Survey of Greek and Latin Literature: Archaic Greek**

Required two-year sequence focusing on the origins, development, and interaction of Greek and Latin literature, history, and philosophy. Greek and Latin material taught in alternate years.

*3-5 units, Win (Peponi, A)*

**CLASSGEN 208B. Survey of Greek and Latin Literature: Classical Greek**

Required two-year sequence focusing on the origins, development, and interaction of Greek and Latin literature, history, and

philosophy. Greek and Latin material taught in alternate years.  
3-5 units, Aut (*Nightingale, A*)

**CLASSGEN 208C. Survey of Greek and Latin Literature: Hellenistic and Late Greek**

Required two-year sequence focusing on the origins, development, and interaction of Greek and Latin literature, history, and philosophy. Greek and Latin material taught in alternate years.  
3-5 units, Spr (*Stephens, S*)

**CLASSGEN 223. Urban Sustainability: Long-Term Archaeological Perspectives**

(Same as CLASSGEN 123, URBANST 115) Comparative and archaeological view of urban design and sustainability. How fast changing cities challenge human relationships with nature. Innovation and change, growth, industrial development, the consumption of goods and materials. Five millennia of city life including Near Eastern city states, Graeco-Roman antiquity, the Indus Valley, and the Americas.  
3-5 units, Aut (*Shanks, M*)

**CLASSGEN 226. Judaism and Christianity in the Mediterranean World: Contact, Competition, and Conflict**

(Same as CLASSGEN 126, JEWISHST 226B, JEWISHST 326B, RELIGST 226B, RELIGST 326B) Jewish beginnings of Christianity in the first century C.E.; process of differentiation between various Jewish and Christian groups; effect of Roman-Jewish wars on Jewish and Christian identity formation; Jewish Christians, Christian Jews, and other heretics; rise of the discourse of orthodoxy and heresy; the emergence of the *Adversus Iudaeos* tradition; theology as a realm of mutual attraction and conflict. Readings include Epistles of Paul in the New Testament, Christian authors from Justin through Augustine, excerpts from Rabbinic Texts (Mishnah, Midrash and Talmud), along with current literature on religion, ethnicity, and identity in the Roman world.  
5 units, not given this year

**CLASSGEN 235. Petronius and Apuleius**

Petronius' *Satyricon* and Apuleius' *Metamorphoses* represent the surviving Latin novel. Differences between them. Readings include Petronius' dinner at Trimalchio's and Apuleius' love story of Cupid and Psyche. Philological analysis, history of the novel, and social history of the Roman empire. The afterlife of these texts. Recent scholarship.  
4-5 units, Spr (*Parker, G*)

**CLASSGEN 241. Words and Things in the History of Classical Scholarship**

How have scholars used ancient texts and objects since the revival of the classical tradition? How did antiquarians study and depict objects and relate them to texts and reconstructions of the past? What changed and what stayed the same as humanist scholarship gave way to professional archaeologists, historians, and philologists? Focus is on key works in the history of classics, such as Erasmus and Winckelmann, in their scholarly, cultural, and political contexts, and recent critical trends in intellectual history and the history of disciplines.  
4-5 units, NEXTYEAR

**CLASSGEN 244. The Journey Beyond**

(Same as CLASSGEN 144) Between 270 and 240 BC, Apollonius, in the newly established city of Ptolemaic Alexandria, wrote a four-book hexameter poem (the *Argonautica*) in the manner of Homer on the subject of Jason and the Argonauts. This seminar will consider the social, political, intellectual, and geographic dimensions of the poem, its literary antecedents, lyric and tragic in addition to epic, its engagement with contemporary Alexandrian poetics, as well as several aspects of its reception in later Greek and Roman poetry.  
4-5 units, Aut (*Stephens, S*)

**CLASSGEN 248. Critical Approaches to Latin Literature: Roman Love Elegy**

(Same as CLASSGEN 148) For many, Roman elegy is the poetry of unrequited love. But closer reading of the genre and its modes shows that the concept of elegiac love can be seen as a rhetorical ploy to picture the world from a unique and contesting perspective. Often speaking from eccentric, dislocated, and rebellious stances, the alternative poets of love elegy offer contrasting outlooks on themes as wide-ranging as urbanity, politics and war, sex and leisure, art and knowledge, male and female, mind and spirit,

death, and even the occult. Through a reading of select elegies of Tibullus, Propertius, and Ovid's *Amores*, we shall explore these issues together with questions of canon, genre, gender, narratology, and psychology, amongst others. There will be also an opportunity for both close textual criticism, and discussion of the broader analysis of the socio-cultural and literary history of the genre.  
4-5 units, Spr (*Yansen de Skipper, L*)

**CLASSGEN 259. Winged Bulls and Sun Disks: Religion and Politics in the Persian Empire**

(Same as CLASSGEN 159, RELIGST 229, RELIGST 329) Since Herodotus in the 5th century BCE, the Persian Empire has been represented as the exemplar of oriental despotism and imperial arrogance, a looming presence and worthy foil for the West and Greek democracy. History of the Achaemenid Empire, beginning with the rise of the Medes in the 7th century BCE to the fall of the Achaemenids to Alexander the Great's armies in 331 BCE. Focus on the intimate relationship between religion and empire and will also survey the diverse cultural institutions and religious practices found within the Empire. Evaluate contemporary representations of the Persians in politics and popular culture, such as the recent film *300* and the graphic novel on which it is based, in an attempt to better appreciate the enduring cultural legacy of the Greco-Persian wars.  
3 units, not given this year

**CLASSGEN 260. Directed Reading in Classics (Graduate Students)**

1-15 units, Aut (*Staff*), Win (*Staff*), Spr (*Staff*), Sum (*Staff*)

**CLASSGEN 282. In Search of David and Solomon**

(Same as CLASSGEN 182, JEWISHST 182A, JEWISHST 382A, RELIGST 182A, RELIGST 382A) In recent years, the existence of King David and Solomon has become a hotly contested subject, with some scholars questioning whether they were real-life historical figures and others claiming to have found evidence that corroborates their existence. Drawing on the most recent archaeological research, this course will involve students in the quest for the historical David and Solomon as a way to introduce them to the challenges of using the Bible as an historical source.  
4 units, Spr (*Lederman, Z*)

**CLASSGEN 336. Augustine on Memory, Time, and the Self**

This course examines Augustine's *Confessions* as an autobiographical discourse. It investigates his theories of memory and of time and address different theories of the self. How does memory and the passing of time affect the notion of the self? Does Augustine's subjective theory of time offer an identifiable self? Is the self constructed by narratives? We will locate these issues in their cultural context by investigating Christian and pagan discourses and practices in Late Antiquity.  
4-5 units, Win (*Nightingale, A*)

**CLASSGEN 342. Introduction to Greek Aesthetics : The Paradigm of Dance**

How did the Greeks contemplate and theorize about beauty and allied concepts? Since aesthetics as a discipline emerged in the eighteenth century, is it legitimate for us to use this term when discussing Greek antiquity? In the first part of the seminar we will read and discuss secondary literature on aesthetics esp. eighteenth and nineteenth century European thought and compare/contrast this literature with poetic and philosophical texts of the archaic and classical periods in Greece. In the second part of the seminar we will focus on one particular art and its relation to aesthetics: dance. We will juxtapose and compare modern and ancient texts about dance and raise questions concerning dance as a spectacle and the type of pleasure this spectacle provides to its viewers.  
3-5 units, Spr (*Peponi, A*)

**CLASSGEN 360. Dissertation Research in Classics**

1-10 units, Aut (*Staff*), Win (*Staff*), Spr (*Staff*), Sum (*Staff*)

**CLASSGEN 801. TGR Project**

0 units, Aut (*Staff*), Win (*Staff*), Spr (*Staff*), Sum (*Staff*)

**CLASSGEN 802. TGR Dissertation**

0 units, Aut (*Staff*), Win (*Staff*), Spr (*Staff*), Sum (*Staff*)

# CLASSICS GREEK (CLASSGRK) COURSES

## UNDERGRADUATE COURSES IN CLASSICS GREEK

Primarily for undergraduates; graduate students may enroll with consent of adviser.

### CLASSGRK 1. Beginning Greek

No knowledge of Greek is assumed. Classics majors and minors must take course for letter grade. Vocabulary and syntax of the classical language.

3-5 units, Aut (McCall, M; Wietzke, J)

### CLASSGRK 2. Beginning Greek

Continuation of CLASSGRK 1. Classics majors and minors must take course for letter grade.

3-5 units, Win (McCall, M)

### CLASSGRK 3. Beginning Greek

Continuation of CLASSGRK 2. Classics majors and minors must take course for letter grade. Vocabulary and syntax of the classical language. Separate section for Biblical Greek. CLASSGRK 3 fulfills University language requirement.

3-5 units, Spr (Loar, M)

### CLASSGRK 101. Intermediate Greek: Plato's Apology

Vocabulary building, ongoing review of forms and constructions. Classics majors and minors must take course for letter grade. May be repeated for credit.

3-5 units, Aut (Montagne, J)

### CLASSGRK 102. Intermediate Greek: Aeschylus

In this course, we will read a very great tragedy, Aeschylus' Eumenides. We will use the edition and commentary of A. Sommerstein (Cambridge 1989). My assumption will be that this is the first Greek tragedy in Greek for almost all students in the class, and we will proceed extremely carefully and thoroughly, covering as much of the text as we can in a short quarter. We will discuss and debate the immense themes and issues at every point, and we will read in English the six other Aeschylean tragedies. There will be two midterms and, by the end of the term, a serious paper. Reading a Greek tragedy in Greek will be one of the most important things all students in the class will ever do.

4-5 units, Win (McCall, M)

### CLASSGRK 103. Intermediate Greek

Readings in Greek and English. Classics majors and minors must take course for letter grade. May be repeated for credit.

3-5 units, Spr (Driscoll, D)

### CLASSGRK 111. Advanced Greek: Attic Oratory

(Same as CLASSGRK 211) The speeches of Lysias and Antiphon, with special attention to rhetoric, prose style and Athenian law and culture. The course focuses primarily on forensic oratory, but we will also read samples of deliberative and epideictic speeches. Classics majors and minors must take course for letter grade. May be repeated for credit.

3-5 units, Aut (Staff)

### CLASSGRK 112. Advanced Greek: Lyric Poetry

Invectives, love songs, drinking songs, elegies, and choral odes from 700-500 B.C.E. Readings include Sappho, Alcaeus, Archilochus, Mimnermus, Alcman, Solon, and Pindar. Classics majors and minors must take course for letter grade. May be repeated for credit.

3-5 units, Win (Peponi, A)

### CLASSGRK 113. Advanced Greek

Classics majors and minors must take course for letter grade. May be repeated for credit.

3-5 units, Spr (Netz, R)

### CLASSGRK 175A. Greek Syntax: Prose Composition

(Same as CLASSGRK 275A) (First-year graduate students register for 275A,B.) Review of Greek grammar and instruction in Greek prose composition skills. Begins sixth week of Winter Quarter and continues through Spring Quarter. Classics majors and minors must take course for letter grade. Prerequisite for undergraduates:

three years of Greek.

2 units, Win (O'Connell, P)

### CLASSGRK 175B. Greek Syntax: Prose Composition

(Same as CLASSGRK 275B) (First-year graduate students register for 275A,B.) Review of Greek grammar and instruction in Greek prose composition skills. Begins sixth week of Winter Quarter and continues through Spring Quarter. Classics majors and minors must take course for letter grade. Prerequisite for undergraduates: three years of Greek.

3-5 units, Spr (O'Connell, P)

## GRADUATE COURSES IN CLASSICS GREEK

Primarily for graduate students; undergraduates may enroll with consent of instructor.

### CLASSGRK 211. Advanced Greek: Attic Oratory

(Same as CLASSGRK 111) The speeches of Lysias and Antiphon, with special attention to rhetoric, prose style and Athenian law and culture. The course focuses primarily on forensic oratory, but we will also read samples of deliberative and epideictic speeches. Classics majors and minors must take course for letter grade. May be repeated for credit.

3-5 units, Aut (Staff)

### CLASSGRK 275A. Greek Syntax: Prose Composition

(Same as CLASSGRK 175A) (First-year graduate students register for 275A,B.) Review of Greek grammar and instruction in Greek prose composition skills. Begins sixth week of Winter Quarter and continues through Spring Quarter. Classics majors and minors must take course for letter grade. Prerequisite for undergraduates: three years of Greek.

2 units, Win (O'Connell, P)

### CLASSGRK 275B. Greek Syntax: Prose Composition

(Same as CLASSGRK 175B) (First-year graduate students register for 275A,B.) Review of Greek grammar and instruction in Greek prose composition skills. Begins sixth week of Winter Quarter and continues through Spring Quarter. Classics majors and minors must take course for letter grade. Prerequisite for undergraduates: three years of Greek.

3-5 units, Spr (O'Connell, P)

## CLASSICS HISTORY (CLASSHIS) COURSES

### UNDERGRADUATE COURSES IN CLASSICS HISTORY

Primarily for undergraduates; graduate students may enroll with consent of adviser.

### CLASSHIS 23N. Slavery and Rebellion in Ancient Rome: Spartacus in Legend and History

(F,Sem) (Same as HISTORY 13N) Stanford Introductory Seminar. Preference to freshmen. Spartacus and his army of slaves resisted the power of the Roman legions for two years and became the stuff of legend. Introduction to Roman history. Slavery in ancient Rome in its psychological, social, and economic dimensions. Causes of Spartacus' rebellion; how the traumatic end of the rebellion gave rise to a legend popularized in Stanley Kubrick's 1960 film.

3 units, Aut (Saller, R)

### CLASSHIS 24N. The Roman Empire: Its Grandeur and Fall

(Same as HISTORY 11N) Preference to Freshmen. Prerequisite: IHUM 69A. Explore themes on the Roman Empire and its decline from the 1st through the 5th centuries C.E.. What was the political and military glue that held this diverse, multi-ethnic empire together? What were the bases of wealth and how was it distributed? What were the possibilities and limits of economic growth? How integrated was it in culture and religion? What were the causes and consequences of the conversion to Christianity? Why did the Empire fall in the West? How suitable is the analogy of the U.S. in the 21st century? GER:IHUM-3

4 units, not given this year

**CLASSHIS 26N. From Community to Empire: Understanding the Premodern State**

(F,Sem) Stanford Introductory Seminar. As Rousseau observed, man was born free, and everywhere he is in chains. How did this happen? Bringing together theoretical models from the social sciences and historical evidence from all over the world, this course explores the emergence, evolution and character of the state as a fundamental type of human organization that has shaped our existence for thousands of years. GER:IHUM-3

3-4 units, Spr (Scheidel, W)

**CLASSHIS 60. The Romans**

How did Rome grow from a loose gang of shepherds, exiles, and criminals to an empire of 65 million people stretching from Britain to Egypt? How and why did it then fall into ruins? Topics include Roman history, society, culture, economics, religions, and impact on Western civilization. We also discuss the origins of the republican form of government, explorations of military strategy, imperialism, slavery, and public entertainment. Focus is on original primary sources, including visual and archaeological evidence. This course also teaches general historical methodologies and techniques. GER:DB-Hum

3-5 units, Spr (Scheidel, W)

**CLASSHIS 101. The Greeks**

Greek history from the rise of the city state through Alexander the Great's conquest of Persia. Economics, society, culture, and technology. Competition and cooperation within and between states; the emergence of strong forms of citizenship along with chattel slavery and gender inequality; the origins and practices of democracy; and relations with non-Greek peoples. Focus is on ancient sources and archaeological remains. GER:DB-Hum

4-5 units, Win (Morris, I)

**CLASSHIS 105. History and Culture of Ancient Egypt**

Overview of ancient Egyptian pasts, from predynastic times to Greco-Roman rule, roughly 3000 BCE to 30 BCE. Attention to archaeological sites and artifacts; workings of society; and cultural productions, both artistic and literary. GER:DB-Hum, EC-GlobalCom

3-5 units, Spr (Parker, G)

**CLASSHIS 117. Origins of History in Greece and Rome**

The beginnings and development of historical writing in the ancient world. Emphasis on major classical historians and various models of history they invented from local to imperial, military, cultural, biographical, world history and church history. Focus on themes of power, war, loss, growth and decline, as put by the ancients into historical narrative forms and probed by way of historical questioning and explanation. Attention to how these models resonate still today. Readings in translation: Herodotus, Thucydides, Tacitus, Livy and others.

4-5 units, Win (Ceserani, G)

**CLASSHIS 133. Classical Seminar: Origins of Political Thought**

(Same as CLASSHIS 333, PHIL 176A, PHIL 276A, POLISCI 230A, POLISCI 330A) Political philosophy in classical antiquity, focusing on canonical works of Thucydides, Plato, Aristotle, and Cicero. Historical background. Topics include: political obligation, citizenship, and leadership; origins and development of democracy; and law, civic strife, and constitutional change. GER:DB-Hum

4-5 units, Win (Ober, J)

**CLASSHIS 135B. Ancient Greek Law**

(Same as CLASSHIS 335B, POLISCI 431B) Workshop, which continues the work of the previous quarter. The development and practice of law and legal procedure in the ancient Greek world, emphasizing the well documented case of classical Athens. Constitutional, criminal, and civil law, approached through analysis of actual laws and speeches by litigants in Athenian courtrooms. Review of a growing scholarship juxtaposing Greek law to other prominent legal traditions and exploring the role of law in Greek social relations, economics, and literature.

5 units, Spr (Ober, J)

**GRADUATE COURSES IN CLASSICS HISTORY**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**CLASSHIS 313. The Shape of the Ancient World**

This seminar accompanies and encourages students to become involved in a Digital Humanities project that seeks to transform our understanding of ancient history by creating networks and maps that express distance in real terms (i.e., in terms of travel time and cost incurred), allowing us to reconstruct the true shape and structure of entities such as the Roman Empire and thereby providing a new foundation for our understanding of its emergence, functioning, and unraveling.

3-5 units, Aut (Scheidel, W)

**CLASSHIS 315. The Mediterranean World in the Age of Philip II**

I have stolen my title from Braudel's famous book, but this Philip II is the one from Macedon (382-336 BCE). Since the 1980s many archaeologists and historians have increasingly looked at Greece in its Mediterranean context; this seminar will examine the Mediterranean's geography, climate, and demography in the first millennium BCE and then survey developments in some of the major regions (Assyria, Persia, Levant, Egypt, Italy, and the west), finally locating Greece and Macedon in this broader context.

4-5 units, Spr (Morris, I)

**CLASSHIS 323. Greek Histories in Modern Europe**

The first modern historical rewritings of ancient Greece: What made them modern? How did they shape what Greek history is today? Texts and things in the modern recovery of the Greek past; women, colonies, democracy and art as modern subjects of ancient Greek history; modern historiographical methods and theories in their social and cultural contexts; modern historicity and the Greek past. Reading includes ancient historians, Renaissance antiquarians, eighteenth-century Greek histories and Enlightenment writings on ancient Greeks, and current scholarship.

4-5 units, Win (Ceserani, G)

**CLASSHIS 333. Classical Seminar: Origins of Political Thought**

(Same as CLASSHIS 133, PHIL 176A, PHIL 276A, POLISCI 230A, POLISCI 330A) Political philosophy in classical antiquity, focusing on canonical works of Thucydides, Plato, Aristotle, and Cicero. Historical background. Topics include: political obligation, citizenship, and leadership; origins and development of democracy; and law, civic strife, and constitutional change.

4-5 units, Win (Ober, J)

**CLASSHIS 335A. Ancient Greek Law**

(Same as POLISCI 431A) The development and practice of law and legal procedure in the ancient Greek world, emphasizing the well documented case of classical Athens. Constitutional, criminal, and civil law, approached through analysis of actual laws and speeches by litigants in Athenian courtrooms. Review of a growing scholarship juxtaposing Greek law to other prominent legal traditions and exploring the role of law in Greek social relations, economics, and literature.

5 units, Win (Ober, J)

**CLASSHIS 335B. Ancient Greek Law**

(Same as CLASSHIS 135B, POLISCI 431B) Workshop, which continues the work of the previous quarter. The development and practice of law and legal procedure in the ancient Greek world, emphasizing the well documented case of classical Athens. Constitutional, criminal, and civil law, approached through analysis of actual laws and speeches by litigants in Athenian courtrooms. Review of a growing scholarship juxtaposing Greek law to other prominent legal traditions and exploring the role of law in Greek social relations, economics, and literature.

5 units, Spr (Ober, J)

# CLASSICS LATIN (CLASSLAT) COURSES

## UNDERGRADUATE COURSES IN CLASSICS LATIN

Primarily for undergraduates; graduate students may enroll with consent of adviser.

### **CLASSLAT 1. Beginning Latin: Vocabulary and Syntax**

Vocabulary and syntax of the classical language. No previous knowledge of Latin is assumed. Classics majors and minors must take course for letter grade.

3-5 units, Aut (Klopacz, J)

### **CLASSLAT 2. Beginning Latin**

Continuation of CLASSLAT 1. Classics majors and minors must take course for letter grade.

3-5 units, Win (Klopacz, J)

### **CLASSLAT 3. Beginning Latin**

Continuation of CLASSLAT 2. Classics majors and minors must take course for letter grade. CLASSLAT 3 fulfills the University language requirement.

3-5 units, Spr (Klopacz, J)

### **CLASSLAT 10. Intensive Beginning Latin**

Equivalent to CLASSLAT 1, 2, 3; or 51 and 52. Goal is to read easy Latin prose and poetry by the end of the quarter. Classics majors and minors must take course for letter grade. CLASSLAT 10 fulfills the University language requirement.

9-15 units, Sum (Staff)

### **CLASSLAT 101. Intermediate Latin: Introduction to Literature**

Phonology, morphology, semantics, and syntax. Readings in prose and poetry. Analysis of literary language, including rhythm, meter, word order, narrative, and figures of speech.

3-5 units, Aut (Klopacz, J)

### **CLASSLAT 102. Intermediate Latin: Pliny and Martial**

This is a literature class in which selections from the *Cena Trimalchionis* of Petronius and selected epigrams of Martial will be read in the original Latin. Classics majors and minors must take this course for a letter grade.

3-5 units, Win (MacDonald, C)

### **CLASSLAT 103. Intermediate Latin: Cicero and Ovid**

Classics majors and minors must take course for a letter grade. May be repeated for credit.

3-5 units, Spr (Klopacz, J)

### **CLASSLAT 111. Advanced Latin: Horace's Odes and Epodes**

Reading Horace's lyric and iambic poetry: the class will offer introduction to the literary aspect and also emphasis on Latin as a language of poetry and its evolution. There is also an emphasis on similarity and difference with the Greek lyric tradition and the Western lyric tradition (much influenced by Horace). Classic majors and minors must take course for a letter grade. May be repeated for credit.

3-5 units, Aut (Barchiesi, A)

### **CLASSLAT 112. Advanced Latin: Lucretius**

This course offers advanced students of Latin an opportunity to engage closely with a late Roman Republican text, both at the lexical and thematic level. We shall explore Lucretius' wonderful poem about the atoms (DRN 1) from the perspective of reader-response criticism, and with a focus on the poem's syntax, meter, wordplay, and rhetorical devices. There will also be an opportunity for studying matters of textuality, narrativity and temporality, as well as for the broader analysis of the socio-cultural and literary history of the didactic genre. Classics majors and minors must take course for letter grade. May be repeated for credit.

3-5 units, Win (Yansen de Skipper, L)

### **CLASSLAT 113. Advanced Latin: Livy**

Readings in Latin. Classics majors and minors must take course for a letter grade. May be repeated for credit.

3-5 units, Spr (Ceserani, G)

### **CLASSLAT 175A. Latin Syntax**

(Same as CLASSLAT 275A) (First-year graduate students register for 275A,B.) Intensive review of Latin syntax. Begins Autumn Quarter and continues through the fifth week of Winter Quarter. See CLASSGEN 205A,B for supplemental courses. Classics majors and minors must take course for letter grade. Prerequisite for undergraduates: three years of Latin.

3-5 units, Aut (Devine, A)

### **CLASSLAT 175B. Latin Syntax**

(Same as CLASSLAT 275B) (First-year graduate students register for 275A,B.) Intensive review of Latin syntax. Begins Autumn Quarter and continues through the fifth week of Winter Quarter. See CLASSGEN 205A,B for supplemental courses. Classics majors and minors must take course for letter grade. Prerequisite for undergraduates: three years of Latin.

2 units, Win (Devine, A)

## GRADUATE COURSES IN CLASSICS LATIN

Primarily for graduate students; undergraduates may enroll with consent of instructor.

### **CLASSLAT 275A. Latin Syntax**

(Same as CLASSLAT 175A) (First-year graduate students register for 275A,B.) Intensive review of Latin syntax. Begins Autumn Quarter and continues through the fifth week of Winter Quarter. See CLASSGEN 205A,B for supplemental courses. Classics majors and minors must take course for letter grade. Prerequisite for undergraduates: three years of Latin.

3-5 units, Aut (Devine, A)

### **CLASSLAT 275B. Latin Syntax**

(Same as CLASSLAT 175B) (First-year graduate students register for 275A,B.) Intensive review of Latin syntax. Begins Autumn Quarter and continues through the fifth week of Winter Quarter. See CLASSGEN 205A,B for supplemental courses. Classics majors and minors must take course for letter grade. Prerequisite for undergraduates: three years of Latin.

2 units, Win (Devine, A)

### **CLASSLAT 305. The Divine Council**

The Divine Council is one of the few recurring ideas in epic poetry from the second millennium BCE (West Asia) to the XVII century (Europe and the New World). As such, it lends itself to a comparative approach; the class will focus on epic texts in Latin, since they are the majority of the tradition, but with comparative contributions from other languages.

5 units, Aut (Barchiesi, A)

### **CLASSLAT 316. Maecenas and the Poets**

Maecenas, patron, statesman, collector, gardener, neurotic, has been called "the most original individual of the Augustan Age." This ambiguous figure and versatile symbol makes an ideal filter for exploring the cultural contradictions of the period. Reading Virgil's *Georgics*, Horace's *Satires*, *Epodes*, *Odes*, and *Epistles*, Propertius' *Elegies*, and his own poetic fragments, we will ask: how does Maecenas define the poetry in which he appears and how does he become the focus of contemporary ideas about masculinity, luxury, patronage, and freedom?

3-5 units, Aut (Gowers, E)

## COMMUNICATION (COMM) COURSES

### UNDERGRADUATE COURSES IN COMMUNICATION

Primarily for undergraduates; graduate students may enroll with consent of adviser.

### **COMM 1A. Media Technologies, People, and Society**

(Same as COMM 211) (Graduate students register for COMM 211.) Open to non-majors. Introduction to the concepts and contexts of communication. A topics-structured orientation emphasizing the field and the scholarly endeavors represented in



the department. GER:DB-SocSci  
4-5 units, not given this year

### COMM 1B. Media, Culture, and Society

(Same as AMSTUD 1B) The institutions and practices of mass media, including television, film, radio, and digital media, and their role in shaping culture and social life. The media's shifting relationships to politics, commerce, and identity. GER:DB-SocSci  
5 units, Win (Turner, F)

### COMM 103S. Media Entertainment

The impact of media entertainment on individuals, social groups, and societies. Sources include a diverse cross-section of entertainment. Introduction to psychological and socio-psychological theories. Empirical findings relating to media entertainment as a stimulus and a reception phenomenon. What renders diverse genres of media content and format enjoyable? Why do individuals pursue entertainment experiences in ever-increasing numbers? What is the political impact of apolitical media entertainment?

3-5 units, Sum (Staff)

### COMM 104W. Reporting, Writing, and Understanding the News

Techniques of news reporting and writing. The value and role of news in democratic societies. Gateway class to journalism. Prerequisite for all COMM 177/277 classes. Limited enrollment. Preference to sophomores and juniors. WIM

5 units, Win (Zacharia, J), Spr (Zacharia, J)

### COMM 106. Communication Research Methods

(Same as COMM 206) (Graduate students register for COMM 206.) Conceptual and practical concerns underlying commonly used quantitative approaches, including experimental, survey, content analysis, and field research in communication. Pre- or corequisite: STATS 60 or consent of instructor. GER:DB-SocSci  
4-5 units, Aut (Voelker, D)

### COMM 108. Media Processes and Effects

(Same as COMM 208) (Graduate students register for COMM 208.) The process of communication theory construction including a survey of social science paradigms and major theories of communication. Recommended: 1 or PSYCH 1. GER:DB-SocSci

4-5 units, Win (Bailenson, J)

### COMM 112S. Bending the Truth: Propaganda in Media and Culture

What is propaganda? What role does it play in our lives? And how do we conceive of propaganda's relationship to politics and culture? This course will examine the evolution of propaganda from the early 20th century to the present. It will take up examples from advertising, journalism, cinema, painting and digital media. By the end of the course, students will have a broad understanding of the tactics by which various interest groups have sought to influence public communication.

3-5 units, Sum (Staff)

### COMM 113S. Make up your mind: Judgment and Decision Making

Ever have trouble making up your mind? Every day, millions of people struggle to make wise decisions. Ironically, even when we toil over decisions, they are often plagued with bias. This interactive lecture-based course will explore the core theories and current research on heuristics and biases in human inference. In addition, the course will cover essential communication and psychology findings that shed light on different aspects of the decision making process. The final project is a student-designed empirical research proposal that will have practical applications as well as theoretical importance.

3-5 units, Sum (Staff)

### COMM 114S. Online Manipulation: Persuasion, Contagion, and Compliance-Gaining in Online Media

Political campaigns micro-target their messages to individuals according to the issues each cares about. Endorsements of products and brands spread through Facebook. Mobile devices sense physical activity and coach people to meet diet and exercise goals. Using social-scientific research and real-world examples, this course examines the social and psychological processes by which communication technologies are used to change people's attitudes, beliefs, and behaviors. By the end of the course, students will understand the psychology of persuasion and social influence, and

they will have applied this to the design and criticism of new technologies, interventions, and messages.

3-5 units, Sum (Staff)

### COMM 116. Journalism Law

(Same as COMM 216) (Graduate students register for 216.) Laws and regulation impacting journalists. Topics include libel, privacy, news gathering, protection sources, fair trial and free press, theories of the First Amendment, and broadcast regulation. Prerequisite: Journalism M.A. student or advanced Communication major.

4-5 units, Win (Wheaton, J)

### COMM 117. Digital Journalism

(Same as COMM 217) (Graduate students register for COMM 217.) Seminar and practicum. The implications of new media for journalists. Professional and social issues related to the web as a case of new media deployment, as a story, as a research and reporting tool, and as a publishing channel. Prerequisite: Journalism M.A. student or consent of instructor.

4-5 units, Win (Brenner, R)

### COMM 120. Digital Media in Society

(Same as AMSTUD 120, COMM 220) (Graduate students register for 220.) Contemporary debates concerning the social and cultural impact of digital media. Topics include the historical origins of digital media, cultural contexts of their development and use, and influence of digital media on conceptions of self, community, and state. Priority to Juniors and Seniors. GER:DB-SocSci

4-5 units, not given this year

### COMM 122. Content Analysis: Studying Communication Artifacts

(Same as COMM 222) An empirical and systematic investigation of documented messages in print, graphical, and audio-visual forms and observed human communication behaviors. Focuses on the design and execution of content analytic studies, including manifest vs. latent content, measurement issues, reliability and validity assessment, computer text analysis, and traditional human-coder techniques. Prerequisite: junior, senior or grad standing; COMM 106/206 or an equivalent course in basic social science research.

4-5 units, Win (Voelker, D)

### COMM 123. Attitude Change and Persuasion

(Same as COMM 223) What attitudes are, how they are measured, and the dynamics of their formation, maintenance and change. Central and peripheral routes to attitude change; source, channel and receiver factors; attitude-behavior consistency; the roles of involvement, elaboration, affect and social influence. Note: this is not a how-to course in persuasion for practitioners, but a grounding in the conceptual foundations of attitude change and a survey of prevailing theories.

4-5 units, Spr (Voelker, D)

### COMM 125. Perspectives on American Journalism

(Same as COMM 225) (Graduate students register for COMM 225.) An examination of the practice of American journalism, focusing on the political, social, cultural, economic and technological forces that have shaped the U. S. press since the early 1800s. Aimed at consumers as well as producers of news, the objective of this course is to provide a framework and vocabulary for judging the value and quality of everyday journalism. GER:DB-SocSci

4-5 units, Aut (Glasser, T)

### COMM 130N. The idea of a free press

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. An examination of the meaning of freedom of the press, tied to but not bound by various Supreme Court rulings on the scope and purpose of the First Amendment's speech and press clauses. Discussions will include a look at the recent and rapid computerization of communication and what it portends for the future of a free press.

3-4 units, Spr (Glasser, T)

### COMM 131. Media Ethics and Responsibility

(Same as COMM 231) (Graduate students register for COMM 231.) The development of professionalism among American journalists, emphasizing the emergence of objectivity as a professional and the epistemological norm. An applied ethics course where questions of power, freedom, and truth autonomy are



treated normatively so as to foster critical thinking about the origins and implications of commonly accepted standards of responsible journalism. GER:DB-SocSci

*4-5 units, not given this year*

**COMM 134. Public Participation and Public Policy**

(Same as COMM 234) Examines the role of public participation in public policy making. Around the world, policymakers seek to engage their publics. But, even though public participation is important, it is also problematic. Public meetings can become dysfunctional and turn into media spectacles instead of actually gathering the opinions of the public. The question becomes, when and how should the public be consulted in order to effectively impact public policies? There are consequences of engaging the public, and this seminar explores the methods used to engage publics around the world.

*4-5 units, not given this year*

**COMM 137W. The Dialogue of Democracy**

(Same as AMSTUD 137, COMM 237, POLISCI 232T, POLISCI 332T) All forms of democracy require some kind of communication so people can be aware of issues and make decisions. This course looks at competing visions of what democracy should be and different notions of the role of dialogue in a democracy. Is it just campaigning or does it include deliberation? Small scale discussions or sound bites on television? Or social media? What is the role of technology in changing our democratic practices, to mobilize, to persuade, to solve public problems? This course will include readings from political theory about democratic ideals - from the American founders to J.S. Mill and the Progressives to Joseph Schumpeter and modern writers skeptical of the public will. It will also include contemporary examinations of the media and the internet to see how those practices are changing and how the ideals can or cannot be realized. GER:EC-EthicReas, WIM

*4-5 units, Win (Fishkin, J)*

**COMM 140. Digital Media Entrepreneurship**

(Same as COMM 240) (Graduate students register for COMM 240.) Primarily for graduate journalism and computer science students. Silicon Valley's new media culture, digital storytelling skills and techniques, web-based skills, and entrepreneurial ventures. Guest speakers.

*3-5 units, Spr (Grimes, A)*

**COMM 147. Modern History and Future of Journalism**

(Same as COMM 247) (Graduate students register for COMM 247.) The birth and evolution of local and national television news. The modern history of newspapers. Can they survive in the era of online journalism?

*4-5 units, Spr (Brinkley, J)*

**COMM 156. Negotiation and Influence**

(Same as COMM 256, EDUC 256C) No matter how excellent your ideas, most significant achievements require the ability to communicate with and influence others. This course examines the theory, research, and practice of negotiation across a variety of settings. It provides multiple opportunities for students to develop negotiation skills through role-plays, exercises, and useful analytical frameworks. Topics include: distributive and integrative bargaining, psychological biases, lessons from game theory, principles of influence, multiparty negotiation, and the value of relationships and trust. The course meets intensively over a highly condensed period of time. Intended for graduate students and advanced undergraduates. No prerequisites. Limited enrollment; advance application required; see <http://comm.stanford.edu/faculty/curhan>

*1-2 units, Aut (Staff), Win (Curhan, J), Spr (Staff)*

**COMM 160. The Press and the Political Process**

(Same as COMM 260, POLISCI 323R) (Graduate students register for COMM 260.) The role of mass media and other channels of communication in political and electoral processes. GER:DB-SocSci

*4-5 units, not given this year*

**COMM 162. Campaigns, Voting, Media, and Elections**

(Same as COMM 262, POLISCI 120B) This course examines the theory and practice of American campaigns and elections. First, we will attempt to explain the behavior of the key players -- candidates, parties, journalists, and voters -- in terms of the

institutional arrangements and political incentives that confront them. Second, we will use current and recent election campaigns as laboratories for testing generalizations about campaign strategy and voter behavior. Third, we examine selections from the academic literature dealing with the origins of partisan identity, electoral design, and the immediate effects of campaigns on public opinion, voter turnout, and voter choice. As well, we'll explore issues of electoral reform and their more long-term consequences for governance and the political process. GER:DB-SocSci

*4-5 units, Win (Lyengar, S)*

**COMM 164. The Psychology of Communication About Politics in America**

(Same as COMM 264, POLISCI 224L, PSYCH 170) Focus is on how politicians and government learn what Americans want and how the public's preferences shape government action; how surveys measure beliefs, preferences, and experiences; how poll results are criticized and interpreted; how conflict between polls is viewed by the public; how accurate surveys are and when they are accurate; how to conduct survey research to produce accurate measurements; designing questionnaires that people can understand and use comfortably; how question wording can manipulate poll results; corruption in survey research. Preference to juniors, seniors, graduate students.

*4 units, Spr (Krosnick, J)*

**COMM 166. Virtual People**

(Same as COMM 266) (Graduate students register for COMM 266.) The concept of virtual people or digital human representations; methods of constructing and using virtual people; methodological approaches to interactions with and among virtual people; and current applications. Viewpoints including popular culture, literature, film, engineering, behavioral science, computer science, and communication.

*4-5 units, Spr (Bailenson, J)*

**COMM 167. Advanced Seminar in Virtual Reality Research**

Restricted to students with previous research experience in virtual reality. Experimental methods and other issues.

*1-3 units, Win (Bailenson, J)*

**COMM 168. Experimental Research in Advanced User Interfaces**

(Same as COMM 268, COMM 368, ME 468) Project-based course involves small (3-4) person teams going through all parts of the experimental process: question generation, experiment design, running, and data analysis. Each team creates an original, publishable project that represents a contribution to the research and practicum literatures. All experiments involve interaction between people and technology, including cars, mobile phones, websites, etc. Prerequisite: consent of instructor.

*1-5 units, not given this year*

**COMM 169. Computers and Interfaces**

(Same as COMM 269) (Graduate students register for COMM 269.) Interdisciplinary. User responses to interfaces and design implications of those responses. Theories from different disciplines illustrate responses to textual, voice-based, pictorial, metaphoric, conversational, adaptive, agent-based, intelligent, and anthropomorphic interfaces. Group design project applying theory to the design of products or services for developing countries. GER:DB-SocSci

*4-5 units, not given this year*

**COMM 171. Multimedia Reporting and Production for Public Issues**

(Same as COMM 271) (Graduate students register for 271.) Production of multimedia assignments for traditional news beats using audio, still photography, graphics and video. 2-hour lab class for creative, conceptual and technical skills for production of multimedia stories. Prerequisite: Journalism MA student or instructor's consent.

*3-5 units, Win (Migielicz, G)*

**COMM 172. Media Psychology**

(Same as COMM 272) (Graduate students register for COMM 272.) The literature related to psychological processing and the effects of media. Topics: unconscious processing; picture perception; attention and memory; emotion; the physiology of processing media; person perception; pornography; consumer behavior; advanced film and television systems; and differences

among reading, watching, and listening. GER:DB-SocSci  
4-5 units, Spr (Reeves, B)

**COMM 176. Advanced Digital Media Production**

(Same as COMM 276) In-depth reporting and production using audio, images and video. Focus on an in-depth journalism project with appropriate uses of digital media: audio, photography, graphics, and video. Topics include advanced field techniques and approaches (audio, video, still) and emphasis on creating a non-fiction narrative arc in a multimedia piece of 10-12 minutes. Prerequisite: COMM 275 or consent of instructor

4-5 units, Spr (Migielicz, G)

**COMM 177C. Specialized Writing and Reporting: Environmental Journalism**

(Same as COMM 277C, ENVRES 277C) (Graduate students register for COMM / ENVRES 277C.) Practical, collaborative, writing-intensive course in science-based environmental journalism. Science and journalism students learn how to identify and write engaging stories about environmental issues and science, how to assess the quality and relevance of environmental news, how to cover the environment and science beats effectively, and how to build bridges between the worlds of journalism and science. Limited enrollment: preference to journalism students and students in the natural and environmental sciences. Prerequisite: COMM 104, ENVRES 200 or consent of instructor. Admissions by application only, available from thayden@stanford.edu and due 3/28/12.

4-5 units, Spr (Hayden, T)

**COMM 177D. Specialized Writing and Reporting: Magazine Journalism**

(Same as COMM 277D) (Graduate students register for COMM 277D.) How to report, write, edit, and read magazine articles, emphasizing long-form narrative. Tools and templates of story telling such as scenes, characters, dialogue, and narrative arc. How the best magazine stories defy or subvert conventional wisdom and bring fresh light to the human experience through reporting, writing, and moral passion. Prerequisite: 104 or consent of instructor.

4-5 units, Spr (Brenner, R)

**COMM 177G. Specialized Writing and Reporting: Covering Silicon Valley**

(Same as COMM 277G) (Graduate students register for COMM 277G.) Business reporting basics in the context of Silicon Valley's technology scene. Prerequisite: 104 or consent of instructor.

4-5 units, Win (Grimes, A)

**COMM 177I. Specialized Writing and Reporting: Investigative Reporting**

(Same as COMM 277I) Graduate students register for COMM 277I.) Under the supervision of editors from the Center for Investigative Reporting, students will work on a group investigative project with the end-goal of publication and distribution through CIR's California Watch project. The class will emphasize the history and role of investigative reporting as well as skills and techniques needed to do it. Limited enrollment. Prerequisite: instructor consent. Go to <http://comm.stanford.edu/faculty/grimes> for application instructions.

4-5 units, not given this year

**COMM 177K. Specialized Writing and Reporting: Human Rights Journalism**

(Same as COMM 277K) (Graduate students register for COMM 277K.) The evolution of human rights law and enforcement, and the role of journalists in uncovering, pursuing, and publicizing political violence, detention, and torture. Case studies from S. Africa, Latin America, Israel and Palestine, N. Ireland, Bosnia, Rwanda, and Sudan and Darfur. Human rights issues in the U.S. in the aftermath of 9/11. Students conduct research and write journalistic reports on foreign and domestic issues. Prerequisite: 104 or consent of instructor.

4-5 units, not given this year

**COMM 177S. Specialized Writing and Reporting: Sports Journalism**

(Same as COMM 277S) (Graduate students register for COMM 277S.) Workshop. The history of sports writing from the 20s to present. Reporting, interviewing, deadline writing, and how to

conceptualize and develop stories. Students write features and news stories for publication in a new sports section in 'The Cardinal Inquirer', an online publication of the graduate program in journalism. Prerequisite: 104 or consent of instructor.

4-5 units, Win (Pomerantz, G)

**COMM 177Y. Specialized Writing and Reporting: Foreign Correspondence in the Middle East and Asia**

(Same as COMM 277Y) (Graduate students register for COMM 277Y.) What's involved in working as a foreign correspondent in these important and volatile parts of the world, where in many cases journalists are not respected and may face danger -- taught by a journalist who has worked extensively in both regions. (no pre-requisites)

4-5 units, Aut (Brinkley, J)

**COMM 180. Topics in Learning and Technology: Core Mechanics for Learning**

(Same as COMM 280, CS 377H, EDUC 328X) Contents of the course change each year. The course can be repeated. In game play, core mechanics refers to the rules of interaction that drive the game forward. This class will consider whether there are core mechanics that can drive learning forward, and if so, how to build them into learning environments.

3 units, Win (Schwartz, D)

**COMM 182. Virtual Communities and Social Media**

(Same as COMM 282) (Graduate students register for COMM 282.) Students will take away from this course a set of conceptual tools, a vocabulary, and an analytical framework with which to recognize, understand, and more effectively manage new social practices online, together with a familiarity with the literature regarding social media and identity, community, collective action, public sphere, social capital, networks, and social networks. Students will also develop skills at using online forums, blogs, microblogs, wikis for research, collaboration, and communication. Limited enrollment. Prerequisite: instructor consent. Go to <http://comm.stanford.edu/faculty/rheingold/> for application instructions.

4-5 units, Aut (Rheingold, H)

**COMM 190. Senior Project**

Research project. Prerequisite: senior standing.

5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**COMM 195. Honors Thesis**

Qualifies students to conduct communication research. Student must apply for department honors thesis program during Spring Quarter of junior year.

5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**COMM 199. Individual Work**

For students with high academic standing. May be repeated for credit.

1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**COMM 212. Models of Democracy**

(Same as COMM 312, POLISCI 237, POLISCI 337) Ancient and modern varieties of democracy; debates about their normative and practical strengths and the pathologies to which each is subject. Focus is on participation, deliberation, representation, and elite competition, as values and political processes. Formal institutions, political rhetoric, technological change, and philosophical critique. Models tested by reference to long-term historical natural experiments such as Athens and Rome, recent large-scale political experiments such as the British Columbia Citizens' Assembly, and controlled experiments.

3-5 units, not given this year

**GRADUATE COURSES IN COMMUNICATION**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**COMM 206. Communication Research Methods**

(Same as COMM 106) (Graduate students register for COMM 206.) Conceptual and practical concerns underlying commonly used quantitative approaches, including experimental, survey, content analysis, and field research in communication. Pre- or corequisite: STATS 60 or consent of instructor.

4-5 units, Aut (Voelker, D)

**COMM 208. Media Processes and Effects**

(Same as COMM 108) (Graduate students register for COMM 208.) The process of communication theory construction including a survey of social science paradigms and major theories of communication. Recommended: 1 or PSYCH 1.

4-5 units, Win (Baileenson, J)

**COMM 211. Media Technologies, People, and Society**

(Same as COMM 1A) (Graduate students register for COMM 211.) Open to non-majors. Introduction to the concepts and contexts of communication. A topics-structured orientation emphasizing the field and the scholarly endeavors represented in the department.

4-5 units, not given this year

**COMM 216. Journalism Law**

(Same as COMM 116) (Graduate students register for 216.) Laws and regulation impacting journalists. Topics include libel, privacy, news gathering, protection sources, fair trial and free press, theories of the First Amendment, and broadcast regulation. Prerequisite: Journalism M.A. student or advanced Communication major.

4-5 units, Win (Wheaton, J)

**COMM 217. Digital Journalism**

(Same as COMM 117) (Graduate students register for COMM 217.) Seminar and practicum. The implications of new media for journalists. Professional and social issues related to the web as a case of new media deployment, as a story, as a research and reporting tool, and as a publishing channel. Prerequisite: Journalism M.A. student or consent of instructor.

4-5 units, Win (Brenner, R)

**COMM 220. Digital Media in Society**

(Same as AMSTUD 120, COMM 120) (Graduate students register for 220.) Contemporary debates concerning the social and cultural impact of digital media. Topics include the historical origins of digital media, cultural contexts of their development and use, and influence of digital media on conceptions of self, community, and state. Priority to Juniors and Seniors.

4-5 units, not given this year

**COMM 222. Content Analysis: Studying Communication Artifacts**

(Same as COMM 122) An empirical and systematic investigation of documented messages in print, graphical, and audio-visual forms and observed human communication behaviors. Focuses on the design and execution of content analytic studies, including manifest vs. latent content, measurement issues, reliability and validity assessment, computer text analysis, and traditional human-coder techniques. Prerequisite: junior, senior or grad standing; COMM 106/206 or an equivalent course in basic social science research.

4-5 units, Win (Voelker, D)

**COMM 223. Attitude Change and Persuasion**

(Same as COMM 123) What attitudes are, how they are measured, and the dynamics of their formation, maintenance and change. Central and peripheral routes to attitude change; source, channel and receiver factors; attitude-behavior consistency; the roles of involvement, elaboration, affect and social influence. Note: this is not a how-to course in persuasion for practitioners, but a grounding in the conceptual foundations of attitude change and a survey of prevailing theories.

4-5 units, Spr (Voelker, D)

**COMM 225. Perspectives on American Journalism**

(Same as COMM 125) (Graduate students register for COMM 225.) An examination of the practice of American journalism, focusing on the political, social, cultural, economic and technological forces that have shaped the U. S. press since the early 1800s. Aimed at consumers as well as producers of news, the objective of this course is to provide a framework and vocabulary for judging the value and quality of everyday journalism.

4-5 units, Aut (Glasser, T)

**COMM 231. Media Ethics and Responsibility**

(Same as COMM 131) (Graduate students register for COMM 231.) The development of professionalism among American journalists, emphasizing the emergence of objectivity as a professional and the epistemological norm. An applied ethics course where questions of power, freedom, and truth autonomy are

treated normatively so as to foster critical thinking about the origins and implications of commonly accepted standards of responsible journalism.

4-5 units, not given this year

**COMM 234. Public Participation and Public Policy**

(Same as COMM 134) Examines the role of public participation in public policy making. Around the world, policymakers seek to engage their publics. But, even though public participation is important, it is also problematic. Public meetings can become dysfunctional and turn into media spectacles instead of actually gathering the opinions of the public. The question becomes, when and how should the public be consulted in order to effectively impact public policies? There are consequences of engaging the public, and this seminar explores the methods used to engage publics around the world.

4-5 units, not given this year

**COMM 237. The Dialogue of Democracy**

(Same as AMSTUD 137, COMM 137W, POLISCI 232T, POLISCI 332T) All forms of democracy require some kind of communication so people can be aware of issues and make decisions. This course looks at competing visions of what democracy should be and different notions of the role of dialogue in a democracy. Is it just campaigning or does it include deliberation? Small scale discussions or sound bites on television? Or social media? What is the role of technology in changing our democratic practices, to mobilize, to persuade, to solve public problems? This course will include readings from political theory about democratic ideals - from the American founders to J.S. Mill and the Progressives to Joseph Schumpeter and modern writers skeptical of the public will. It will also include contemporary examinations of the media and the internet to see how those practices are changing and how the ideals can or cannot be realized.

4-5 units, Win (Fishkin, J)

**COMM 240. Digital Media Entrepreneurship**

(Same as COMM 140) (Graduate students register for COMM 240.) Primarily for graduate journalism and computer science students. Silicon Valley's new media culture, digital storytelling skills and techniques, web-based skills, and entrepreneurial ventures. Guest speakers.

3-5 units, Spr (Grimes, A)

**COMM 247. Modern History and Future of Journalism**

(Same as COMM 147) (Graduate students register for COMM 247.) The birth and evolution of local and national television news. The modern history of newspapers. Can they survive in the era of online journalism?

4-5 units, Spr (Brinkley, J)

**COMM 256. Negotiation and Influence**

(Same as COMM 156, EDUC 256C) No matter how excellent your ideas, most significant achievements require the ability to communicate with and influence others. This course examines the theory, research, and practice of negotiation across a variety of settings. It provides multiple opportunities for students to develop negotiation skills through role-plays, exercises, and useful analytical frameworks. Topics include: distributive and integrative bargaining, psychological biases, lessons from game theory, principles of influence, multiparty negotiation, and the value of relationships and trust. The course meets intensively over a highly condensed period of time. Intended for graduate students and advanced undergraduates. No prerequisites. Limited enrollment; advance application required; see <http://comm.stanford.edu/faculty/curhan>

1-2 units, Aut (Staff), Win (Curhan, J), Spr (Staff)

**COMM 260. The Press and the Political Process**

(Same as COMM 160, POLISCI 323R) (Graduate students register for COMM 260.) The role of mass media and other channels of communication in political and electoral processes.

4-5 units, not given this year

**COMM 262. Campaigns, Voting, Media, and Elections**

(Same as COMM 162, POLISCI 120B) This course examines the theory and practice of American campaigns and elections. First, we will attempt to explain the behavior of the key players -- candidates, parties, journalists, and voters -- in terms of the institutional arrangements and political incentives that confront

them. Second, we will use current and recent election campaigns as laboratories for testing generalizations about campaign strategy and voter behavior. Third, we examine selections from the academic literature dealing with the origins of partisan identity, electoral design, and the immediate effects of campaigns on public opinion, voter turnout, and voter choice. As well, we'll explore issues of electoral reform and their more long-term consequences for governance and the political process.

*4-5 units, Win (Iyengar, S)*

**COMM 264. The Psychology of Communication About Politics in America**

(Same as COMM 164, POLISCI 224L, PSYCH 170) Focus is on how politicians and government learn what Americans want and how the public's preferences shape government action; how surveys measure beliefs, preferences, and experiences; how poll results are criticized and interpreted; how conflict between polls is viewed by the public; how accurate surveys are and when they are accurate; how to conduct survey research to produce accurate measurements; designing questionnaires that people can understand and use comfortably; how question wording can manipulate poll results; corruption in survey research. Preference to juniors, seniors, graduate students.

*4 units, Spr (Krosnick, J)*

**COMM 266. Virtual People**

(Same as COMM 166) (Graduate students register for COMM 266.) The concept of virtual people or digital human representations; methods of constructing and using virtual people; methodological approaches to interactions with and among virtual people; and current applications. Viewpoints including popular culture, literature, film, engineering, behavioral science, computer science, and communication.

*4-5 units, Spr (Bailenson, J)*

**COMM 268. Experimental Research in Advanced User Interfaces**

(Same as COMM 168, COMM 368, ME 468) Project-based course involves small (3-4) person teams going through all parts of the experimental process: question generation, experiment design, running, and data analysis. Each team creates an original, publishable project that represents a contribution to the research and practicum literatures. All experiments involve interaction between people and technology, including cars, mobile phones, websites, etc. Prerequisite: consent of instructor.

*1-5 units, not given this year*

**COMM 269. Computers and Interfaces**

(Same as COMM 169) (Graduate students register for COMM 269.) Interdisciplinary. User responses to interfaces and design implications of those responses. Theories from different disciplines illustrate responses to textual, voice-based, pictorial, metaphorical, conversational, adaptive, agent-based, intelligent, and anthropomorphic interfaces. Group design project applying theory to the design of products or services for developing countries.

*4-5 units, not given this year*

**COMM 271. Multimedia Reporting and Production for Public Issues**

(Same as COMM 171) (Graduate students register for 271.) Production of multimedia assignments for traditional news beats using audio, still photography, graphics and video. 2-hour lab class for creative, conceptual and technical skills for production of multimedia stories. Prerequisite: Journalism MA student or instructor's consent.

*3-5 units, Win (Migielicz, G)*

**COMM 272. Media Psychology**

(Same as COMM 172) (Graduate students register for COMM 272.) The literature related to psychological processing and the effects of media. Topics: unconscious processing; picture perception; attention and memory; emotion; the physiology of processing media; person perception; pornography; consumer behavior; advanced film and television systems; and differences among reading, watching, and listening.

*4-5 units, Spr (Reeves, B)*

**COMM 273. Public Issues Reporting I**

Reporting and writing on government and public policies and issues; their implications for the people and the press. Required for journalism M.A. students.

*3-4 units, Aut (Brenner, R)*

**COMM 274. Public Issues Reporting II**

Almost everything a journalist writes about involves government, either directly or indirectly. In this course we learn about the hidden forces that control government decisions: lobbying, campaign finance, budgets and more. Students write stories and do two accompanying multimedia pieces. Prerequisites: 273, Journalism M.A. student.

*3-4 units, Win (Brinkley, J)*

**COMM 275. Multimedia Storytelling: Reporting and Production Using Audio, Still Images, and Video**

Multimedia assignments coordinated with deadline reporting efforts in COMM 273 from traditional news beats using audio, still photography, and video. Use of digital audio recorders and audio production to leverage voice-over narration, interviews, and natural sound; use of digital still cameras and audio to produce audio slideshows; and the combination of these media with video in post-production with Final Cut Pro. Prerequisite: Journalism M.A. student. Corequisite: COMM 273.

*4 units, Aut (Migielicz, G)*

**COMM 276. Advanced Digital Media Production**

(Same as COMM 176) In-depth reporting and production using audio, images and video. Focus on an in-depth journalism project with appropriate uses of digital media: audio, photography, graphics, and video. Topics include advanced field techniques and approaches (audio, video, still) and emphasis on creating a non-fiction narrative arc in a multimedia piece of 10-12 minutes. Prerequisite: COMM 275 or consent of instructor

*4-5 units, Spr (Migielicz, G)*

**COMM 277C. Specialized Writing and Reporting: Environmental Journalism**

(Same as COMM 177C, ENVRES 277C) (Graduate students register for COMM / ENVRES 277C.) Practical, collaborative, writing-intensive course in science-based environmental journalism. Science and journalism students learn how to identify and write engaging stories about environmental issues and science, how to assess the quality and relevance of environmental news, how to cover the environment and science beats effectively, and how to build bridges between the worlds of journalism and science. Limited enrollment: preference to journalism students and students in the natural and environmental sciences. Prerequisite: COMM 104, ENVRES 200 or consent of instructor. Admissions by application only, available from thayden@stanford.edu and due 3/28/12.

*4-5 units, Spr (Hayden, T)*

**COMM 277D. Specialized Writing and Reporting: Magazine Journalism**

(Same as COMM 177D) (Graduate students register for COMM 277D.) How to report, write, edit, and read magazine articles, emphasizing long-form narrative. Tools and templates of story telling such as scenes, characters, dialogue, and narrative arc. How the best magazine stories defy or subvert conventional wisdom and bring fresh light to the human experience through reporting, writing, and moral passion. Prerequisite: 104 or consent of instructor.

*4-5 units, Spr (Brenner, R)*

**COMM 277G. Specialized Writing and Reporting: Covering Silicon Valley**

(Same as COMM 177G) (Graduate students register for COMM 277G.) Business reporting basics in the context of Silicon Valley's technology scene. Prerequisite: 104 or consent of instructor.

*4-5 units, Win (Grimes, A)*

**COMM 277I. Specialized Writing and Reporting: Investigative Reporting**

(Same as COMM 177I) Graduate students register for COMM 277I.) Under the supervision of editors from the Center for Investigative Reporting, students will work on a group investigative project with the end-goal of publication and distribution through CIR's California Watch project. The class will emphasize the history and role of investigative reporting as well as skills and techniques needed to do it. Limited enrollment. Prerequisite: instructor consent. Go to <http://comm.stanford.edu/faculty/grimes> for application instructions.

4-5 units, not given this year

**COMM 277K. Specialized Writing and Reporting: Human Rights Journalism**

(Same as COMM 177K) (Graduate students register for COMM 277K.) The evolution of human rights law and enforcement, and the role of journalists in uncovering, pursuing, and publicizing political violence, detention, and torture. Case studies from S. Africa, Latin America, Israel and Palestine, N. Ireland, Bosnia, Rwanda, and Sudan and Darfur. Human rights issues in the U.S. in the aftermath of 9/11. Students conduct research and write journalistic reports on foreign and domestic issues. Prerequisite: 104 or consent of instructor.

4-5 units, not given this year

**COMM 277S. Specialized Writing and Reporting: Sports Journalism**

(Same as COMM 177S) (Graduate students register for COMM 277S.) Workshop. The history of sports writing from the 20s to present. Reporting, interviewing, deadline writing, and how to conceptualize and develop stories. Students write features and news stories for publication in a new sports section in 'The Cardinal Inquirer', an online publication of the graduate program in journalism. Prerequisite: 104 or consent of instructor.

4-5 units, Win (Pomerantz, G)

**COMM 277Y. Specialized Writing and Reporting: Foreign Correspondence in the Middle East and Asia**

(Same as COMM 177Y) (Graduate students register for COMM 277Y.) What's involved in working as a foreign correspondent in these important and volatile parts of the world, where in many cases journalists are not respected and may face danger -- taught by a journalist who has worked extensively in both regions. (no pre-requisites)

4-5 units, Aut (Brinkley, J)

**COMM 278. Journalism and Imaginative Writing in America**

(Same as AMSTUD 257, ENGLISH 257) Walt Whitman spent twenty-five years as a journalist before publishing his first book of poems. Mark Twain was a journalist for twenty years before publishing his first novel. Topics include examination of how writers; backgrounds in journalism shaped the poetry or fiction for which they are best known; study of recent controversies surrounding writers who blurred the line between journalism and fiction. Writers include Whitman, Fanny Fern, Twain, Pauline Hopkins, Theodore Dreiser, Charlotte Perkins Gilman, Ernest Hemingway, Meridel LeSueur.

5 units, not given this year

**COMM 280. Topics in Learning and Technology: Core Mechanics for Learning**

(Same as COMM 180, CS 377H, EDUC 328X) Contents of the course change each year. The course can be repeated. In game play, core mechanics refers to the rules of interaction that drive the game forward. This class will consider whether there are core mechanics that can drive learning forward, and if so, how to build them into learning environments.

3 units, Win (Schwartz, D)

**COMM 282. Virtual Communities and Social Media**

(Same as COMM 182) (Graduate students register for COMM 282.) Students will take away from this course a set of conceptual tools, a vocabulary, and an analytical framework with which to recognize, understand, and more effectively manage new social practices online, together with a familiarity with the literature regarding social media and identity, community, collective action, public sphere, social capital, networks, and social networks. Students will also develop skills at using online forums, blogs, microblogs, wikis for research, collaboration, and communication. Limited enrollment. Prerequisite: instructor consent. Go to <http://comm.stanford.edu/faculty/rheingold/> for application instructions.

4-5 units, Aut (Rheingold, H)

**COMM 289. Journalism Master's Project**

4 units, Spr (Staff)

**COMM 290. Media Studies M.A. Project**

Individual research for coterminal Media Studies students.

1 unit, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**COMM 291. Graduate Journalism Seminar**

Required of students in the graduate program in Journalism. Forum for current issues in the practice and performance of the press. The seminar frequently features Bay Area Journalists as guest speakers. May be repeated for credit.

1 unit, Aut (Grimes, A), Win (Brinkley, J), Spr (Brenner, R)

**COMM 299. Individual Work**

1-4 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**COMM 301. Communication Research, Curriculum**

**Development and Pedagogy**

Designed to prepare students for teaching and research in the Department of Communication. Students will be trained in developing curriculum and in pedagogical practices, and will also be exposed to the research programs of various faculty members in the department. Required of all Ph.D. students.

1 unit, Aut (Bailenson, J)

**COMM 307. Summer Institute in Political Psychology**

Lectures, discussion groups, and workshops addressing many applications of psychology to the analysis of political behavior. Public opinion, international relations, political decision-making, attitudes and beliefs, prejudice, social influence and persuasion, terrorism, news media influence, foreign policy, socialization, social justice.

3 units, Sum (Staff)

**COMM 308. Graduate Seminar in Political Psychology**

(Same as POLISCI 324) For students interested in research in political science, psychology, or communication. Methodological techniques for studying political attitudes and behaviors. May be repeated for credit.

1-3 units, Aut (Krosnick, J), Win (Krosnick, J), Spr (Krosnick, J)

**COMM 310. Method of Analysis Program in the Social Sciences**

(Same as ANTHRO 446A) Colloquium series. Creation and application of new methodological techniques for social science research. Presentations on methodologies of use for social scientists across departments at Stanford by guest speakers from Stanford and elsewhere. See <http://mapss.stanford.edu>.

1 unit, not given this year

**COMM 311. Theory of Communication**

Basic communication theory for first-year Ph.D. students in the Department of Communication. Introduction to basic writings and concepts in communication research. The goal is an introduction to issues in the field that are common in communication research. First half of the class will emphasize classic literature about field organization, history and theory. Second half will emphasize contemporary theory in areas that students select.

1-5 units, Aut (Reeves, B)

**COMM 312. Models of Democracy**

(Same as COMM 212, POLISCI 237, POLISCI 337) Ancient and modern varieties of democracy; debates about their normative and practical strengths and the pathologies to which each is subject. Focus is on participation, deliberation, representation, and elite competition, as values and political processes. Formal institutions, political rhetoric, technological change, and philosophical critique. Models tested by reference to long-term historical natural experiments such as Athens and Rome, recent large-scale political experiments such as the British Columbia Citizens' Assembly, and controlled experiments.

3-5 units, not given this year

**COMM 314. Doctoral Research Methods II B**

Part of the doctoral research methods sequence. Focus is on the logic of qualitative research methods and modes of inquiry relevant to the study of communication and meaning. Prerequisite: Communication Ph.D. student, or consent of instructor.

1-5 units, Win (Glasser, T)

**COMM 317. Doctoral Research Methods I**

Approaches to social science research and their theoretical presuppositions. Readings from the philosophy of the social sciences. Research design, the role of experiments, and quantitative and qualitative research. Cases from communication and related social sciences. Prerequisite: consent of instructor.

1-5 units, Spr (Fishkin, J)

**COMM 318. Doctoral Research Methods II**

An introduction to a broad range of social science research methods that are widely used in PhD work. Prerequisite: consent of instructor.

*1-5 units, Win (Krosnick, J)*

**COMM 320G. Advanced Topics in New Media and American Culture**

This course deals with advanced issues in computing and American cultural history since World War II. Primarily for Ph.D. students. Prerequisite: 220 or consent of instructor.

*1-5 units, not given this year*

**COMM 325G. Comparative Studies of News and Journalism**

Focus is on topics such as the roles and responsibilities of journalists, news as a genre of popular literature, the nexus between press and state, and journalism's commitment to political participation.

*1-5 units, Spr (Glasser, T)*

**COMM 326. Advanced Topics in Human Virtual Representation**

Topics include the theoretical construct of person identity, the evolution of that construct given the advent of virtual environments, and methodological approaches to understanding virtual human representation. Prerequisite: consent of instructor.

*1-5 units, Spr (Bailenson, J)*

**COMM 331G. Communication and Media Ethics**

Limited to Ph.D. students. Advanced topics in press ethics and responsibility. Prerequisite: 231 or consent of instructor.

*1-3 units, not given this year*

**COMM 360G. Political Communication**

(Same as POLISCI 425) An overview of research in political communication with particular reference to work on the impact of the mass media on public opinion and voting behavior. Limited to Ph.D. students. Prerequisite: 260 or consent of instructor.

*1-5 units, Spr (Iyengar, S)*

**COMM 368. Experimental Research in Advanced User Interfaces**

(Same as COMM 168, COMM 268, ME 468) Project-based course involves small (3-4) person teams going through all parts of the experimental process: question generation, experiment design, running, and data analysis. Each team creates an original, publishable project that represents a contribution to the research and praction literature. All experiments involve interaction between people and technology, including cars, mobile phones, websites, etc. Prerequisite: consent of instructor.

*1-5 units, not given this year*

**COMM 372G. Seminar in Psychological Processing**

Limited to Ph.D. students. Advanced topics. Prerequisite: 272 or consent of instructor.

*1-5 units, Win (Reeves, B)*

**COMM 379. History of the Study of Communication**

The origins of communication/media theory and research emphasizing the rise of communication as a separate field of study. The influence of schools of thought concerning the scope and purpose of the study of communication. Readings include foundational essays and studies. Prerequisite: Ph.D. student or consent of instructor.

*1-5 units, not given this year*

**COMM 380. Curriculum Practical Training**

Practical experience in the communication industries. Prerequisites: graduate standing in Communication, consent of instructor. Meets requirements for Curricular Practical Training for students on F-1 visas. 380 May be repeated four times for credit. (Staff)

*1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**COMM 386. Media Cultures of the Cold War**

(Same as ARTHIST 475) The intersection of politics, aesthetics, and new media technologies in the U.S. between the end of WW II and the fall of the Berlin Wall. Topics include the aesthetics of thinking the unthinkable in the wake of the atom bomb; abstract expressionism and 'modern man' discourse; game theory, cybernetics, and new models of art making; the rise of television, intermedia, and the counterculture; and the continuing influence of the early cold war on contemporary media aesthetics. Readings

from primary and secondary sources in art history, communication, and critical theory.

*3-5 units, Spr (Turner, P; Lee, P)*

**COMM 397. Complementary Project**

Individual research for Ph.D. candidates.

*1-6 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**COMM 398. Major Research Project**

Individual research for Ph.D. candidates.

*1-6 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**COMM 399. Advanced Individual Work**

*1-9 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**COMM 801. TGR Project**

*0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**COMM 802. TGR Dissertation**

*0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

## COMPARATIVE LITERATURE (COMPLIT) COURSES

### UNDERGRADUATE COURSES IN COMPARATIVE LITERATURE

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**COMPLIT 10N. Shakespeare and Performance in a Global Context**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. The problem of performance including the performance of gender through the plays of Shakespeare. In-class performances by students of scenes from plays. The history of theatrical performance. Sources include filmed versions of plays, and readings on the history of gender, gender performance, and transvestite theater. GER:DB-Hum, EC-Gender

*3 units, Spr (Parker, P)*

**COMPLIT 11Q. Shakespeare, Playing, Gender**

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Focus is on several of the best and lesser known plays of Shakespeare, on theatrical and other kinds of playing, and on ambiguities of both gender and playing gender. GER:DB-Hum, EC-Gender

*3 units, Win (Parker, P)*

**COMPLIT 49. What is Nobel Literature? Reading, Assessing, and Interpreting the Nobel Novels on the World Stage**

Recent Nobel laureates in literature: Gabriel García Márquez, Nadine Gordimer, Toni Morrison, Kenzaburo Oe, and V.S. Naipaul. These writers come from different locations, yet each participates in a global conversation about the human condition. The impact of their identities upon their thought and writing. How the Nobel prize is awarded. The role of literature in the world, and analytical skills for reading literary texts. GER:DB-Hum, EC-GlobalCom

*5 units, Sum (Staff)*

**COMPLIT 50Q. Is God Dead?**

(Same as GERLIT 120Q) A consideration of Nietzsche's claim that God is dead in relation to other texts of German literature and philosophy. The status of religious faith in relation to modernity and secularization; religion and science; culture and faith. Readings in German include selections from sacred and liturgical texts; fictional depictions of religious experience; religion in poetry; German theories of religion. Authors to be studied include Rilke, Hesse, Weiss, Schöder, Buber, Sachs, Haecker, Weber, Taubes, Ratzinger. GER:DB-Hum

*3-5 units, not given this year*

**COMPLIT 51N. Comparative Fictions of Ethnicity**

(S,Sem) (Same as AMSTUD 51N, CSRE 51N) Stanford Introductory Seminar. We may know who we are, but we are, after all, social creatures. How does our sense of self interact with those around us? How does literature provide a particular medium for not only self expression, but also for meditations on what goes into the construction of the Self? After all, don't we tell stories in

response to the question, who are you? Besides a list of nouns and names and attributes, we give our lives flesh and blood in telling how we process the world. Our course focuses in particular on this question--Does this universal issue (who am I) become skewed differently when we add a qualifier before it, like ethnic?  
GER:DB-Hum

5 units, Win (*Palumbo-Liu, D*)

#### COMPLIT 101. What is Literature?

How critics and authors from different eras and different parts of the globe have considered how literature, as a traditional cultural form, can or cannot, help to sustain societies faced with concrete historical crises such as war, revolution, and colonization. How the aesthetic work of verbal art has been seen to offer the possibility of continuity in the face of change. What, if anything, can be continued? How does art perhaps aid in accommodating change?  
GER:DB-Hum

5 units, Aut (*Saldivar, J*)

#### COMPLIT 110. Introduction to Queer Literary Studies

Introduction to the comparative literary study of important gay, lesbian, queer, bisexual, and transgender writers and their changing social, political, and cultural contexts from the 1890s to today: Wilde, Gide, Lucie Delarue-Mardrus, Radclyffe Hall, E.M. Forster, Thomas Mann, Georges Bataille, James Baldwin, Jean Genet, Jeanette Winterson, Sarah Waters, Audre Lorde, discussed in the context of 20th-century feminist and queer literary and social theories of gender and sexuality (Judith Butler, Eve Sedgwick, Julia Serano, and others). GER:DB-Hum

3-5 units, Win (*Dierkes-Thrun, P*)

#### COMPLIT 110N. Du Fu: The Case for Chinese Poetry

(F,Sem) Stanford Introductory Seminar. When one asks: what is a classic? one expects the title of a big novel as the response. This course argues the case for the classical Chinese poetry of the author who has the rightful claim of the greatest poet in Chinese history, Du Fu (712-770). We will look at how poetry focuses on the chemistry of language - the ways words can be put together just so to create specific catalytic conversations of meaning; the engineering of language - the ways specific structures build on and create certain distributions of energy and mass. We will learn to appreciate Du Fu's wit, compassion, learnedness and critical powers and to appreciate as well how poetry can illustrate the evocative and expressive power of language. GER:IHUM-3

4 units, Spr (*Palumbo-Liu, D*)

#### COMPLIT 115. Nabokov in the Transnational Context

(Same as COMPLIT 215, SLAVGEN 156, SLAVGEN 256) Nabokov's techniques of migration and camouflage as he inhabits the literary and historical contexts of St. Petersburg, Berlin, Paris, America, and Switzerland. His early and late stories, last Russian novel *The Gift*, *Lolita* (the novel and screenplay), and *Pale Fire*. Readings in English. Russian speakers will be encouraged to read Russian texts in original. GER:DB-Hum

3-5 units, Aut (*Greenleaf, M*)

#### COMPLIT 118. Women Poets of Iran: 1797-1967

This course traces the emergence of a female voice in Persian poetry and prose writing in the 19th and 20th centuries and, although focused on women's poetry, it will also explore the contribution of women to the wider Iranian literary scene during this period, one of the most turbulent of modern Iranian history. Starting at the dawn of the 19th century, this course will first examine the existing, indigenous tradition of women's poetry in Qajar Iran, in particular that of the Fath-'Ali Shah period (1797-1834). The focus of the course will then shift to the emergence of liberalist, modernist, and proto-feminist poets and writers in the late 19th and early 20th centuries, moving to women poets' subsequent reconfiguration of (and ultimate break with) classical poetic forms. The course will culminate in an in-depth discussion of the iconoclastic and disruptive figures of Simin Behbahani (b.1927) and Forugh Farrokhzad (1935-1967), key figures in the development of Persian poetry in the late 20th century. GER:DB-Hum

3-5 units, Aut (*Brookshaw, D*)

#### COMPLIT 121. The Ghazal: The Origins, Evolution, and Migration of a World Poetic Genre

This course will explore the origins, evolution, and migration of one of the world's great poetic genres, the ghazal (short lyric poem, usually on love). Starting with a discussion of the origins of the

genre in the late pre-Islamic and early Islamic periods in Arabic and Persian, the course will then move to an examination of the evolution of the genre in the early medieval Islamic period in those languages, and the subsequent emergence of the ghazal in the related literatures of Ottoman Turkish and Urdu. We will then consider European translations of selected Persian ghazals in the 18th and 19th centuries, the effect of these translations on contemporary European poetry, and the migration of the genre into English in the late 19th/early 20th centuries. The course will end with close reading of ghazals written in English by diasporic poets of Middle Eastern and South Asian descent writing in the US and the UK. GER:DB-Hum

5 units, Win (*Brookshaw, D*)

#### COMPLIT 122. Literature as Performance

Theater as performance and as literature. The historical tension between performance and sexuality in the Western tradition since Greek antiquity. Non-European forms and conventions of performance and theatricality. The modern competition between theater and other forms of performance and media such as sports, film, and television. Sources include: classical Japanese theater; ancient Greek tragedy and comedy; medieval theater in interaction with Christian rituals and its countercultural horizons; the classical age of European theater including Shakespeare, Lope de Vega, and Molière. GER:DB-Hum

5 units, Spr (*Greenleaf, M*)

#### COMPLIT 123. Novels about China: Tradition and Modernity

Short novels by Chinese and Western writers about Chinese experience and culture in the interconnected and conflicted world between East and West. Topics include the persistence of tradition and premodern lifestyle and morality in modern changes, reform and revolution. We will also discuss the individual, society and gender issues and take a global, comparative approach to texts. GER:DB-Hum

5 units, Spr (*Wang, B*)

#### COMPLIT 125A. The Gothic Novel

(Same as ENGLISH 125A) The Gothic novel and its relatives from its invention by Walpole in *The Castle of Otranto* of 1764. Readings include: *Northanger Abbey*, *The Italian*, *The Monk*, *Frankenstein*, *Jane Eyre*, *Great Expectations*, and *Dracula*. What defines the Gothic as it evolves from one specific novel to a mode that makes its way into a range of fictional types? GER:DB-Hum

5 units, not given this year

#### COMPLIT 128. Survivors: Stories of Staying Alive

From deserted islands and nuclear wastelands to dangerous frontiers and zombie attacks -- this course explores aesthetic and intellectual issues in survival narratives both fictional and non-fictional: individualism and/or community; self-sufficiency and DIY movements; categorizations of good/evil, civilization/barbarity; survival as adventure; frontier experience. *Survivor's* guilt, trauma, and the moral ambiguities of human agency (such as violence or environmental impact). Readings from authors such as DeFoe, Steinbeck, Murakami, Spiegelman, Atwood, McCarthy, Auster, and Brooks. Examples in film, television and popular culture.

3-5 units, Spr (*Becerra Videgar, A*)

#### COMPLIT 129A. Contemporary Persian Poetry: Encounter of a Thousand-Year-Old Classical Tradition with Modernity

The primacy of poetic expression in Persian culture in the transition from tradition to modernity. Major 20th-century poets in relation to historical events and social change. Authors include: Nima Yushij, Ahmad Shamlou, Sohrab Sepehri, Mehdi Akhavan Sales, Forough Farrokhzad, Nader Naderpour, Fereydoun Moshiri, Esmail Kho'i, and Afghan and Tajik poets.

5 units, not given this year

#### COMPLIT 130A. Of Wine, Women, and Boys: Re-visiting Medieval Islamic Culture Through Texts

This course will examine elements of medieval Islamic culture which have stereotypically been considered taboo. The texts read will comprise a broad range of medieval Arabic and Persian poetry and prose in English translation. This course will focus on elements of culture that, although technically at odds with a strict understanding of Islamic law, were integral to the majority of medieval Muslim societies. GER:DB-Hum

3-5 units, Spr (*Brookshaw, D*)



**COMPLIT 131. The Decadent 1890s**

(Same as COMPLIT 231A) This course introduces you to major works of literature of Decadent literature and culture in the European fin de siècle, focusing on the artistic and social culture of London, Paris, Vienna, and Berlin in the 1870s-1900s. Among the topics to be studied are the interconnections between the movements of Decadence, Aestheticism and Symbolism; theories of cultural decay and degeneration; the culture wars of the 19th century; stereotypes of gender, specifically the Dandy and the New Woman; the influence of sexology (regarding homosexuality and sexual transgression); cultural and legal attitudes toward sexual perversity; and homosexuality; the rise of Wagnerism and theories of Gesamtkunstwerk on the stage; and the period of cultural transition from Decadence to Modernism. We will read works by Mallarmé, Baudelaire, Wilde, Strindberg, Huysmans, Nordau, Nietzsche, Wedekind, Ibsen, Michael Field (Katherine Bradley and Edith Cooper) and various New Woman writers such as George Egerton, Victo GER:DB-Hum

3-5 units, Aut (*Dierkes-Thrun, P*)

**COMPLIT 133. Gender and Modernism**

Gender and sexuality in trans-Atlantic modernist literature and culture from the 1880s-1930s. Topics include the 19th-century culture wars and the figures of the dandy and the New Woman; modernist critiques of Enlightenment rationality; impact of World War I on gender roles; gender and the rise of modern consumer culture, fashion, design; the modernist metropolis and gender/sexuality; the avant-garde and gender; literary first-wave feminism; homoerotic modernism; modernism in the context of current theories of gender and sexuality. GER:DB-Hum

3-5 units, Win (*Dierkes-Thrun, P*)

**COMPLIT 135. Chinese Cultural Revolution: Performance, Politics, and Aesthetics**

(Same as CHINLIT 190, CHINLIT 290) Events, arts, films, and operas of the Chinese Cultural Revolution. Analysis of political passion, aesthetics, and psychology of mass movements. Places the Cultural Revolution in the long-range context of art, social movements, and politics. Chinese language is not required.

4 units, not given this year

**COMPLIT 137. War Creations: World War II and the Novel**

World War II, with its unprecedented atrocities, ideological disputes, and engaged intellectuals, also threw into question the role of the novel and its relationship to society and to history, influencing literature, theory, and literary criticism in the decades that followed. How might we define an engaged author or a political novel? What are the different approaches of novelists to the war and its ideologies, and how does this differ between countries? How far might the novel venture into allegory, memoir, and political propaganda and still remain a novel? How does fiction recreate, revise, and help examine the horrific momentum of fanatical politics and the consequences, and how does it do this differently from journalism and historical writing? Finally, how might the breakdown of linear narratives relate to attempts to tell about the war? The course will address these questions through reading excerpts from theoretical texts in conjunction with works by a range of auth GER:DB-Hum

3-5 units, Aut (*Lewis, K*)

**COMPLIT 140B. Love à la Turque: Tales of Love in Turkish Literature**

(Same as COMPLIT 240B) This course will introduce students whose command of the Turkish language is at an advanced level to the theme of romantic love in Turkish literature, with particular attention to key classical and contemporary works that influenced the development of Turkish literary tradition. Classes will include close reading and discussion of folk tales, poems, short stories, and plays with particular attention to characters of lover/beloved and theme of romantic love and to how these elements are related to cultural and historical background. We will begin with essential examples of ghazels from Ottoman court poetry to explore the notion of ç courtly loveç and move to the most influential texts of 19th and 20th centuries. Although main emphasis will be on content and textual analysis, we will cover grammar and vocabulary issues as needed. Objectives of the course are 1) help students reach the level of proficiency to read and understand prose and verse of moderate difficulty in Turkish language,

3-5 units, Win (*Richardson, B*)

**COMPLIT 141. Literature and Society in Africa and the Caribbean**

(Same as FRENLIT 133) The course is reading, analysis and discussion of some of the most representative texts by 20th century Francophone writers from a variety of locations: the French Caribbean, Africa North and South of the Sahara. These works convey the changing aspects of Francophone Africa and the French Caribbean societies and cultures: from oral to written, colonization and changes, tradition competing with modernity, particularly for women, building new identities immigration narrative. The course aims to broaden knowledge of the Francophone societies and cultures, as well as improve skills in speaking and writing in French. Lectures and discussions are conducted in French, most required readings and background material are in French as well. Reading in fiction, poetry and theater include Laye Camara, Ferdinand Oyono, Maryse Condé, Aimé Césaire, Leïla Sebbar, Mariama Ba, and others. Prerequisite: FRENLANG 124 or consent of instructor. GER:DB-Hum, EC-GlobalCom

4 units, Win (*Boyi, E*)

**COMPLIT 142. The Literature of the Americas**

(Same as AMSTUD 142, ENGLISH 172E) This course offers a wide-ranging overview of the literatures of the Americas in comparative perspective, emphasizing continuities and crises that are common to North American, Central American, and South American literatures as well as the distinctive national and cultural elements of a diverse array of primary works. Topics include the definitions of such concepts as empire and colonialism, the encounters between worldviews of European and indigenous peoples, the emergence of creole and racially mixed populations, slavery, the New World voice, myths of America as paradise or utopia, the coming of modernism, twentieth-century avant-gardes, and distinctive modern episodes; the Harlem Renaissance, the Beats, magic realism, Noigandres; in unaccustomed conversation with each other. GER:DB-Hum, EC-AmerCul

5 units, Win (*Greene, R; Saldivar, R*)

**COMPLIT 142A. What is Hemispheric Studies?**

This seminar brings together a range of exciting new comparative work in the burgeoning field of Americas' hemispheric studies. The seminar takes as its starting points such questions as: What happens to American literary, political, historical, and cultural studies if we recognize the interdependency of nation-state developments throughout all the Americas? What happens if we recognize the nation as historically evolving and contingent rather than already formed? Finally, what happens if the âççfixedâçç borders of a nation are recognized not only as historically produced political constructs but also as component parts of a deeper, more multilayered series of national and indigenous histories? GER:DB-Hum

5 units, Spr (*Saldivar, J*)

**COMPLIT 144. Interplay between Turkish Cinema and Literature**

(Same as COMPLIT 244A) Turkish cinema has looked to literature for inspiration and for its stories since its inception. In recent years, the relationship between literature and film in Turkey has become more complex and reciprocal. We will explore the interplay between the two by focusing on adaptations and inspirations as well as less traditional modes of interaction such as interpretation and intertextuality. The scope of discussions will include themes like masculinity, representation of women, honor killings, the divide between East and West, as well as the problems of translation from one medium to another. Among the directors and writers whose works will watch and read are Yaçar Kemal, Orhan Pamuk, Yavuz Turgul, and Dervîç Zaim. GER:DB-Hum

3-5 units, Aut (*Richardson, B*)

**COMPLIT 144A. Istanbul the Muse: The City in Literature and Film**

The multiple layers of culture and history in Istanbul, a city on two continents between East and West, have inspired great art and literature. The class focuses on the idea of inbetweenness through art, literature, music, and popular culture seen chronologically. In addition to discussing literary, historical, and academic texts we will explore visual genres such as advertising, architecture, caricature, documentary, film, and miniature painting. Readings and discussion in English. GER:DB-Hum

3-5 units, Spr (*Richardson, B*)



**COMPLIT 145A. Digital Codex: Religion, Literary Culture and Technology in South Asia**

(Same as RELIGST 108C) This course seeks to understand Hindu visual and performative culture through one epic Sanskrit narrative, that of the Mahabharata. It begins with the history of the epic's production and circulation in South Asian communities and continues with an exploration of its constructions of faith and duty. The course moves onto a consideration of the Mahabharata's latest avatars, especially in visual culture (paintings, theatre, graphic art, film and television). Lastly, the course explores questions of canon formation, literary genres and knowledge production in the digital age. GER:DB-Hum

3-5 units, Aut (Tiwari, B)

**COMPLIT 146. Asian American Culture and Community**

(Same as AMSTUD 146, ASNAMST 146S, CSRE 146S) An examination of the history of Asians in America via one case history: the International Hotel in San Francisco. Background history of Asians in America, and the specifics of the I Hotel case as involving the convergence of global and local economies, urban redevelopment, and housing issues for minorities. Focus on the convergence of community and cultural production. Service learning component involving community work at the Manilatown Heritage Foundation in San Francisco. Service Learning Course (certified by Haas Center). GER:DB-Hum

5 units, Spr (Palumbo-Liu, D)

**COMPLIT 148A. The Iranian Cinema: Image and Meaning**

(Same as COMPLIT 249A) This course will focus on the analysis of ten Iranian films with the view of conducting a discourse on the semiotics of Iranian art and culture. Each session will be designated to the viewing of a film by a prominent Iranian filmmaker. Students are expected to prepare for class by having previously examined other available films by the film-maker under consideration.

1-3 units, Aut (Beyzaie, B)

**COMPLIT 148B. Iranian Cinema in Diaspora**

(Same as COMPLIT 249B) Despite enormous obstacles, immigrant Iranian Filmmakers, within a few decades (after the Iranian revolution), have created a slow but steady stream of films outside Iran. They were originally started by individual spontaneous attempts from different corners of the world and by now we can identify common lines of interest amongst them. There are also major differences between them. These films have never been allowed to be screened inside Iran, and without any support from the global system of production and distribution, as independent and individual attempts, they have enjoyed little attention. Despite all this, Iranian cinema in exile is in no sense any less important than Iranian cinema inside Iran. In this course we will view one such film, made outside Iran, in each class meeting and expect to reach a common consensus in identifying the general patterns within these works and this movement. Questions such as the ones listed below will be addressed in our meetings each week: What

1-3 units, Win (Beyzaie, B)

**COMPLIT 148C. Contemporary Iranian Theater**

(Same as COMPLIT 249C) Today Iranian plays, both in traditional and contemporary styles, are staged in theater festivals throughout the world play their role in forming a universal language of theater which combine the heritages from countries in all five continents. Despite many obstacles, some Iranian plays have been translated into English and some prominent Iranian figures are successful stage directors outside Iran. Forty six years ago when Theater in Iran (a monograph on the history of Iranian plays) by Bahram Beyzaie was first published, it put the then contemporary Iranian theater movement--which was altogether westernizing itself blindly--face to face with a new kind of self-awareness. Hence in today's generation of playwrights and stage directors in Iran, all know something of their theatrical heritage. In this course we will spend some class sessions on the history of theater in Iran and some class meetings will be concentrating on contemporary movements and present day playwrights. Given the de

1-3 units, Spr (Beyzaie, B)

**COMPLIT 149. The Laboring of Diaspora & Border Literary Cultures**

(Same as CSRE 149) Focus is given to emergent theories of culture and on comparative literary and cultural studies. How do

we treat culture as a social force? How do we go about reading the presence of social contexts within cultural texts? How do ethno-racial writers re-imagine the nation as a site with many cognitive maps in which the nation-state is not congruent with cultural identity? How do diaspora and border narratives/texts strive for comparative theoretical scope while remaining rooted in specific local histories. GER:DB-Hum

3-5 units, Win (Saldivar, J)

**COMPLIT 151. Reality Check: Modes of Reality and Representation in the Age of Cyberculture**

In an age when phantasmal projections on the computer and smart phone screens rule our daily lives and disembodied fragments of our audio-visual/textual representations fly around the globe, the question of what is real and how is one to know what is real weighs us down with an ever-pressing urgency. This course explores different modes of reality and their literary representations that make ontological and epistemological inquiries into the concept and nature of the real. Readings include novels and short stories by Jorge Luis Borges, Stanislaw Lem, Philip K. Dick, William Gibson, Neil Stephenson and Murakami Haruki, and films (Ghost in the Shell, Inception). In English.

3-5 units, Win (Shin, H)

**COMPLIT 154. World Literature/World Health: Global Writing on Illness and Healing**

This class provides a survey of writing about health and medicine, primarily from non-Western (as well as a few Western) countries. While the focus is on literature, and an introductory literature class is strongly recommended as a prerequisite, we will also consider broader questions: literary and medical authority; private experience and the public sphere; and what the world, or worlds, in the course title might or might not be (according to different theories of globalization and cultural exchange). We will review a selection of critical approaches to literature and medicine and read texts from a variety of cultures and genres. The ideal student for this course would have a strong interest in both health care and writing, but everyone is welcome.

3-5 units, Win (Ferguson, J)

**COMPLIT 156A. States of Nature in Literature and Philosophy**

The state of nature, a hypothetical condition of human existence before the establishment of societies, is a device many early modern thinkers use to address questions about ethics, justice, and politics. Fusing biblical narrative and geometric reasoning, accounts of the state of nature illustrate the overlap and tension between religion, science and philosophy. Questions include whether philosophers and artists actually believe in the state of nature, how it was imagined differently in poetry, the novel, and philosophy, whether it was used to legitimize or undermine existing political structures, and why it is relevant in today's society. Selected readings from Hobbes, Locke, Milton, Defoe, Montaigne, Montesquieu, Diderot.

3-5 units, Aut (Hume, K)

**COMPLIT 181. Philosophy and Literature**

(Same as CLASSGEN 81, ENGLISH 81, FRENGEN 181, ITALGEN 181, GERGEN 181) Required gateway course for Philosophical and Literary Thought; crosslisted in departments sponsoring the Philosophy and Literature track: majors should register in their home department; non-majors may register in any sponsoring department. Introduction to major problems at the intersection of philosophy and literature. Issues may include authorship, selfhood, truth and fiction, the importance of literary form to philosophical works, and the ethical significance of literary works. Texts include philosophical analyses of literature, works of imaginative literature, and works of both philosophical and literary significance. Authors may include Plato, Montaigne, Nietzsche, Borges, Beckett, Barthes, Foucault, Nussbaum, Walton, Nehamas, Pavel, and Pippin. GER:DB-Hum

4-5 units, Win (Staff)

**COMPLIT 189A. Honors Research**

Senior honors students enroll for 5 units in Winter while writing the honors thesis, and may enroll in 189B for 2 units in Spring while revising the thesis. Prerequisite: DLCL 189.

5 units, Win (Staff)

**COMPLIT 189B. Honors Research**

Open to juniors with consent of adviser while drafting honors proposal. Open to senior honors students while revising honors thesis. Prerequisites for seniors: 189A, DLCL 189.

2 units, Spr (Staff)

**COMPLIT 190. Tolstoy's Anna Karenina in Dialogue with Contemporary Philosophical, Social, and Ethical Thought**

(Same as COMPLIT 290, SLAVGEN 190, SLAVGEN 290) Anna Karenina, the novel as a case study in the contest between modernity and tradition, their ethical order, ideology, cultural codes, and philosophies. Images of society, women and men in Tolstoy v. those of his contemporaries: Marx, Mill, Nietzsche, Weber, Durkheim, Freud. Open to juniors, seniors and graduate students. Requirements: three interpretive essays (500-1000 words each). Analysis of a passage from the novel; AK refracted through a philosophical prism and vice versa (30% each); class discussion and Forum (10%). GER:DB-Hum, DB-Hum, EC-EthicReas

3-5 units, Win (Freidin, G)

**COMPLIT 194. Independent Research**

(Staff)

1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**COMPLIT 196. Incarceration as Inspiration: Russian and American Prison Narratives**

(Same as SLAVGEN 196) This course will employ a multitude of prison-related texts (letters, memoirs, short stories, historical accounts, films, and theoretical criticism) to explore the connection between incarceration and inspiration. Together we will examine the following questions: what is the link between creativity and the penitentiary? What is the allure of crime and the function of prison? What effect does the restriction of space have on the mind? How does life-writing versus fictional writing capture the prison experience? The quarter will culminate with a visit to an area correctional facility. GER:DB-Hum

3-5 units, Win (Draskoczy, J)

**COMPLIT 199. Senior Seminar: Narrative and Ethics**

Major terms of narratology; how different literary, cinematic, and popular culture narratives raise ethical issues, stir public debates and contribute to understanding human values. Readings include Biblical texts, Antigone, Kleist, Kafka, Coetzee, V for Vendetta, South Park, Kant, Arendt, Nussbaum, Rorty, and Levinas. GER:DB-Hum

5 units, Win (Eshel, A)

**COMPLIT 217. Hölderlin's Poetry**

(Same as GERLIT 217) A discussion of key poems by Friedrich Hölderlin with regard to themes including the utopian fatherland as mythological landscape; the idea of the Greek gods; the concept of poetry as event; and the emphatic now. The seminar also explores the relationship between the philosophy of history and poetic metaphor.

3-5 units, not given this year

**COMPLIT 218. The work of Luis Martín Santos in Mid-Twentieth Century Spain**

(Same as ILAC 229) First published in 1962, *Tiempo de Silencio* is the only book that the young psychiatrist Luis Martín Santos finished during his lifetime, and, although largely overlooked (even in Spain) until the present day, one of the great European novels of the 20th century. It brings to a complex convergence the evocation of Spain's decadent and run-down post-Civil War society with high-modernist literary procedures and (an implicit parody of) phenomenological analysis.

3-5 units, not given this year

**COMPLIT 223. Literary Diaries of Classic Modernity**

(Same as GERLIT 223) Focus is on self-analysis in works of key modern writers. Since Montaigne's *Essais* and Rousseau's *Confessions*, analysis of the self has been a central topic for modern literature. Texts include Baudelaire's *Intimate Journals*, Kafka's *Diaries*, Gide's *Journals*, Woolf's *Moments of Being*, Benjamin's *Berlin Childhood*, and Pavese's *Diaries*. Analysis of the self as polarizing between the imagination of a utopian childhood and self-deprivation.

3-5 units, not given this year

**COMPLIT 233. Baroque and Neobaroque**

(Same as ENGLISH 233, SPANLIT 293E) The literary, cultural, and political implications of the 17th-century phenomenon formed

in response to the conditions of the 16th century including humanism, absolutism, and early capitalism, and dispersed through Europe, the Americas, and Asia. If the Baroque is a universal code of this period, how do its vehicles, such as tragic drama, Ciceronian prose, and metaphysical poetry, converse with one another? The neobaroque as a complex reaction to the remains of the baroque in Latin American cultures, with attention to the mode in recent Brazilian literary theory and Mexican poetry.

5 units, not given this year

**COMPLIT 234. Conservative Revolution**

(Same as GERGEN 201) An examination of conservative critiques of modernity in the early 20th century, including topics such as German nationalism, the war experience, responses to democracy, anti-liberalism, cultural pessimism in the decline of the West, crises of authority, technology, geopolitics, existentialism, and tradition. Readings from authors such as Oswald Spengler, Thomas Mann, Carl Schmitt, Ernst Jünger, Hugo von Hofmannsthal, Rudolf Borchardt. Consideration of conservative exile authors such as Leo Strauss and Hannah Arendt. Readings in either English or German. GER:DB-Hum

3-5 units, Aut (Berman, R)

**COMPLIT 246A. Literature and Film of Modern Iran**

Iran's social structures, political system, cultural tendencies, and modern artistic culture.

3-5 units, not given this year

**COMPLIT 247. Modernism and the Jewish Voice in Europe**

(Same as GERGEN 221A, SLAVGEN 221) Some of the most haunting literary voices of the 20th century emerged from the Jewish communities of Eastern and Central Europe. The Jewishness of the modernists is thematized, asking whether it contributed to shared attitudes toward text, history, or identity. Their works are situated in specific linguistic traditions: Yiddish, Hebrew, Russian, Polish, or German. Primary readings from Ansky, Bialik, Mandelstam, Babel, Schulz, Kafka, Celan; secondary readings in history, E. European literature, and theory, including Marx, Freud, Benjamin, and Arendt. GER:DB-Hum

3-4 units, not given this year

**COMPLIT 256A. Dionysus - Mythology and Poetry of a Nietzschean Inspiration**

(Same as COMPLIT 356A, GERLIT 210, GERLIT 310) The Greek god Dionysus became, like Apollo, the symbol of poetic imagination. In the modern era he substituted the Apolline tradition, while Apollo assumed the characteristics of Dionysus. We will examine this central poctological motif in texts by authors including Euripides, Keats, Nietzsche, Pound, and Eliot. Open to advanced undergraduates.

3-5 units, Aut (Bohrer, C)

**GRADUATE COURSES IN COMPARATIVE LITERATURE**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**COMPLIT 210. Bakhtin and His Legacy**

(Same as SLAVLIT 226) ¿Quests for my own word are in fact quests for a word that is not my own, a word that is more than myself.¿ writes Mikhail Bakhtin towards the end of his life. It was this ceaseless pursuit of another word that allowed Bakhtin, one of the most distinguished literary critics of the twentieth century, to author several influential literary theory concepts, many of which deal with the ideas of multiplicity, diversity and unfinalizability. The seminar explores these core concepts through close reading of key texts in English and investigates their reverberations in the writings of other thinkers such as Kristeva, de Man and Derrida

3-5 units, Spr (Skakov, N)

**COMPLIT 215. Nabokov in the Transnational Context**

(Same as COMPLIT 115, SLAVGEN 156, SLAVGEN 256) Nabokov's techniques of migration and camouflage as he inhabits the literary and historical contexts of St. Petersburg, Berlin, Paris, America, and Switzerland. His early and late stories, last Russian novel *The Gift*, *Lolita* (the novel and screenplay), and *Pale Fire*. Readings in English. Russian speakers will be encouraged to read Russian texts in original.

3-5 units, Aut (Greenleaf, M)

**COMPLIT 216. Petrarch and Petrarchism**

(Same as ITALGEN 264E) The works of Petrarch (1304-1374), acknowledged as the founder of Renaissance humanism, and a bibliophile, collector of manuscripts, and devotee of erudition. How he dedicated his life to harmonizing the Christian faith with classical learning. Sources include his Latin moral works, epistles, epics, and treatises on illustrious men, and the *Triumphs and Canzoniere*.

5 units, not given this year

**COMPLIT 219. Dostoevsky: Narrative Performance and Literary Theory**

(Same as SLAVLIT 251) This course is an in-depth engagement with a range of Dostoevsky's genres: early works (epistolary novella *Poor Folk* and experimental *Double*), major novels (*Crime and Punishment*, *The Idiot*), less-read shorter works (*A Faint Heart*, *Bobok*, and *The Meek One*), and genre-bending *House of the Dead* and *Diary of a Writer*. We will apply recent theory of autobiography, performance, repetition and narrative gaps, to Dostoevsky's transformations of genre, philosophical and dramatic discourse, and narrative performance. For graduate students. Slavic students will read primary texts in Russian, other participants in translation. Course conducted in English. Undergraduates with advanced linguistic and critical competence may apply.

3-5 units, *Win (Greenleaf, M; Erman, I)*

**COMPLIT 221. Memory, History, and the Contemporary Novel**

(Same as GERLIT 246, JEWISHST 241) How the watershed events of the 20th century, the philosophic linguistic turn, and the debate regarding the end of history left their mark on the novel. How does the contemporary novel engage with the past? How does its interest in memory and history relate to late- or postmodern culture of time or to political and ethical concerns? Novels by Toni Morrison, W. G. Sebald, J. M. Coetzee, Kazuo Ishiguro, and A. B. Yehoshua; theoretical works by Nietzsche, Freud, Heidegger, Hannah Arendt, Walter Benjamin, Fredric Jameson, Paul Ricoeur, Avishai Margalit, and Walter Benn Michaels.

3-5 units, *Spr (Eshel, A)*

**COMPLIT 228. Introduction to Digital Humanities: Concepts, Technologies, Tools**

What happens when you think about computers and other digital devices as more than web browsers and word processing? Think this way about humanities disciplines, and you are in the realm of the digital humanities. In this course, we will explore the perspectives of scholars who have thought about what digital humanities means and the technologies and tools that are shaping new kinds of scholarship. Topics will include history of the digital humanities, textual studies, electronic literature, computational and new media, and emerging work around curation and visualization. This course is organized as a mix of seminar and workshop; active engagement by all participants is expected and thus enrollment is limited to 20 students. Students will contribute to the field with a creative final project that they develop over the course of the quarter. Enrollment limited to 20 students.

4 units, *Spr (Lowood, H; Davis, G)*

**COMPLIT 230A. The Novel in Europe: The Age of Compromise, 1800-1848**

(Same as ENGLISH 230A) The novel after the French revolution and the industrial take-off. Novelistic form and historical processes: nation-building and the marriage market, political conservatism and the advent of fashion, aristocracy and bourgeoisie and proletariat... focusing on how stylistic choices and plot structures offer imaginary resolutions to social and ideological conflicts. Authors will include Austen, Scott, Shelley, Stendhal, Puskin, Balzac, Bronte.

5 units, not given this year

**COMPLIT 231A. The Decadent 1890s**

(Same as COMPLIT 131) This course introduces you to major works of literature of Decadent literature and culture in the European fin de siècle, focusing on the artistic and social culture of London, Paris, Vienna, and Berlin in the 1870s-1900s. Among the topics to be studied are the interconnections between the movements of Decadence, Aestheticism and Symbolism; theories of cultural decay and degeneration; the culture wars of the 19th century; stereotypes of gender, specifically the Dandy and the New Woman; the influence of sexology (regarding homosexuality and

sexual transgression); cultural and legal attitudes toward sexual perversity; and homosexuality; the rise of Wagnerism and theories of Gesamtkunstwerk on the stage; and the period of cultural transition from Decadence to Modernism. We will read works by Mallarmé, Baudelaire, Wilde, Strindberg, Huysmans, Nordau, Nietzsche, Wedekind, Ibsen, Michael Field (Katherine Bradley and Edith Cooper) and various New Woman writers such as George Egerton, Victo

3-5 units, *Aut (Dierkes-Thrun, P)*

**COMPLIT 239. Realistic Fictions**

(Same as GERLIT 232) Realistic narratives in nineteenth-century literature. Structures of representation, temporality, and closure. Realism, history and political economy. Realism, modernism, and twentieth-century revisions. Texts by authors such as Keller, Stifter, Fontane, Seghers, Lukacs, and Adorno.

3-5 units, not given this year

**COMPLIT 240B. Love à la Turque: Tales of Love in Turkish Literature**

(Same as COMPLIT 140B) This course will introduce students whose command of the Turkish language is at an advanced level to the theme of romantic love in Turkish literature, with particular attention to key classical and contemporary works that influenced the development of Turkish literary tradition. Classes will include close reading and discussion of folk tales, poems, short stories, and plays with particular attention to characters of lover/beloved and theme of romantic love and to how these elements are related to cultural and historical background. We will begin with essential examples of ghazels from Ottoman court poetry to explore the notion of courtly love, and move to the most influential texts of 19th and 20th centuries. Although main emphasis will be on content and textual analysis, we will cover grammar and vocabulary issues as needed. Objectives of the course are 1) help students reach the level of proficiency to read and understand prose and verse of moderate difficulty in Turkish language,

3-5 units, *Win (Richardson, B)*

**COMPLIT 244A. Interplay between Turkish Cinema and Literature**

(Same as COMPLIT 144) Turkish cinema has looked to literature for inspiration and for its stories since its inception. In recent years, the relationship between literature and film in Turkey has become more complex and reciprocal. We will explore the interplay between the two by focusing on adaptations and inspirations as well as less traditional modes of interaction such as interpretation and intertextuality. The scope of discussions will include themes like masculinity, representation of women, honor killings, the divide between East and West, as well as the problems of translation from one medium to another. Among the directors and writers whose works will watch and read are Yaşar Kemal, Orhan Pamuk, Yavuz Turgul, and Derviş Zaim.

3-5 units, *Aut (Richardson, B)*

**COMPLIT 245D. Modern Hebrew Literature: Prose**

(Same as COMPLIT 345) The class will discuss major works of Hebrew prose from the nineteenth through the twenty first century, introduce major trends in the study of Modern Hebrew prose and will ask what new paradigms may be developed for the study of Hebrew narrative prose in the future. Readings will include Avraham Mapu, Mendele Mokher Sfarim, Y.H.Brenner, S.J. Agnon, S. Yizhar, Amos Os, Aharon Appelfeld, Amalia Kahana Carmon, A.B. Yehoshua, Yehudit Katzir, and Zeruya Shalev among others. Readings in Hebrew. Discussion in English.

3-5 units, not given this year

**COMPLIT 248A. Reading Turkish I**

This course is an introduction to the structures of Turkish language necessary for reading. It is designed to develop reading competence in Turkish for graduate students (undergraduates should consult the instructor). Essential grammar, syntax points, vocabulary, and reading skills will be emphasized. The goal is to enable you to read Turkish at an advanced level in a relatively short period of time. It is not a traditional language course that takes an integrated four-skill approach; it focuses only on reading, and as a result we will be able to cover advanced material in a short amount of time.

3-5 units, *Aut (Richardson, B)*

**COMPLIT 248B. Reading Turkish II**

Continuation of language and reading development from Reading Turkish I. Open with consent of the instructor to undergraduates who have already taken Reading Turkish I.

3-5 units, *Win (Richardson, B)*

**COMPLIT 248C. Advanced Turkish for Research**

Refining advanced reading skills in modern Turkish through intensive reading and translation. Emphasis on Turkish cultural, historical, literary, and political texts depending on students' academic interests. Prior knowledge of Turkish and/or consultation with the instructor is necessary.

3-5 units, *Spr (Richardson, B)*

**COMPLIT 249A. The Iranian Cinema: Image and Meaning**

(Same as COMPLIT 148A) This course will focus on the analysis of ten Iranian films with the view of conducting a discourse on the semiotics of Iranian art and culture. Each session will be designated to the viewing of a film by a prominent Iranian film-maker. Students are expected to prepare for class by having previously examined other available films by the film-maker under consideration.

1-3 units, *Aut (Beyzaie, B)*

**COMPLIT 249B. Iranian Cinema in Diaspora**

(Same as COMPLIT 148B) Despite enormous obstacles, immigrant Iranian Filmmakers, within a few decades (after the Iranian revolution), have created a slow but steady stream of films outside Iran. They were originally started by individual spontaneous attempts from different corners of the world and by now we can identify common lines of interest amongst them. There are also major differences between them. These films have never been allowed to be screened inside Iran, and without any support from the global system of production and distribution, as independent and individual attempts, they have enjoyed little attention. Despite all this, Iranian cinema in exile is in no sense any less important than Iranian cinema inside Iran. In this course we will view one such film, made outside Iran, in each class meeting and expect to reach a common consensus in identifying the general patterns within these works and this movement. Questions such as the ones listed below will be addressed in our meetings each week: What

1-3 units, *Win (Beyzaie, B)*

**COMPLIT 249C. Contemporary Iranian Theater**

(Same as COMPLIT 148C) Today Iranian plays, both in traditional and contemporary styles, are staged in theater festivals throughout the world play their role in forming a universal language of theater which combine the heritages from countries in all five continents. Despite many obstacles, some Iranian plays have been translated into English and some prominent Iranian figures are successful stage directors outside Iran. Forty six years ago when *Theater in Iran* (a monograph on the history of Iranian plays) by Bahram Beyzaie was first published, it put the then contemporary Iranian theater movement--which was altogether westernizing itself blindly--face to face with a new kind of self-awareness. Hence in today's generation of playwrights and stage directors in Iran, all know something of their theatrical heritage. In this course we will spend some class sessions on the history of theater in Iran and some class meetings will be concentrating on contemporary movements and present day playwrights. Given the de

1-3 units, *Spr (Beyzaie, B)*

**COMPLIT 250. Literature, History, and Representation**

(Same as FRENLIT 248) Literary works as historical narratives; texts which envision ways of reconstructing or representing an ancient or immediate past through collective or individual narratives. Narration and narrator; relation between individual and collective history; historical events and how they have shaped the narratives; master narratives; and alternative histories. Reading include Glissant, Césaire, Dadié, Cixous, Pérec, Le Clézio, Mokkedem, Benjamin, de Certeau, and White.

3-5 units, *not given this year*

**COMPLIT 254. Modern Chinese Novel: Theory, Aesthetics, History**

(Same as CHINLIT 174, CHINLIT 274) From the May Fourth movement to the 40s. Themes include enlightenment, democracy, women's liberation, revolution, war, urban culture, and love. Prerequisite: advanced Chinese.

4 units, *not given this year*

**COMPLIT 263. Advanced Translation Workshop**

Translation as a critical, creative, conservative, and subversive act. Students workshop and revise a translation project throughout the quarter. Readings include comparative translations and statements on the theory and craft of translation. Final project consists of an annotated translation. Prerequisite: ENG 293 or previous translation experience. Enrollment limited to 10 students.

3-5 units, *Aut (Santana, C)*

**COMPLIT 267. National Literatures, Littérature-monde: A New Comparatism**

(Same as FRENLIT 267) This course will focus on the implications of a global francophonie, through discussion of texts produced in different francophone times and spaces. Among the topics to be explored: confrontation of inward/outward territories and the questions of otherness, identity and minority status, the relation between history and literature, transnationality, métissage of languages and transnationality. Readings include Montaigne and Calvin, Tzvetan Todorov, Lise Gauvin, Aimé Césaire, Bernard Dadié, Edouard Glissant, Leila Sebbar and others.

3-5 units, *not given this year*

**COMPLIT 278. Special Topics (Francophone Literature): From Exoticism to a Discourse of Auto-Representation**

(Same as AFRICAST 278, FRENLIT 278) Critical analysis of major issues relating to literatures in French language in and outside France. Focus is on exoticism and self-representation, with an emphasis on the evolution of mentalities, new sensitivities and the role of literature in developing individual or collective identity. Readings include Le Clézio, Memmi, Malouf, Lopes, Schwarz-Bart, Delaygue, Glissant, Todorov, Kane and others. Primary sources, secondary sources and film. Taught in French.

3-5 units, *not given this year*

**COMPLIT 290. Tolstoy's Anna Karenina in Dialogue with Contemporary Philosophical, Social, and Ethical Thought**

(Same as COMPLIT 190, SLAVGEN 190, SLAVGEN 290) Anna Karenina, the novel as a case study in the contest between modernity and tradition, their ethical order, ideology, cultural codes, and philosophies. Images of society, women and men in Tolstoy v. those of his contemporaries: Marx, Mill, Nietzsche, Weber, Durkheim, Freud. Open to juniors, seniors and graduate students. Requirements: three interpretive essays (500-1000 words each). Analysis of a passage from the novel; AK refracted through a philosophical prism and vice versa (30% each); class discussion and Forum (10%).

3-5 units, *Win (Freidin, G)*

**COMPLIT 303D. Thinking in Fiction**

(Same as ENGLISH 303D) Narrative and cognition in 18th-century fictional, philosophical, scientific, and cultural texts. Probable readings: Hobbes, Locke, Newton, Swift, Defoe, Hume, Lennox, Sterne, Adam Smith, Wollstonecraft, and Bentham.

5 units, *not given this year*

**COMPLIT 311. Shakespeare, Islam, and Others**

(Same as ENGLISH 373D) Shakespeare and other early modern writers in relation to new work on Islam and the Ottoman Turk in early modern studies. Othello, Twelfth Night, Titus Andronicus, The Merchant of Venice, and other Shakespeare plays. Kyd's Solyman and Perseda, Daborne's A Christian Turned Turk, Massinger's The Renegado, Marlowe's The Jew of Malta, and literary and historical materials.

5 units, *not given this year*

**COMPLIT 320A. Epic and Empire**

(Same as ENGLISH 314) Focus is on Virgil's Aeneid and its influence, tracing the European epic tradition (Ariosto, Tasso, Camoes, Spenser, and Milton) to New World discovery and mercantile expansion in the early modern period.

5 units, *Spr (Parker, P)*

**COMPLIT 322A. Theories of the Novel**

(Same as FRENGEN 356) The novel as the literary genre most closely identified with the development of cultural modernity by literary historians and theorists. Critical models for defining the novel's poetics and cultural work. Critical readings such as texts by Lukacs, Bakhtin, Auerbach, Barthes, Armstrong, Gallagher, Bourdieu, Macherey, Jameson, Said and Spivak. Tutor texts such as Defoe's Robinson Crusoe, Flaubert's Madame Bovary, and

Woolf's *To the Lighthouse*.

3-5 units, not given this year

**COMPLIT 330. The Bourgeois**

(Same as ENGLISH 363) Goal is to define the ruling class of modern times. Social history (Weber, Hirschmann, Marx); literary texts (Defoe, Goethe, Gaskell); and Henrik Ibsen who produced an intransigent criticism of the bourgeois ethos.

5 units, not given this year

**COMPLIT 331C. Institutions of Enlightenment: The Invention of the Public Sphere**

(Same as ENGLISH 303F) This course treats the cultural foundations upon which the Enlightenment instituted a public sphere and constituted its relationship to the private (or intimate) sphere. The aim is to explore the invention and naturalization of some of the most fundamental institutions of the Enlightenment -- institutions such as the public, the private, the market, public opinion, literature, and even more basic categories such as the individual, society, culture, knowledge, and politics.

5 units, Aut (Bender, J)

**COMPLIT 332. The Transatlantic Renaissance**

(Same as ENGLISH 310) The emergence of a transatlantic culture in the early modern period. How is the Renaissance of Europe and England fashioned in a conversation with the cultural forms and material realities of the colonial Americas? And how do colonial writings expand and complicate the available understanding of the Renaissance? Readings in Columbus, More, Hakluyt, Spenser, Shakespeare, the Inca Garcilaso de la Vega.

5 units, Aut (Greene, R)

**COMPLIT 340. Literature of the Iranian Diaspora**

This course examines poetry and prose produced by authors of Iranian descent living outside of Iran. The focus will be on works composed in English that have appeared since the Revolution of 1978-79. Translations of selected Persian and French texts will also be discussed. Although focused on the Iranian immigrant experience, this course also seeks to locate Iranian diasporic writing within the broader context of the diasporic literary scene in the US, UK and France.

3-5 units, Spr (Brookshaw, D)

**COMPLIT 345. Modern Hebrew Literature: Prose**

(Same as COMPLIT 245D) The class will discuss major works of Hebrew prose from the nineteenth through the twenty first century, introduce major trends in the study of Modern Hebrew prose and will ask what new paradigms may be developed for the study of Hebrew narrative prose in the future. Readings will include Avraham Mapu, Mendele Mokher Sfarim, Y.H.Brenner, S.J. Agnon, S. Yizhar, Amos Os, Aharon Appelfeld, Amilia Kahana Carmon, A.B. Yehoshua, Yehudit Katzir, and Zeruya Shalev among others. Readings in Hebrew. Discussion in English.

3-5 units, not given this year

**COMPLIT 348. The Novel as/and Critical Discourse**

(Same as FRENLIT 358) Literature is the site of a multiplicity of knowledges. This course is an attempt to build a history of ideas in the Francophone world. We will be looking at narrative styles, as well as the ways in which the 20th century theoretical discourse among Francophone intellectuals is often embedded in the novel. The role of intellectuals in society will be discussed, with a focus on three major topics: identities, religion (Islam, Christianity, violence), and democracy. Reading includes Assia Djebar, Abdelwahab Meddeb, Henri Lopes, Amin Malouf, VY Mudimbe, Franz Fanon, Jean-Paul Sartre, Edward Said and others.

3-5 units, Win (Boyi, E)

**COMPLIT 349. LITERARY THEORY**

(Same as DLCL 349, SLAVLIT 349, ILAC 349) Advanced survey course of key schools in literary theory, from formalism onwards. Emphasis is on the discussion of primary sources. Topics include structuralism, ideology critique, psychoanalysis, reception aesthetics, deconstruction, feminism, and post-colonialism. Readings by Barthes, Bakhtin, Benjamin, Borges, Derrida, de Man, Foucault, Freud, Iser, Lacan, Shklovsky, and Spivak, among others.

3-5 units, Aut (Hoyos, H; Skakov, N)

**COMPLIT 349. LITERARY THEORY**

(Same as DLCL 349, SLAVLIT 349, ILAC 349) Advanced survey course of key schools in literary theory, from formalism onwards.

Emphasis is on the discussion of primary sources. Topics include structuralism, ideology critique, psychoanalysis, reception aesthetics, deconstruction, feminism, and post-colonialism. Readings by Barthes, Bakhtin, Benjamin, Borges, Derrida, de Man, Foucault, Freud, Iser, Lacan, Shklovsky, and Spivak, among others.

3-5 units, Aut (Staff)

**COMPLIT 353A. Experiment and the Novel**

(Same as ENGLISH 303) A double exploration of experiment in the novel from 1750 into the 19th century. Taking off from Zola's *The Experimental Novel*, consideration of the novel's aspect as scientific instrument. Taking the idea of experimental fiction in the usual sense of departures from standard practice, consideration of works that seem to break away from techniques of realism devised prior to 1750. Possible texts by: Lennox, Sterne, Walpole, Goldsmith, Godwin, Lewis, Shelley, Hogg, Emily Bronte, and Diderot.

5 units, not given this year

**COMPLIT 356A. Dionysus - Mythology and Poetry of a Nietzschean Inspiration**

(Same as COMPLIT 256A, GERLIT 210, GERLIT 310) The Greek god Dionysus became, like Apollo, the symbol of poetic imagination. In the modern era he substituted the Apolline tradition, while Apollo assumed the characteristics of Dionysus. We will examine this central poctological motif in texts by authors including Euripides, Keats, Nietzsche, Pound, and Eliot. Open to advanced undergraduates.

3-5 units, Aut (Bohrer, C)

**COMPLIT 359A. Philosophical Reading Group**

(Same as FRENGEN 395, ITALGEN 395) Discussion of one contemporary or historical text from the Western philosophical tradition per quarter in a group of faculty and graduate students. For admission of new participants, a conversation with H. U. Gumbrecht is required. May be repeated for credit.

1 unit, Aut (Gumbrecht, H), Win (Gumbrecht, H)

**COMPLIT 364. Style**

(Same as ENGLISH 364) The return of a term that was central in 20th-century criticism, and has all but disappeared in recent decades. Focus is on looking at concepts of style from various branches of linguistic and literary theory, and examination of some revealing examples in novels and films. Team taught with D.A. Miller from U.C. Berkeley.

5 units, not given this year

**COMPLIT 369. Introduction to Graduate Studies: Criticism as Profession**

(Same as FRENGEN 369, ITALGEN 369, GERLIT 369) Based on a survey of (and a conversation about) the history of academic Literary Criticism, and on presentation (and discussion) of contemporary theoretical positions, this seminar will try to enhance a reflection on the conditions, difficulties, and rewards of Literary Criticism as a profession and as an intellectual life form. Attention will be paid to the most relevant (and most pressing) institutional frame-conditions but this attention will not prevent us from trying to explore a (seldom used) potential of eccentricity and freedom that has always been inherent to (although sometimes dormant in) Literary Criticism.

5 units, Aut (Gumbrecht, H)

**COMPLIT 371. Seminar in Chinese Literary Criticism**

(Same as CHINLIT 371) How aesthetics and politics intertwine and break apart in Western and Eastern traditions. Aesthetics for understanding culture, morality, and power in crosscultural contexts. Readings include Hegel, Kant, Marcuse, Lukacs, and Adorno; and Chinese thinkers Wang Guowei, Lu Xun, Li Zehou, and Mao. Prerequisite: CHINLIT 127/207 or consent of instructor.

2-5 units, not given this year

**COMPLIT 395. Research**

(Staff)

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**COMPLIT 396L. Pedagogy Seminar I**

(Same as ENGLISH 396L) Required for first-year Ph.D students in English, Modern Thought and Literature, and Comparative Literature. Preparation for surviving as teaching assistants in undergraduate literature courses. Focus is on leading discussions and grading papers.

2 units, Aut (Woloch, A)

**COMPLIT 399. Dissertation**

(Staff)

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**COMPLIT 802. TGR Dissertation**

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

## COMPARATIVE MEDICINE (COMP MED) COURSES

### UNDERGRADUATE COURSES IN COMPARATIVE MEDICINE

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**COMP MED 81N. Comparative Anatomy and Physiology of Mammals**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Emphasis is on a comparative approach to anatomy and physiology of a wide range of mammals, the unique adaptations of each species in terms of its anatomical, and behavioral characteristics, and how these species interact with human beings and other animals. Dissection required. Class size is limited to 16. GER: DB-NatSci

3 units, Win (Bouley, D)

**COMP MED 84Q. Globally Emerging Zoonotic Diseases**

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Infectious diseases impacting veterinary and human health around the world today. Mechanisms of disease, epidemiology, and underlying diagnostic, treatment and control principles associated with these pathogens.

3 units, Spr (Felt, S)

**COMP MED 87Q. Introduction to the Mouse in Biomedical Research**

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Focus is on the laboratory mouse, one of the most widely used models for biomedical research. Topics include the natural history and origin of the laboratory mouse; characteristics of commonly used strains; mouse anatomy, physiology, and husbandry; common mouse diseases and their effects on research; coat color genetics; and genetically engineered mouse technology. Demonstrations and hands-on experience with necropsy, mouse handling, and research techniques.

3 units, Aut (Nagamine, C)

**COMP MED 103. Horse Medicine**

The most common equine diseases, ranging from colic to lameness. Equine anatomy and physiology relevant to topics in equine medicine. Equine infectious diseases, care of the newborn foal, medical emergencies, and neurological disorders. Laboratory sessions involve physical examination of the horse and review the basics of the neurological and lameness exam.

2 units, Spr (Staff)

**COMP MED 107. Comparative Neuroanatomy**

(Same as COMP MED 207) Functional organization and evolution of the vertebrate nervous system. Topics include paleoneurology, cladistic analysis, allometry, mosaic versus concerted evolution, and evolution of brain region structure, connectivity, and neurons. Comparisons between structure and function of vertebrate forebrains including hippocampi. Evolution of the primate visual and sensorimotor central nervous system as related to vocalization, socialization, and intelligence.

4 units, alternate years, not given this year

**COMP MED 110. Pre-Vet Advisory**

For students interested in a career in veterinary medicine. How to meet the academic and practical experience prerequisites for admission to veterinary school. Networking with other pre-vet students. Periodic group meetings with guest speakers presenting career options in veterinary medicine. Prerequisite: consent of instructor.

1 unit, Aut (Bouley, D), Win (Bouley, D), Spr (Staff)

**COMP MED 120. Rodent Biomethodology**

Preference to bioengineering and other biological sciences undergraduates. Techniques and surgery using mice and rats in biomedical research. Laboratory sessions include handling, dosing, and sampling techniques; basic understanding of anesthesia and analgesia; aseptic surgery techniques, suturing, and surgical approaches. Prerequisite: instructor consent.

3 units, Aut (Green, S; Heath, L; Pacharinsak, C), Spr (Staff)

**COMP MED 198. Undergraduate Directed Reading in Comparative Medicine**

May be taken as a prelude to research and may also involve participation in a lab or research group seminar and/or library research.

1-3 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**COMP MED 199. Undergraduate Research**

Investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

1-3 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### GRADUATE COURSES IN COMPARATIVE MEDICINE

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**COMP MED 207. Comparative Neuroanatomy**

(Same as COMP MED 107) Functional organization and evolution of the vertebrate nervous system. Topics include paleoneurology, cladistic analysis, allometry, mosaic versus concerted evolution, and evolution of brain region structure, connectivity, and neurons. Comparisons between structure and function of vertebrate forebrains including hippocampi. Evolution of the primate visual and sensorimotor central nervous system as related to vocalization, socialization, and intelligence.

4 units, alternate years, not given this year

**COMP MED 215. Synaptic Properties and Neuronal Circuits**

Focus is on synapses and circuits in the central nervous system. Objective is to demonstrate how the specific properties of different synapses play a role in the function of neuronal circuits. The main types of synapses are covered, including both ionotropic and metabotropic-receptor-dependent synapses and their related circuits in the CNS. Lectures and student presentations. If taken for 3 units qualifies as a Core Course satisfying requirements in Cellular, Molecular & Developmental Neuroscience in the Neurosciences Graduate Program. Students enrolling for 3 units write an NIH-style proposal on a selected synapse, proposing a study of its properties and related function and presenting the proposal to the class for critique and discussion.

2-3 units, not given this year

**COMP MED 299. Directed Reading in Comparative Medicine**

Prerequisite: consent of instructor. (Staff)

1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**COMP MED 370. Medical Scholars Research**

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

4-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**COMP MED 399. Graduate Research**

Investigations sponsored by individual faculty members. Opportunities are available in comparative medicine and pathology, immuno-histochemistry, electron microscopy, molecular genetics, quantitative morphometry, neuroanatomy and neurophysiology of the hippocampus, pathogenesis of intestinal infections, immunopathology, biology of laboratory rodents, anesthesiology of laboratory animals, gene therapy of animal models of neurodegenerative diseases, and development and characterization of transgenic animal models. Prerequisite: consent of instructor.

1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

# COMPARATIVE STUDIES IN RACE AND ETHNICITY (CSRE) COURSES

## UNDERGRADUATE COURSES IN COMPARATIVE STUDIES IN RACE AND ETHNICITY

Primarily for undergraduates; graduate students may enroll with consent of adviser.

### CSRE 14N. Growing Up Bilingual

(F,Sem) (Same as CHICANST 14N, EDUC 114N) Stanford Introductory Seminar. This course is a Freshman Introductory Seminar that has as its purpose introducing students to the sociolinguistic study of bilingualism by focusing on bilingual communities in this country and on bilingual individuals who use two languages in their everyday lives. Much attention is given to the history, significance, and consequences of language contact in the United States. The course focuses on the experiences of long-term US minority populations as well as that of recent immigrants.

3 units, Win (Valdes, G)

### CSRE 15. Global Flows: The Globalization of Hip Hop Art, Culture, and Politics

(Same as AMSTUD 15) This course consists of film screenings, dialogues, and performances that examine and engage Hip Hop Cultures and artists from around the world. We will explore diverse scenes and artists, from the formation of new musical genres such as hiplife in Ghana, to the impact of the first Hip Hop concert in Morocco, to comparative investigations of race and citizenship in Japan, Cuba, Palestine, France, and the United States (including Black, Mexican and Arab-Americans).

1-2 units, not given this year

### CSRE 16N. African Americans and Social Movements

(F,Sem) (Same as AFRICAAM 16N, SOC 16N) Stanford Introductory Seminar. Theory and research on African Americans' roles in post-Civil Rights, US social movements. Topics include women's right, LGBT rights, environmental movement, and contemporary political conservatism. GER:DB-SocSci

3 units, Aut (Fields, C)

### CSRE 28N. The Cultural Shaping of Mental Health and Illness

(F,Sem) (Same as PSYCH 28N) Stanford Introductory Seminar. This seminar examines how our cultural ideas and practices shape our conceptions, perceptions, experiences, and treatment of emotional wellness and distress. We will read and discuss empirical research and case studies from psychology, anthropology, sociology, and medicine. Course requirements include weekly reading and thought papers, weekly discussion, and a final research project and presentation.

3 units, Win (Tsai, J)

### CSRE 45Q. Understanding Race and Ethnicity in American Society

(S,Sem) (Same as SOC 45Q) Stanford Introductory Seminar. Preference to sophomores. Historical overview of race in America, race and violence, race and socioeconomic well-being, and the future of race relations in America. Enrollment limited to 16. GER:DB-SocSci

5 units, Aut (Snipp, C)

### CSRE 51N. Comparative Fictions of Ethnicity

(S,Sem) (Same as AMSTUD 51N, COMPLIT 51N) Stanford Introductory Seminar. We may know who we are, but we are, after all, social creatures. How does our sense of self interact with those around us? How does literature provide a particular medium for not only self expression, but also for meditations on what goes into the construction of the Self? After all, don't we tell stories in response to the question, who are you? Besides a list of nouns and names and attributes, we give our lives flesh and blood in telling how we process the world. Our course focuses in particular on this question--Does this universal issue (who am I) become skewed differently when we add a qualifier before it, like ethnic?

GER:DB-Hum

5 units, Win (Palumbo-Liu, D)

### CSRE 53S. Passing Unseen: Race, Discourse, and Cultural Expectation

Narratives of passing are usually founded on visible manifestations of racial difference. But the possibility for passing means, of course, that race is not always obvious or apparent in terms of skin color. There are critical elements of representation and passing that go unseen. And even without the problematic ideal of visible race, there is still deep cultural interest and investment in racial differentiation. This course investigates modes of passing unseen.

3 units, Spr (Trump, W)

### CSRE 55C. Black Childhood in American Literature

This course will explore ways that the black child as a trope, a site, a body and a subject is represented in 20th Century American literature. With attention to the representation of black childhood in the novels, short fiction, and memoirs of Richard Wright, Toni Morrison, Toni Cade Bambara, James Baldwin, Gwendolyn Brooks, Alice Childress, and others, we will also investigate the ways in which those representations reflect larger issues and dilemmas for black childhood within American institutions and cultural discourse.

3 units, Spr (Caruthers, J)

### CSRE 55S. Real Men and Dragon Ladies: Race and Sexuality in America, 1662-1965

(Same as HISTORY 55S) How do race and sexuality mutually construct each other throughout American history? How do historians use primary sources to make historical arguments? Examines a variety of primary sources, including political pamphlets, legal documents, illustrations, and film. The historical trajectory we will follow examines the creation and elaboration of racial and sexual categories, from colonial slave codes and 19th century miscegenation law, through modern urban culture and the GI Bill.

5 units, Aut (Heinz, A), ONCEONLY

### CSRE 56N. Mixed Race in the New Millennium: Crossings of Kin, Faith & Culture

(F,Sem) (Same as AFRICAAM 56N, ENGLISH 56N) Stanford Introductory Seminar. Preference to freshmen. How literature, theater, graphic art and popular culture shape understandings of contemporary mixed race identity and other complex experiences of cultural hybridity. Course explores implications for racial identity, art, and politics for the new millennium. GER:DB-Hum

3 units, Win (Elam, M)

### CSRE 99. Poetics, Culture, and Geopolitics: Performing Power

(Same as DRAMA 110) Poet/performer Mark Gonzales of the Human Writes Project leads a course that examines the relationship between traditional forms of power and the power of performance. Students will analyze the text of body and bureaucracy that is performed on the stage of the globe. Through this analysis students will engage in critical reflection of how performance creates spaces to move beyond the dialectic of oppression and dominance. At culmination, students will create their own text, through body, visuals, or multi-media, to share the summary of their ideas at a campus wide symposium. GER:DB-Hum

4 units, Aut (Staff)

### CSRE 103B. Race, Ethnicity, and Linguistic Diversity in Classrooms: Sociocultural Theory and Practices

(Same as AFRICAAM 106, EDUC 103B, EDUC 337) Focus is on classrooms with students from diverse racial, ethnic and linguistic backgrounds. Studies, writing, and media representation of urban and diverse school settings; implications for transforming teaching and learning. Issues related to developing teachers with attitudes, dispositions, and skills necessary to teach diverse students.

3-5 units, Spr (Ball, A)

### CSRE 104F. The Modern Tradition of Non-Violent Resistance

(Same as AFRICAAM 204F, HISTORY 204F) During the twentieth century, peasants and menial laborers who comprised the majority of humanity launched liberation movements to secure citizenship rights. Mohandas K. Gandhi, Martin Luther King, Jr., and Nelson Mandela are among the leaders whose ideas continue to influence contemporary movements for global peace with social justice in a sustainable environment.



5 units, not given this year

**CSRE 107. The Black Mediterranean: Greece, Rome and Antiquity**

(Same as AFRICAAM 107C, CLASSGEN 107) Explore problems of race and ethnicity as viable criteria in studying ancient societies and consider the question, What is the Mediterranean?, in relation to premodern evidence. Investigate the role of blackness as a marker of ethnicity; the demography of slavery and its roles in forming social identities; and environmental determinism as a factor in ethnic and racial thinking. Consider Greek and Roman perspectives and behavior, and their impact on later theories of race and ethnicity as well as the Mediterranean as a whole. GER:EC-GlobalCom

4-5 units, not given this year

**CSRE 108. Introduction to Feminist Studies**

(Same as AMSTUD 107, FEMST 101, HISTORY 107) Introduction to interdisciplinary feminist scholarship, which seeks to understand the creation, perpetuation, and critiques of gender inequalities. Topics include the historical emergence of feminist politics and contemporary analyses of work and family, health and sexuality, creativity, and politics. Close attention to the intersections of race, gender, ethnicity, and sexuality and to international, as well as U.S., perspectives. Students learn to think critically about gender in the past, present, and future. GER:DB-SocSci, EC-Gender

4-5 units, Aut (Freedman, E)

**CSRE 109B. Indian Country Economic Development**

(Same as NATIVEAM 109B) The history of competing tribal and Western economic models, and the legal, political, social, and cultural implications for tribal economic development. Case studies include mineral resource extraction, gaming, and cultural tourism. 21st-century strategies for sustainable economic development and protection of political and cultural sovereignty.

5 units, Spr (Biestman, K)

**CSRE 112. Colonial Exchanges: Rethinking Race and Gender in Encounters between Europe and the New World**

What does the term *race* mean in the 17th and 18th centuries? How can we talk about either *race* or *gender* in the early modern period without imposing contemporary values on their meaning? This course looks at emerging discourses of race and gender in literary, biographical, historical, and visual representations of encounters between Europe and the New World from Shakespeare to Swift as well as representations of the period by contemporary writers like Coetzee, Phillips, and Morrison.

5 units, Win (Wahl, E)

**CSRE 117N. Film, Nation, Latinidad**

(Same as CHICANST 117N, ILAC 117N) Examination of films from Spain, Mexico, and Latina/o USA that expand, trouble, contest, parody, or otherwise interrogate notions of national identity. Filmmakers may include Lourdes Portillo, Alejandro González Iñárritu, John Sayles, Maria Novaro, Pedro Almodóvar, and Gregory Nava.

3-4 units, not given this year

**CSRE 117S. History of California Indians**

(Same as NATIVEAM 117S, HISTORY 250A) Demographic, political, and economic history of California Indians, 1700s-1950s. Processes and events leading to the destruction of California tribes, and their effects on the groups who survived. Geographic and cultural diversity. Spanish, Mexican, and Anglo-American periods. The mission system. GER:EC-AmerCul

5 units, not given this year

**CSRE 120. Native American Writers, 1880-1920**

(Same as NATIVEAM 120) The period of time-1880 to 1920-is a time when many important events in American Indian history occurred. Hoxie's historical work provides a framework for analyzing what effects these policies had on American Indian people. His work does not provide an American Indian perspective; he stated at the onset, that this was not an objective in this study. His main objective was to present a study that shows Indians' relations with whites as a clash of two complex cultures from a white point of view (Hoxie xxi). Three American Indians writing during this time period provide the needed Indian perspective lacking in Hoxie's work.

5 units, not given this year

**CSRE 121X. Hip Hop, Youth Identities, and the Politics of Language**

(Same as AFRICAAM 121X, AMSTUD 121X, ANTHRO 121A, EDUC 121X, LINGUIST 155) Focus is on issues of language, identity, and globalization, with a focus on Hip Hop cultures and the verbal virtuosity within the Hip Hop nation. Beginning with the U.S., a broad, comparative perspective in exploring youth identities and the politics of language in what is now a global Hip Hop movement. Readings draw from the interdisciplinary literature on Hip Hop cultures with a focus on sociolinguistics and youth culture.

3-4 units, Spr (Alim, H)

**CSRE 125V. Minority Representation and the Voting Rights Act**

(Same as POLISCI 125V) Focus is on whether and how racial and ethnic minorities including African Americans, Asian Americans, and Latinos are able to organize and press their demands on the political system. Topics include the political behavior of minority citizens, the strength and effect of these groups at the polls, the theory and practice of group formation among minorities, the responsiveness of elected officials, and the constitutional obstacles and issues that shape these phenomena. GER:DB-SocSci

5 units, Aut (Segura, G)

**CSRE 133. Women and Race in the American West, 1849-1950**

(Same as HISTORY 258G) The western myth of the lone white cowboy gives little insight into women and people of color. However, race and gender are crucial to the U.S. West's history, creating complex identities and social structures. The course examines lives of women of diverse races, in addition to the mythology surrounding icons such as pioneer mothers or Sacagawea. Using literature, art work, and film, along with works by historians, to analyze the intersection of race and the relation between history and myth.

5 units, Win (Frink, B)

**CSRE 135H. Conversations in CSRE: Case Studies in the Stanford Community**

(Same as ANTHRO 135H) Race, ethnicity, gender, and religion using the tools, analytical skills and concepts developed by anthropologists.

1-2 units, Aut (Wilcox, M), Win (Wilcox, M)

**CSRE 135I. CSRE House Seminar: Race and Ethnicity at Stanford**

(Same as ANTHRO 135I) Race, ethnicity, gender, and religion using the tools, analytical skills and concepts developed by anthropologists.

1-2 units, not given this year

**CSRE 144. Transforming Self and Systems: Crossing Borders of Race, Ethnicity, Gender, Sexuality, and Class**

(Same as ASNAMST 144) An exploration of crossing borders within ourselves, and between *us* and *them* through the following questions: How is understanding the self tied to understanding others? What does the *personal* is political mean for us? How can our personal identity struggles have meaning beyond the self? How does *synergistic consciousness* move us toward meaning, balance, connectedness, and wholeness? What knowledge comes from the heart? How does self healing lead to community healing? Can *victims* claim agency? How does contemplation lead to action? What is a narrative construction of reality? In a learning community, we will engage these questions through group process, journaling, reading, drama, creative writing, and storytelling.

5 units, Spr (Murphy-Shigematsu, S)

**CSRE 145A. Poetics and Politics of Caribbean Women's Literature**

(Same as AFRICAAM 145A) Mid 20th-century to the present. How historical, economic, and political conditions in Haiti, Cuba, Jamaica, Antigua, and Guadeloupe affected women. How Francophone, Anglophone, and Hispanophone women novelists, poets, and short story writers respond to similar issues and pose related questions. Caribbean literary identity within a multicultural and diasporic context; the place of the oral in the written feminine text; family and sexuality; translation of European master texts; history, memory, and myth; and responses to slave history, colonialism, neocolonialism, and globalization. GER:DB-SocSci,



DB-SocSci, EC-Gender

5 units, not given this year

**CSRE 146. Community Matters: Research and Service with Community Organizations**

Methods and principles for academic research in community settings for students preparing to enter summer experiences with community organizations. Case studies and tools to help students conceptualize a research strateg. Students develop a memorandum of understanding in collaboration with the community agency to define the work, relationship, and mutual benefit of the research partnership.

2 units, Spr (Mitchell, T)

**CSRE 146S. Asian American Culture and Community**

(Same as AMSTUD 146, COMPLIT 146, ASNAMST 146S) An examination of the history of Asians in America via one case history: the International Hotel in San Francisco. Background history of Asians in America, and the specifics of the I Hotel case as involving the convergence of global and local economies, urban redevelopment, and housing issues for minorities. Focus on the convergence of community and cultural production. Service learning component involving community work at the Manilatown Heritage Foundation in San Francisco. Service Learning Course (certified by Haas Center). GER:DB-Hum

5 units, Spr (Palumbo-Liu, D)

**CSRE 149. The Laboring of Diaspora & Border Literary Cultures**

(Same as COMPLIT 149) Focus is given to emergent theories of culture and on comparative literary and cultural studies. How do we treat culture as a social force? How do we go about reading the presence of social contexts within cultural texts? How do ethno-racial writers re-imagine the nation as a site with many cognitive maps in which the nation-state is not congruent with cultural identity? How do diaspora and border narratives/texts strive for comparative theoretical scope while remaining rooted in specific local histories. GER:DB-Hum

3-5 units, Win (Saldivar, J)

**CSRE 150. Race and Political Sociology**

(Same as SOC 150, SOC 250) How race informs the theories and research within political sociology. The state's role in creation and maintenance of racial categories, the ways in which racial identity motivates political actors, how race is used to legitimate policy decisions, comparisons across racial groups. Emphasis on understanding the ways race operates in the political arena. GER:DB-SocSci

5 units, Aut (Fields, C)

**CSRE 159H. Creating Comedy, Performing Identity**

(Same as DRAMA 159H) This course examines how comedy has been utilized as a performance structure to negotiate issues of personal and group identity, including race, gender and sexuality. We will range from Shakespeare to Richard Pryor, covering stage comedy, solo performance, stand-up comedy, and sitcom. GER:DB-Hum

4 units, Aut (Daube, M)

**CSRE 160N. Latino/Latina Performance in the United States**

(F,Sem) (Same as CHICANST 160N, DRAMA 17N) Stanford Introductory Seminar. Preference to freshmen. This course will introduce works by U.S. Latino and Latina performance artists producing from the margins of the mainstream Euro-American theater world. We will examine how performance art serves as a kind of dramatized political forum for Latino/a artists, producing some of the most transgressive explorations of queer and national/ethnic identities in the U.S. today. By the course's conclusion, each student will create and perform in a staged reading of an original performance piece. GER:DB-Hum, EC-AmerCul

3 units, Win (Moraga, C)

**CSRE 162. WOMEN IN MODERN AMERICA**

(Same as AMSTUD 161, HISTORY 161) Considers the political, economic, and social development of women in the United States during a long twentieth century. How have women been shaped or constrained by gendered conceptions of work, reproduction, education, family, and culture? Have all women reacted similarly to wars and depression or domestic and foreign policy? Through personal narratives and historical accounts, the course will answer

these questions, observing how women negotiated gender, race, sexuality, and class difference to achieve greater opportunity and citizenship rights. GER:DB-SocSci, EC-Gender

4-5 units, Spr (Sbardellati, L)

**CSRE 163S. Post Black Drama in the Age of Obama**

(Same as AFRICAAM 163S, AMSTUD 163S, DRAMA 163S, DRAMA 363S) This course will examine works of the new millennium that confront questions of African American experience. These plays are written by African American and non-black writers. In analyzing these works, this course will investigate such questions as: In a time that has been called 'Post Race' or 'Post Soul' or even 'Post Black,' what can we discern about African American drama? How do these plays reflect or contradict such labeling? How do these works speak to our times? Who does the form relate to in matters of content in these works? What do these works tell us about the contemporary constructions and meanings of blackness? GER:DB-Hum

5 units, Win (Elam, H)

**CSRE 164. Immigration and the Changing United States**

(Same as CHICANST 164, SOC 164, SOC 264) The role of race and ethnicity in immigrant group integration in the U.S. Topics include: theories of integration; racial and ethnic identity formation; racial and ethnic change; immigration policy; intermarriage; hybrid racial and ethnic identities; comparisons between contemporary and historical waves of immigration. GER:DB-SocSci

5 units, Aut (Jimenez, T)

**CSRE 166B. Immigration Debates in America, Past and Present**

(Same as HISTORY 166B, HISTORY 366B) Examines the ways in which the immigration of people from around the world and migration within the United States shaped American nation-building and ideas about national identity in the twentieth century. Focuses on how conflicting ideas about race, gender, ethnicity, and citizenship with respect to particular groups led to policies both of exclusion and integration. Part One begins with the ways in which the American views of race and citizenship in the colonial period through the post-Reconstruction Era led to the passage of the Chinese Exclusion Act in 1882 and subsequently to broader exclusions of immigrants from other parts of Asia, Southern and Eastern Europe, and Mexico. Explores how World War II and the Cold War challenged racial ideologies and led to policies of increasing liberalization culminating in the passage of the 1965 Immigration Act, which eliminated quotas based on national origins and opened the door for new waves of immigrants, especially from Asia and Latin Ameri GER:DB-SocSci

3-5 units, Win (McKibben, C), Sum (Staff)

**CSRE 168. New Citizenship: Grassroots Movements for Social Justice in the U.S.**

(Same as ANTHRO 169A, CHICANST 168, FEMST 140H) Focus is on the contributions of immigrants and communities of color to the meaning of citizenship in the U.S. Citizenship, more than only a legal status, is a dynamic cultural field in which people claim equal rights while demanding respect for differences. Academic studies of citizenship examined in dialogue with the theory and practice of activists and movements. Engagement with immigrant organizing and community-based research is a central emphasis.

5 units, Win (Coll, K)

**CSRE 173S. Transcultural and Multiethnic Lives: Contexts, Controversies, and Challenges**

(Same as AFRICAAM 173S, ASNAMST 173S) Lived experience of people who dwell in the border world of race and nation where they negotiate transcultural and multiethnic identities and politics. Comparative, historical, and global contexts such as family and class. Controversies, such as representations of mixed race people in media and multicultural communities. What the lives of people like Tiger Woods and Barack Obama reveal about how the marginal is becoming mainstream.

5 units, not given this year

**CSRE 177. Writing for Performance: The Fundamentals**

(Same as DRAMA 177, DRAMA 277) Course introduces students to the basic elements of playwriting and creative experimentation for the stage. Topics include: character development, conflict and plot construction, staging and setting, and play structure. Script

analysis of works by contemporary playwrights may include: Marsha Norman, Patrick Shanley, August Wilson, Suzan-Lori Parks, Paula Vogel, Octavio Solis and others. Table readings of one-act length work required by quarter, end. GER:DB-Hum  
5 units, *Win (Moraga, C)*

**CSRE 178. Ethics and Politics of Public Service**

(Same as ETHICSOC 133, HUMBIO 178, PHIL 175A, PHIL 275A, POLISCI 133) Ethical and political questions in public service work, including volunteering, service learning, humanitarian assistance, and public service professions such as medicine and teaching. Motives and outcomes in service work. Connections between service work and justice. Is mandatory service an oxymoron? History of public service in the U.S. Issues in crosscultural service work. Integration with the Haas Center for Public Service to connect service activities and public service aspirations with academic experiences at Stanford. GER:DB-SocSci

5 units, *Win (Mitchell, T)*

**CSRE 179. Asian American Experiences and Documentary Practice**

(Same as FILMSTUD 279, ASNAMST 179) Focus is on documentary cinema as a technology for understanding Asian Americans in the U.S. The social and historical context of the formation of the Asian American filmmaker, an authorial position that emerges in the 60s and 70s as part of the civil rights movement. Works include films by Loni Ding, Bob Nakamura and Curtis Choy; readings about the establishment of Asian American media industries and Asian American film criticism as a multi-genre. Social issue documentaries that represent new ethnographies of social experience including transnational adoption (Daughter From Danang), refugee experience (AKA Don Bonus), and sex tourism (The Women Outside). Readings include analyses of the implications of these works for cinema studies, ethnic studies, and the politics of film in everyday life. Experimental documentaries and their interrogation of the limits of the documentary form in representing identities and social problems. How does representation matter within and for Asian America GER:DB-Hum

5 units, *not given this year*

**CSRE 179F. Flor y Canto: Poetry Workshop**

(Same as DRAMA 179F, DRAMA 279F) Poetry reading and writing. The poet as philosopher and the poet as revolutionary. Texts: the philosophical meditations of pre-Columbian Aztec poetry known as flor y canto, and reflections on the poetry of resistance born out of the nationalist and feminist struggles of Latin America and Aztlán. Required 20-page poetry manuscript. GER:DB-Hum

3-5 units, *Spr (Moraga, C)*

**CSRE 179G. Indigenous Identity in Diaspora: People of Color Art Practice in North America**

(Same as CSRE 279G, DRAMA 179G, DRAMA 279G) This gateway core course to the IDA emphasis in CSRE offers a 21st century examination of people of color aesthetics and related politics, drawing from contemporary works (literature, music, visual and performing arts) in conversation with their native (especially American Indigenous and African) origins. Issues of gender and sexuality in relation to cultural identity are also integral to this study. Students will be required to produce a final work, integrating critical writing with a creative project.

3-5 units, *not given this year*

**CSRE 180E. Introduction to Chicana/o Studies**

(Same as CHICANST 180E) Historical and contemporary experiences that have defined the status of Mexican-origin people living in the U.S. Topics include the U.S./Mexico border and the borderlands; immigration and anti-immigration sentiment; literary and cultural traditions; music; labor; historical perspectives on Mexicans in the U.S. and the Chicano movement; urban realities; gender relations; political and economic changes; and inter- and intra-group interactions. Sources include social science and humanities scholarship. GER:DB-Hum, EC-AmerCul

5 units, *Spr (Gallardo, S)*

**CSRE 183. Border Crossings and American Identities**

(Same as AMSTUD 183, ANTHRO 183A) How novelists, filmmakers, and poets perceive racial, ethnic, gender, sexual

preference, and class borders in the context of a national discussion about the place of Americans in the world. How Anna Deavere Smith, Sherman Alexie, or Michael Moore consider redrawing such lines so that center and margin, or self and other, do not remain fixed and divided. How linguistic borderlines within multilingual literature by Caribbean, Arab, and Asian Americans function. Can Anzaldúa's conception of borderlands be constructed through the matrix of language, dreams, music, and cultural memories in these American narratives? Course includes examining one's own identity. GER:DB-Hum, EC-AmerCul

5 units, *Aut (Duffey, C)*

**CSRE 186. African Visual Art & Graphic Communication in the Americas**

(Same as AFRICAAM 196, ARTHIST 196, ARTHIST 396) The class addresses the modes of visual expression used among the Bakongo people in Central Africa and their descendants in Cuba, Haiti, and Brazil and argues that together these constitute identifiable graphic writing systems. After providing a brief overview of the forms of graphic expression in use within Kongo and Kongo Atlantic cultures, the class focuses on the most central of the traditional cosmograms, Dikenga. By mapping the meanings and forms of Dikenga, the essay attempts to demonstrate its continuity throughout the Kongo diaspora. Finally, the class highlights the rich cosmology, cosmogony, and moral philosophy that have consistently informed the use and meaning of Dikenga in its central role in religious narratives, moral philosophy and religious education among the Bakongo in Atlantic world. GER:DB-Hum

4 units, *not given this year*

**CSRE 189W. Language and Minority Rights**

(Same as CHICANST 189W, EDUC 189X) Language as it is implicated in migration and globalization. The effects of globalization processes on languages, the complexity of language use in migrant and indigenous minority contexts, the connectedness of today's societies brought about by the development of communication technologies. Individual and societal multilingualism; preservation and revival of endangered languages. GER:EC-GlobalCom

3 units, *not given this year*

**CSRE 192E. Topics in the History of Sexuality: Sexual Violence**

(Same as AMSTUD 258, HISTORY 258, HISTORY 358) Recent historical interpretations of sexual violence, with particular attention to the intersections of gender and race in the construction of rape, from early settlement through the twentieth century. Topics include the legal prosecution of rape in Early America; the racialization of rape in the U.S.; lynching and anti-lynching in the U.S.; and feminist responses to sexual violence. GER:DB-SocSci, EC-Gender

4-5 units, *not given this year*

**CSRE 196C. Introduction to Comparative Studies in Race and Ethnicity**

(Same as ENGLISH 172D, PSYCH 155, SOC 146) How different disciplines approach topics and issues central to the study of ethnic and race relations in the U.S. and elsewhere. Lectures by senior faculty affiliated with CSRE. Discussions led by CSRE teaching fellows. GER:DB-SocSci, EC-AmerCul

5 units, *not given this year*

**CSRE 198. Internship for Public Service**

Restricted to CSRE comparative studies majors with a concentration in public service. Students consult with the CSRE undergraduate program director and CSRE affiliated faculty to develop an internship. Group meetings. May be repeated for credit. Service Learning Course (certified by Haas Center).

1-5 units, *Aut (Mitchell, T), Win (Mitchell, T), Spr (Mitchell, T)*

**CSRE 199. Pre-Honors Seminar**

For students interested in writing a senior honors thesis. Conceptualizing and defining a manageable honors project, conducting interdisciplinary research, the parameters of a literature review essay, and how to identify a faculty adviser.

1-2 units, *Aut (Seo, P)*

**CSRE 200. Latin@ Literature**

(Same as CHICANST 200, ILAC 280, ILAC 382) Texts by U.S. Latin@s of Mexican, Puerto Rican, Cuban, and Dominican

descent. Examines how these writers' shared history of Spanish colonization and U.S. imperialism has resulted in differing representations of home and homeland, nation, diaspora, history, and memory. Explores how racialization informs the production of gendered identities as well as sexualities. Analysis of the formal conventions of fiction, poetry, drama, memoir, and film.

3-5 units, *Win (Yarbro-Bejarano, Y)*

**CSRE 200R. Directed Research**

1-5 units, *Aut (Staff), Win (Staff), Spr (Staff)*

**CSRE 200W. Directed Reading**

1-5 units, *Aut (Staff), Win (Staff), Spr (Staff)*

**CSRE 200X. CSRE Senior Seminar**

Required for CSRE-related students, including those who opt to write honors theses in other departments and programs. Research and the writing of the senior honors thesis or senior paper under the supervision of a faculty project adviser. The process of research including conceptualization, development of prospectus, development of theses, research, analysis, and writing.

5 units, *Aut (Saldivar, J)*

**CSRE 200Y. CSRE Senior Honors Research**

1-10 units, *Win (Seo, P)*

**CSRE 200Z. CSRE Senior Honors Research**

1-10 units, *Spr (Seo, P)*

**CSRE 201B. From Racial Justice to Multiculturalism:**

**Movement-based Arts Organizing in the Post Civil Rights Era** (Same as CHICANST 201B) How creative projects build and strengthen communities of common concern. Projects focus on cultural reclamation, multiculturalism, cultural equity and contemporary cultural wars, media literacy, independent film, and community-based art. Guest artists and organizers, films, and case studies.

5 units, *Aut (Hernandez, G)*

**CSRE 203A. The Changing Face of America: Civil Rights and Education Strategies for the 21st Century**

For students with leadership potential who have studied these topics in lecture format. Race discrimination strategies, their relation to education reform initiatives, and the role of media in shaping racial attitudes in the U.S.

5 units, *Spr (Steyer, J; Lythcott-Haims, J)*

**CSRE 220. Public Policy Institute**

Public Policy Institute serves to: provide students with information and perspectives on important public policy issues that have particular relevancy to matters of race and ethnicity in American society, past and present; expose students to faculty and other professionals working on public policy-related issues; and provide insight into the legislative process of public policy making at the state and local levels. Students are expected to conduct research necessary to write a policy brief on a particular issue, and make a presentation based on the policy brief. A field trip to Sacramento introduces students to policymakers and current policy matters of importance to marginalized communities in California.

3-5 units, *Aut (Segura, G)*

**CSRE 255D. Racial Identity in the American Imagination**

(Same as AFRICAAM 255, AMSTUD 255D, HISTORY 255D, HISTORY 355D) Major historical transformations shaping the understanding of racial identity and how it has been experienced, represented, and contested in American history. Topics include: racial passing and racial performance; migration, immigration, and racial identity in the urban context; the interplay between racial identity and American identity; the problems of class, gender, and sexuality in the construction of racial identity. Sources include historical and legal texts, memoirs, photography, literature, film, and music. GER:DB-SocSci, EC-AmerCul

4-5 units, *Win (Hobbs, A)*

**CSRE 260. California's Minority-Majority Cities**

(Same as HISTORY 260, HISTORY 360) Historical development and the social, cultural, and political issues that characterize large cities and suburbs where communities of color make up majority populations. Case studies include cities in Los Angeles, Santa Clara, and Monterey counties. Comparisons to minority-majority cities elsewhere in the U.S. Service Learning Course (certified by Haas Center). GER:DB-SocSci, EC-AmerCul

4-5 units, *Spr (McKibben, C)*

## GRADUATE COURSES IN COMPARATIVE STUDIES IN RACE AND ETHNICITY

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**CSRE 201C. Critical Concepts in Chicana/o Literature**

(Same as CHICANST 201C, ILAC 380E) Interrogation of the critical discourses that have configured and reconfigured the canon of Chicana/o literature over the last thirty years. Close textual readings of primary texts, mainly narrative, within the development of Chicana/o literary and cultural criticism. Construction of narrative genealogies and foundational texts. Impact of the publication of late-nineteenth or pre-movement novels and Chicana feminist/lesbian/queer critiques. Consideration of alternative paradigms such as positioning Chicana/o literature within a U.S. Latina/o literary imaginary, and the shift of critical discourse in the field of visual art from a paradigm of resistance and affirmation to one of post Chicano.

3-5 units, *not given this year*

**CSRE 216X. Education, Race, and Inequality in African American History, 1880-1990**

(Same as EDUC 216X, HISTORY 255E) Seminar. The relationship among race, power, inequality, and education from the 1880s to the 1990s. How schools have constructed race, the politics of school desegregation, and ties between education and the late 20th-century urban crisis.

3-5 units, *not given this year*

**CSRE 233A. Counseling Theories and Interventions from a Multicultural Perspective**

(Same as AFRICAAM 233A, EDUC 233A) In an era of globalization characterized by widespread migration and cultural contacts, professionals face a unique challenge: How does one practice successfully when working with clients/students from so many different backgrounds? This course focuses upon the need to examine, conceptualize, and work with individuals according to the multiple ways in which they identify themselves. It will systematically examine multicultural counseling concepts, issues, and research. Literature on counselor and client characteristics such as social status or race/ethnicity and their effects on the counseling process and outcome will be reviewed. Issues in consultation with culturally and linguistically diverse parents and students and work with migrant children and their families are but a few of the topics covered in this course.

3-5 units, *not given this year*

**CSRE 245. Understanding Racial and Ethnic Identity Development**

(Same as AFRICAAM 245, EDUC 245) African American, Native American, Mexican American, and Asian American racial and ethnic identity development; the influence of social, political and psychological forces in shaping the experience of people of color in the U.S. The importance of race in relationship to social identity variables including gender, class, and occupational, generational, and regional identifications. Bi- and multiracial identity status, and types of white racial consciousness.

3-5 units, *not given this year*

**CSRE 279G. Indigenous Identity in Diaspora: People of Color Art Practice in North America**

(Same as CSRE 179G, DRAMA 179G, DRAMA 279G) This gateway core course to the IDA emphasis in CSRE offers a 21st century examination of people of color aesthetics and related politics, drawing from contemporary works (literature, music, visual and performing arts) in conversation with their native (especially American Indigenous and African) origins. Issues of gender and sexuality in relation to cultural identity are also integral to this study. Students will be required to produce a final work, integrating critical writing with a creative project.

3-5 units, *not given this year*

# COMPUTATIONAL AND MATHEMATICAL ENGINEERING (CME) COURSES

## UNDERGRADUATE COURSES IN COMPUTATIONAL AND MATHEMATICAL ENGINEERING

Primarily for undergraduates; graduate students may enroll with consent of adviser.

### CME 100. Vector Calculus for Engineers

(Same as ENGR 154) Computation and visualization using MATLAB. Differential vector calculus: analytic geometry in space, functions of several variables, partial derivatives, gradient, unconstrained maxima and minima, Lagrange multipliers. Integral vector calculus: multiple integrals in Cartesian, cylindrical, and spherical coordinates, line integrals, scalar potential, surface integrals, Green's, divergence, and Stokes' theorems. Examples and applications drawn from various engineering fields. Prerequisites: MATH 41 and 42, or 10 units AP credit. GER:DB-Math

5 units, Aut (Khayms, V)

### CME 100A. Vector Calculus for Engineers, ACE

Students attend CME100/ENGR154 lectures with additional recitation sessions; two to four hours per week, emphasizing engineering mathematical applications and collaboration methods. Prerequisite: application

at:[http://soe.stanford.edu/current\\_students/edp/programs/ace.html](http://soe.stanford.edu/current_students/edp/programs/ace.html)  
GER:DB-Math

6 units, Aut (Khayms, V)

### CME 102. Ordinary Differential Equations for Engineers

(Same as ENGR 155A) Analytical and numerical methods for solving ordinary differential equations arising in engineering applications: Solution of initial and boundary value problems, series solutions, Laplace transforms, and non-linear equations; numerical methods for solving ordinary differential equations, accuracy of numerical methods, linear stability theory, finite differences. Introduction to MATLAB programming as a basic tool kit for computations. Problems from various engineering fields. Prerequisite: CME 100/ENGR 154 or MATH 51. GER:DB-Math

5 units, Win (Darve, E)

### CME 102A. Ordinary Differential Equations for Engineers, ACE

Students attend CME102/ENGR155A lectures with additional recitation sessions; two to four hours per week, emphasizing engineering mathematical applications and collaboration methods. Prerequisite: application

at:[http://soe.stanford.edu/current\\_students/edp/programs/ace.html](http://soe.stanford.edu/current_students/edp/programs/ace.html)  
GER:DB-Math

6 units, Win (Darve, E)

### CME 104. Linear Algebra and Partial Differential Equations for Engineers

(Same as ENGR 155B) Linear algebra: matrix operations, systems of algebraic equations, Gaussian elimination, undetermined and overdetermined systems, coupled systems of ordinary differential equations, eigensystem analysis, normal modes. Fourier series with applications, partial differential equations arising in science and engineering, analytical solutions of partial differential equations. Numerical methods for solution of partial differential equations: iterative techniques, stability and convergence, time advancement, implicit methods, von Neumann stability analysis. Examples and applications from various engineering fields. Prerequisite: CME 102/ENGR 155A. GER:DB-Math

5 units, Spr (Khayms, V)

### CME 104A. Linear Algebra and Partial Differential Equations for Engineers, ACE

Students attend CME104/ENGR155B lectures with additional recitation sessions; two to four hours per week, emphasizing engineering mathematical applications and collaboration methods. Prerequisite: application

at:[http://soe.stanford.edu/current\\_students/edp/programs/ace.html](http://soe.stanford.edu/current_students/edp/programs/ace.html)  
GER:DB-Math

6 units, Spr (Khayms, V)

### CME 106. Introduction to Probability and Statistics for Engineers

(Same as ENGR 155C) Probability: random variables, independence, and conditional probability; discrete and continuous distributions, moments, distributions of several random variables. Topics in mathematical statistics: random sampling, point estimation, confidence intervals, hypothesis testing, non-parametric tests, regression and correlation analyses; applications in engineering, industrial manufacturing, medicine, biology, and other fields. Prerequisite: CME 100/ENGR154 or MATH 51. GER:DB-Math

3-4 units, Win (Khayms, V), Sum (Staff)

### CME 108. Introduction to Scientific Computing

Numerical computation for mathematical, computational, physical sciences and engineering: error analysis, floating-point arithmetic, nonlinear equations, numerical solution of systems of algebraic equations, banded matrices, least squares, polynomial interpolation, numerical differentiation and integration, numerical solution of ordinary differential equations, truncation error, numerical stability for time dependent problems and stiffness. Prerequisites: CS 106A or familiarity with MATLAB; MATH 51, 52, 53; inappropriate for students who have taken CME 102,104/ENGR 155A,B. GER:DB-EngrAppSci

3-4 units, Spr (Staff), Sum (Staff)

## GRADUATE COURSES IN COMPUTATIONAL AND MATHEMATICAL ENGINEERING

Primarily for graduate students; undergraduates may enroll with consent of instructor.

### CME 200. Linear Algebra with Application to Engineering Computations

(Same as ME 300A) Computer based solution of systems of algebraic equations obtained from engineering problems and eigen-system analysis, Gaussian elimination, effect of round-off error, operation counts, banded matrices arising from discretization of differential equations, ill-conditioned matrices, matrix theory, least square solution of unsolvable systems, solution of non-linear algebraic equations, eigenvalues and eigenvectors, similar matrices, unitary and Hermitian matrices, positive definiteness, Cayley-Hamilton theory and function of a matrix and iterative methods. Prerequisite: familiarity with computer programming, and MATH103, 130, or equivalent.

3 units, Aut (Gerritsen, M)

### CME 204. Partial Differential Equations in Engineering

(Same as ME 300B) Geometric interpretation of partial differential equation (PDE) characteristics; solution of first order PDEs and classification of second-order PDEs; self-similarity; separation of variables as applied to parabolic, hyperbolic, and elliptic PDEs; special functions; eigenfunction expansions; the method of characteristics. If time permits, Fourier integrals and transforms, Laplace transforms. Prerequisite: CME 200/ME 300A, equivalent, or consent of instructor.

3 units, Win (Lele, S)

### CME 206. Introduction to Numerical Methods for Engineering

(Same as AA 214A, ME 300C) Numerical methods from a user's point of view. Lagrange interpolation, splines. Integration: trapezoid, Romberg, Gauss, adaptive quadrature; numerical solution of ordinary differential equations: explicit and implicit methods, multistep methods, Runge-Kutta and predictor-corrector methods, boundary value problems, eigenvalue problems; systems of differential equations, stiffness. Emphasis is on analysis of numerical methods for accuracy, stability, and convergence. Introduction to numerical solutions of partial differential equations; Von Neumann stability analysis; alternating direction implicit methods and nonlinear equations. Prerequisites: CME 200/ME 300A, CME 204/ME 300B.

3 units, Spr (Iaccarino, G)

**CME 211. Computer Programming in C++ for Earth Scientists and Engineers**

(Same as EARTHSCI 211) Computer programming methodology emphasizing modern software engineering principles: object-oriented design, decomposition, encapsulation, abstraction, and modularity. Fundamental data structures. Time and space complexity analysis. The basic facilities of the programming language C++. Numerical problems from various science and engineering applications.

3 units, Aut (Aboud, S; Henderson, N)

**CME 212. Introduction to Large-Scale Computing in Engineering**

(Same as ENERGY 212) Advanced programming methodologies for solving fundamental engineering problems using algorithms with pervasive application across disciplines. Overview of computer systems from a programming perspective including processor architectures, memory hierarchies, machine arithmetic, performance tuning techniques. Algorithms include iterative, direct linear solvers, fft, and divide and conquer strategies for n-body problems. Software development; other practical UNIX tools including shell scripting, vi/emacs, gcc, make, gdb, gprof, version control systems and LaTeX. Prerequisites: CME 200/ME 300A, CME 211, and CS 106X or equivalent level of programming in C/C++.

3 units, Win (Henderson, N)

**CME 213. Introduction to parallel computing using MPI, openMP, and CUDA**

(Same as ME 339) This class will give hands on experience with programming multicore processors, graphics processing units (GPU), and parallel computers. Focus will be on the message passing interface (MPI, parallel clusters) and the compute unified device architecture (CUDA, GPU). Topics will include: network topologies, modeling communication times, collective communication operations, parallel efficiency, MPI, dense linear algebra using MPI. Symmetric multiprocessing (SMP), pthreads, openMP, CUDA, combining MPI and CUDA, dense linear algebra using CUDA, sort, reduce and scan using CUDA. Pre-requisites include: C programming language and numerical algorithms (solution of differential equations, linear algebra, Fourier transforms).

3 units, Spr (Darve, E)

**CME 215A. Advanced Computational Fluid Dynamics**

(Same as AA 215A) High resolution schemes for capturing shock waves and contact discontinuities; upwinding and artificial diffusion; LED and TVD concepts; alternative flow splittings; numerical shock structure. Discretization of Euler and Navier Stokes equations on unstructured meshes; the relationship between finite volume and finite element methods. Time discretization; explicit and implicit schemes; acceleration of steady state calculations; residual averaging; math grid preconditioning. Automatic design; inverse problems and aerodynamic shape optimization via adjoint methods. Pre- or corequisite: 214B or equivalent.

3 units, Win (Jameson, A)

**CME 215B. Advanced Computational Fluid Dynamics**

(Same as AA 215B) High resolution schemes for capturing shock waves and contact discontinuities; upwinding and artificial diffusion; LED and TVD concepts; alternative flow splittings; numerical shock structure. Discretization of Euler and Navier Stokes equations on unstructured meshes; the relationship between finite volume and finite element methods. Time discretization; explicit and implicit schemes; acceleration of steady state calculations; residual averaging; math grid preconditioning. Automatic design; inverse problems and aerodynamic shape optimization via adjoint methods. Pre- or corequisite: 214B or equivalent.

3 units, Spr (Jameson, A)

**CME 263. Introduction to Linear Dynamical Systems**

(Same as EE 263) Applied linear algebra and linear dynamical systems with application to circuits, signal processing, communications, and control systems. Topics: least-squares approximations of over-determined equations and least-norm solutions of underdetermined equations. Symmetric matrices, matrix norm, and singular value decomposition. Eigenvalues, left and right eigenvectors, with dynamical interpretation. Matrix

exponential, stability, and asymptotic behavior. Multi-input/multi-output systems, impulse and step matrices; convolution and transfer matrix descriptions. Control, reachability, and state transfer; observability and least-squares state estimation. Prerequisites: linear algebra and matrices as in MATH 103; differential equations and Laplace transforms as in EE 102A.

3 units, Aut (Lall, S)

**CME 291. Master's Research**

Students require faculty sponsor. (Staff)

1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**CME 300. Departmental Seminar Series**

Required for first-year ICME Ph.D. students; recommended for first-year ICME M.S. students. Presentations about research at Stanford by faculty and researchers from Engineering, H&S, and organizations external to Stanford. May be repeated for credit.

1 unit, Aut (Murray, W), Win (Murray, W)

**CME 302. Numerical Linear Algebra**

First in a three quarter graduate sequence. Solution of systems of linear equations: direct methods, error analysis, structured matrices; iterative methods and least squares. Parallel techniques. Prerequisites: CME 108, MATH 103 or 113.

3 units, Aut (Gerritsen, M)

**CME 303. Partial Differential Equations of Applied Mathematics**

(Same as MATH 220) First-order partial differential equations; method of characteristics; weak solutions; elliptic, parabolic, and hyperbolic equations; Fourier transform; Fourier series; and eigenvalue problems. Prerequisite: foundation in multivariable calculus and ordinary differential equations.

3 units, Aut (Ryzhik, L)

**CME 304. Numerical Optimization**

(Same as MS&E 315) Solution of nonlinear equations; unconstrained optimization; linear programming; quadratic programming; global optimization; general linearly and nonlinearly constrained optimization. Theory and algorithms to solve these problems. Prerequisite: background in analysis and numerical linear algebra.

3 units, Win (Murray, W)

**CME 305. Discrete Mathematics and Algorithms**

(Same as MS&E 316) Topics: enumeration such as Cayley's theorem and Prufer codes, SDR, flows and cuts (deterministic and randomized algorithms), probabilistic methods and random graphs, asymptotics (NP-hardness and approximation algorithms). Topics illustrated with EE, CS, and bioinformatics applications. Prerequisites: MATH 51 or 103 or equivalents.

3 units, Win (Saber, A)

**CME 306. Numerical Solution of Partial Differential Equations**

(Same as MATH 226) Hyperbolic partial differential equations: stability, convergence and qualitative properties; nonlinear hyperbolic equations and systems; combined solution methods from elliptic, parabolic, and hyperbolic problems. Examples include: Burger's equation, Euler equations for compressible flow, Navier-Stokes equations for incompressible flow. Prerequisites: MATH 220A or CME 302.

3 units, Spr (Garapon, P)

**CME 308. Stochastic Methods in Engineering**

(Same as MATH 228) Review of basic probability; Monte Carlo simulation; state space models and time series; parameter estimation, prediction, and filtering; Markov chains and processes; stochastic control; and stochastic differential equations. Examples from various engineering disciplines. Prerequisites: exposure to probability; background in real variables and analysis.

3 units, Spr (Papanicolaou, G)

**CME 309. Randomized Algorithms**

(Same as CS 365) Design and analysis of algorithms that use randomness to guide their computations. Topics include: basic tools, from probability theory and probabilistic analysis that are recurrent in algorithmic applications; randomized complexity theory and game-theoretic techniques; algebraic techniques, probability amplification and derandomization. Applications: sorting and searching, data structures, combinatorial optimization and graph algorithms, geometric algorithms and linear programming, approximation and counting problems, similarity

search and metric embeddings, online algorithms. Prerequisites: CS 161 and STAT 116, or equivalents and instructor consent.

3 units, Win (Goel, A)

### **CME 325. Numerical Approximations of Partial Differential Equations in Theory and Practice**

Finite volume and finite difference methods for initial boundary value problems in multiple space dimensions. Emphasis is on formulation of boundary conditions for the continuous and the discrete problems. Analysis of numerical methods with respect to stability, accuracy, and error behavior. Techniques of treating non-rectangular domains, and effects of non-regular grids.

1-2 units, not given this year

### **CME 326. Numerical Methods for Initial Boundary Value Problems**

Initial boundary value problems model many phenomena in engineering and science such as, fluid flow problems, wave propagation, fluid-structure interaction, conjugate heat transfer and financial mathematics. We discuss numerical techniques for such simulations and focus on the underlying principles and theoretical understanding. Emphasis is on stability, convergence and efficiency for methods applied to hyperbolic and parabolic initial boundary value problems.

3 units, not given this year

### **CME 327. Numerical Methods for Stiff Problems**

Focus is on analysis of numerical techniques for stiff ordinary differential equations, including those resulting from spatial discretization of partial differential equations. Topics include stiffness, convergence, stability, adaptive time stepping, implicit time-stepping methods (SDIRK, Rosenbrock), linear and nonlinear system solvers (Fixed Point, Newton, Multigrid, Krylov subspace methods) and preconditioning. Pre-requisites: CME200/ME300A or equivalent; or consent of instructor.

3 units, not given this year

### **CME 330. Applied Mathematics in the Chemical and Biological Sciences**

(Same as CHEMENG 300) Mathematical solution methods via applied problems including chemical reaction sequences, mass and heat transfer in chemical reactors, quantum mechanics, fluid mechanics of reacting systems, and chromatography. Topics include generalized vector space theory, linear operator theory with eigenvalue methods, phase plane methods, perturbation theory (regular and singular), solution of parabolic and elliptic partial differential equations, and transform methods (Laplace and Fourier). Prerequisites: CME 102/ENGR 155A and CME 104/ENGR 155B, or equivalents.

3 units, Aut (Shaqfeh, E)

### **CME 334. Advanced Methods in Numerical Optimization**

(Same as MS&E 312) Topics include interior-point methods, relaxation methods for nonlinear discrete optimization, sequential quadratic programming methods, optimal control and decomposition methods. Topic chosen in first class; different topics for individuals or groups possible. Individual or team projects. May be repeated for credit.

3 units, Aut (Murray, W)

### **CME 335. Advanced Topics in Numerical Linear Algebra**

Possible topics: Discrete Fourier Transform from linear algebra point of view, convolution and circulant matrices, multi-resolution and Discrete Wavelet Transform, Discrete Radon Transform, Fractional Fourier Transform and Toeplitz matrices, Pseudo-polar Fast Fourier Transform and Fast Slant Stack Transform; orthogonal projections and linear least squares models, regularization of least squares models and sparse representation methods, orthogonal matching pursuit and basis pursuit algorithms, dimensionality reduction and principle components analysis, reconstruction from projections in tomographic imaging, denoising, compression and image interpolation using sparse representation with over-complete dictionaries. Students will get hands-on experience. Prerequisite - CME 302: Numerical Linear Algebra

3 units, Win (Staff)

### **CME 336. Linear and Conic Optimization with Applications**

(Same as MS&E 314) Linear, semidefinite, conic, and convex nonlinear optimization problems as generalizations of classical linear programming. Algorithms include the interior-point, barrier

function, and cutting plane methods. Related convex analysis, including the separating hyperplane theorem, Farkas lemma, dual cones, optimality conditions, and conic inequalities. Complexity and/or computation efficiency analysis. Applications to combinatorial optimization, sensor network localization, support vector machine, and graph realization. Prerequisite: MS&E 211 or equivalent.

3 units, alternate years, not given this year

### **CME 337. Information Networks**

(Same as MS&E 337) Network structure of the Internet and the web. Modeling, scale-free graphs, small-world phenomenon. Algorithmic implications in searching and inter-domain routing; the effect of structure on performance. Game theoretic issues, routing games, and network creation games. Security issues, vulnerability, and robustness. Prerequisite: basic probability and graph theory.

3 units, Spr (Saber, A), alternate years, not given next year

### **CME 338. Large-Scale Numerical Optimization**

(Same as MS&E 318) The main algorithms and software for constrained optimization emphasizing the sparse-matrix methods needed for their implementation. Iterative methods for linear equations and least squares. The simplex method. Basic factorization and updates. Interior methods. The reduced-gradient method, augmented Lagrangian methods, and SQP methods. Prerequisites: Basic numerical linear algebra, including LU, QR, and SVD factorizations, and an interest in MATLAB, sparse-matrix methods, and gradient-based algorithms for constrained optimization. Recommended: MS&E 310, 311, 312, 314, or 315; CME 108, 200, 302, 304, 334, or 335.

3 units, Spr (Saunders, M)

### **CME 342. Parallel Methods in Numerical Analysis**

Emphasis is on techniques for obtaining maximum parallelism in numerical algorithms, especially those occurring when solving matrix problems, partial differential equations, and the subsequent mapping onto the computer. Implementation issues on parallel computers. Topics: parallel architecture, programming models (MPI, GPU Computing with CUDA  $\zeta$  quick review), matrix computations, FFT, fast multiple methods, domain decomposition, graph partitioning, discrete algorithms. Prerequisites: 302 or 200 (ME 300A), 213 or equivalent, or consent of instructor. Recommended: differential equations and knowledge of a high-level programming language such as C or C++ (F90/95 also allowable).

3 units, Spr (Alonso, J)

### **CME 345. Model Reduction**

Model reduction is an indispensable tool for computational-based design and optimization, statistical analysis, embedded computing and real-time optimal control. This course presents the basic mathematical theory for projection-based model reduction. Topics include: notions of linear dynamical systems and projection; projection-based model reduction; error analysis; proper orthogonal decomposition; Hankel operator and balancing of a linear dynamical system; balanced truncation method; modal reduction and other reduction methods for linear oscillators; model reduction via moment matching methods based on Krylov subspaces; introduction to model reduction of parametric systems and notions of nonlinear model reduction. Course material is complemented by a balanced set of theoretical, algorithmic and Matlab computer programming assignments. Pre-requisites: CME200 or equivalent, CME 263 or equivalent and basic numerical methods for ODEs.

3 units, not given this year

### **CME 356. Engineering Functional Analysis and Finite Elements**

(Same as ME 412) Concepts in functional analysis to understand models and methods used in simulation and design. Topology, measure, and integration theory to introduce Sobolev spaces. Convergence analysis of finite elements for the generalized Poisson problem. Extensions to convection-diffusion-reaction equations and elasticity. Upwinding. Mixed methods and LBB conditions. Analysis of nonlinear and evolution problems. Prerequisites: 335A,B, CME 200, CME 204, or consent of instructor. Recommended: 333, MATH 171.

3 units, not given this year

**CME 358. Finite Element Method for Fluid Mechanics**

Mathematical theory of the finite element method for incompressible flows; related computational algorithms and implementation details. Poisson equation; finite element method for simple elliptic problems; notions of mathematical analysis of non-coercive partial differential equations; the inf-sup or Babushka-Brezzi condition and its applications to the Stokes and Darcy problems; presentation of stable mixed finite element methods and corresponding algebraic solvers; stabilization approaches in the context of advection-diffusion equation; numerical solution of the incompressible Navier-Stokes equations by finite element method. Theoretical, computational, and MATLAB computer programming assignments. Prerequisites: foundation in multivariate calculus and ME 335A or equivalent.

3 units, not given this year

**CME 362. An Introduction to Compressed Sensing**

(Same as STATS 330) Compressed sensing is a new data acquisition theory asserting that one can design nonadaptive sampling techniques that condense the information in a compressible signal into a small amount of data. This revelation may change the way engineers think about signal acquisition. Course covers fundamental theoretical ideas, numerical methods in large-scale convex optimization, hardware implementations, connections with statistical estimation in high dimensions, and extensions such as recovery of data matrices from few entries (famous Netflix Prize).

3 units, Aut (Donoho, D)

**CME 364A. Convex Optimization I**

(Same as EE 364A) Convex sets, functions, and optimization problems. The basics of convex analysis and theory of convex programming: optimality conditions, duality theory, theorems of alternative, and applications. Least-squares, linear and quadratic programs, semidefinite programming, and geometric programming. Numerical algorithms for smooth and equality constrained problems; interior-point methods for inequality constrained problems. Applications to signal processing, communications, control, analog and digital circuit design, computational geometry, statistics, machine learning, and mechanical engineering. Prerequisite: linear algebra such as EE263, EE178/278A.

3 units, Win (Boyd, S)

**CME 364B. Convex Optimization II**

(Same as EE 364B) Continuation of 364. Subgradient, cutting-plane, and ellipsoid methods. Decentralized convex optimization via primal and dual decomposition. Exploiting problem structure in implementation. Convex relaxations of hard problems. Global optimization via branch and bound. Robust and stochastic optimization. Applications in areas such as control, circuit design, signal processing, and communications. Substantial project. Prerequisite: 364A.

3 units, not given this year

**CME 390. Curricular Practical Training**

May be repeated three times for credit.

1 unit, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**CME 400. Ph.D. Research**

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**CME 444. Computational Consulting**

Advice by graduate students under supervision of ICME faculty. Weekly briefings with faculty adviser and associated faculty to discuss ongoing consultancy projects and evaluate solutions. May be repeated for credit.

1-3 units, Aut (Gerritsen, M), Win (Gerritsen, M), Spr (Gerritsen, M)

**CME 500. Numerical Analysis and Computational and Mathematical Engineering Seminar**

Weekly research lectures by experts from academia, national laboratories, industry, and doctoral students. May be repeated for credit.

1 unit, Aut (Gerritsen, M), Win (Gerritsen, M), Spr (Gerritsen, M)

**CME 510. Linear Algebra and Optimization Seminar**

Recent developments in numerical linear algebra and numerical optimization. Guest speakers from other institutions and local industry. Goal is to bring together scientists from different

theoretical and application fields to solve complex scientific computing problems. May be repeated for credit.

1 unit, Aut (Saunders, M), Win (Saunders, M), Spr (Saunders, M)

**CME 801. TGR Project**

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**CME 802. TGR Dissertation**

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

## COMPUTER SCIENCE (CS) COURSES

### UNDERGRADUATE COURSES IN COMPUTER SCIENCE

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**CS 1C. Introduction to Computing at Stanford**

For those with limited experience with computers or who want to learn more about Stanford's computing environment. Topics include: computer maintenance and security, computing resources, Internet privacy, and copyright law. One-hour lecture/demonstration in dormitory clusters prepared and administered weekly by the Resident Computer Consultant (RCC). Final project. Not a programming course.

1 unit, Aut (Smith, S)

**CS 1U. Practical Unix**

A practical introduction to using the Unix operating system with a focus on Linux command line skills. Class will consist of video tutorials and weekly hands-on lab sections. The time listed on AXESS is for the first week's logistical meeting only. Topics include: grep and regular expressions, ZSH, Vim and Emacs, basic and advanced GDB features, permissions, working with the file system, revision control, Unix utilities, environment customization, and using Python for shell scripts. Topics may be added, given sufficient interest. Course website: <http://cs1u.stanford.edu>

1 unit, Aut (King, S; Zelenski, J; Topalovic, E)

**CS 2C. Multimedia Production**

Sound, image and video editing techniques and applications, including understanding file formats and publishing multimedia online. Topics: GarageBand, Photoshop, iMovie, Final Cut Pro, and iDVD. Weekly lecture followed by lab section. Second unit for additional creative production assignments completed outside of class time and Final Project with group. Not a programming course, but will use computer multimedia applications heavily for editing.

1-2 units, Aut (Chan, K), Win (Chan, K)

**CS 21N. Can Machines Know? Can Machines Feel?**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Can mental attitudes attributed to people and sometimes to animals, including knowledge, belief, desire, and intention, also be ascribed to machines? Can light sensors have a belief? Can a pool cleaning robot or tax-preparation software have an intention? If not, why not? If yes, what are the rules of such ascription, and do they vary between human beings and machines? Sources include philosophy, neuroscience, computer science, and artificial intelligence. Topics: logic, probability theory, and elements of computation. Students present a paper. GER:DB-EngrAppSci

3 units, Aut (Shoham, Y)

**CS 26N. Motion Planning for Robots, Digital Actors, and Other Moving Objects**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Motion planning theory and computational approaches: how to represent, simulate, and plan motions in a computer. Intriguing algorithms, representations, and applications: terminology and concepts for reading motion planning research literature. Problems include: how a robot arm manipulates parts without colliding with its environment; how many maneuvers are required to park a car in a tight spot; how characters in computer games avoid running into obstacles; how molecules change shapes to perform biological



functions; how to assemble a product from individual parts; how a multi-limbed robot can navigate on rough terrain; how robots can perform surgical procedures. Prerequisite: some computer programming experience in any language. GER:DB-EngrAppSci, DB-EngrAppSci

3 units, *Win (Latombe, J)*

#### **CS 45N. Computers and Photography: From Capture to Sharing**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen with experience in photography and use of computers. Elements of photography, such as lighting, focus, depth of field, aperture, and composition. How a photographer makes photos available for computer viewing, reliably stores them, organizes them, tags them, searches them, and distributes them online. No programming experience required. Digital SLRs and editing software will be provided to those students who do not wish to use their own.

3-4 units, *Aut (Garcia-Molina, H)*

#### **CS 47N. Computers and the Open Society**

(F,Sem) Stanford Introductory Seminar. How online technologies change our lives and the social structure that we live in. Course emphasizes critical analyses of current trends i.e. blogging, social networks, and instant mobile communication. Readings include case studies and analyses of basic principles i.e. privacy, equity and sustainability. Guest speakers who have participated in development of computers and the net will share their experiences and enter into debates on current issues. Students work individually and in small groups to research issues, develop the capacity for critical thinking about them, and use the results as the basis for writing and discussions both in class and on-line.

3 units, *Aut (Winograd, T)*

#### **CS 73N. The Business of the Internet**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Issues in Internet history, technology, and public policy are discussed as well as the Internet's impact on commerce, education, government, and health care. Writing for the web. Participants develop a substantial website. GER:DB-EngrAppSci

3 units, *Spr (Wiederhold, G; Barr, A; Tessler, S)*

#### **CS 74N. Digital Dilemmas**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Issues where policy decision making requires understanding computer and communications technology. Technology basics taught in non-technology terms. Topics include consumer privacy, government surveillance, file sharing and intellectual property, and electronic voting. GER:DB-EngrAppSci

3 units, *Spr (Dill, D)*

#### **CS 75N. Cell Phones, Sensors, and You**

(F,Sem) Stanford Introductory Seminar. Focuses on the role of cell phones as the first prevalent wearable sensors that gather information about you that can be both useful and potentially harmful. Topics include the state of technology, sociological and privacy implications, potential governmental regulation, etc. Addresses omniscient big brother technology including radar guns and the recording devices that led to the Watergate scandal. Students will gather and compile information on topics and come to class ready to discuss and debate with formulated opinions. GER:DB-EngrAppSci

3 units, *Spr (Fedkiw, R)*

#### **CS 81G. Social Animals, Social Revolutions and Social Networks**

(Same as BIO 167, FRENGEN 167) We like to think of social networks as contemporary phenomena. But before Facebook, individuals organized themselves in social networks; before Twitter, revolutionaries used media to communicate and coordinate their messages. In fact, even animal societies are networked. Do all these social networks share certain properties? What can we learn by comparing them? These are some of the questions we will ask in this course, as we traverse the natural world and past societies before taking a fresh look at our modern social networks. GER: DB-NatSci

4 units, *Spr (Gordon, D; Edelstein, D; Roberts, E)*

#### **CS 101. Introduction to Computing Principles**

Introduces the essential ideas of computing: data representation, algorithms, programming code, computer hardware, networking, security, and social issues. Students learn how computers work and

what they can do through hands-on exercises. In particular, students will see the capabilities and weaknesses of computer systems so they are not mysterious or intimidating. Course features many small programming exercises, although no prior programming experience is assumed or required. CS101 is not a complete programming course such as CS106A. CS101 is effectively an alternative to CS105. A laptop computer is required for the in-class exercises. Limited enrollment GER:DB-EngrAppSci

3-5 units, *Win (Parlante, N)*

#### **CS 103. Mathematical Foundations of Computing**

Mathematical foundations required for computer science, including propositional predicate logic, induction, sets, functions, and relations. Formal language theory, including regular expressions, grammars, finite automata, Turing machines, and NP-completeness. Mathematical rigor, proof techniques, and applications. May not be taken by students who have completed 103A,B or 103X. Prerequisite: 106A or equivalent. GER:DB-Math

3-5 units, *Aut (Schwarz, K), Win (Dill, D), Spr (Schwarz, K)*

#### **CS 105. Introduction to Computers**

For non-technical majors. What computers are and how they work. Practical experience in programming. Construction of computer programs and basic design techniques. A survey of Internet technology and the basics of computer hardware. Students in technical fields and students looking to acquire programming skills should take 106A or 106X. Students with prior computer science experience at the level of 106 or above require consent of instructor. Prerequisite: minimal math skills. GER:DB-EngrAppSci

3-5 units, *Aut (Young, P), Win (Cooper, S), Spr (Young, P)*

#### **CS 106A. Programming Methodology**

(Same as ENGR 70A) Introduction to the engineering of computer applications emphasizing modern software engineering principles: object-oriented design, decomposition, encapsulation, abstraction, and testing. Uses the Java programming language. Emphasis is on good programming style and the built-in facilities of the Java language. No prior programming experience required. GER:DB-EngrAppSci

3-5 units, *Aut (Sahami, M), Win (Schwarz, K), Spr (Cain, G), Sum (Staff)*

#### **CS 106B. Programming Abstractions**

(Same as ENGR 70B) Abstraction and its relation to programming. Software engineering principles of data abstraction and modularity. Object-oriented programming, fundamental data structures (such as stacks, queues, sets) and data-directed design. Recursion and recursive data structures (linked lists, trees, graphs). Introduction to time and space complexity analysis. Uses the programming language C++ covering its basic facilities. Prerequisite: 106A or equivalent. GER:DB-EngrAppSci

3-5 units, *Aut (Cain, G), Win (Roberts, E), Spr (Schwarz, K), Sum (Staff)*

#### **CS 106L. Standard C++ Programming Laboratory**

Supplemental lab to 106B and 106X. Additional features of standard C++ programming practice. Possible topics include advanced C++ language features, standard libraries, STL containers and algorithms, object memory management, operator overloading, and inheritance. Prerequisite: consent of instructor. Corequisite: 106B or 106X.

1 unit, *Aut (Cain, G; Costello, P; Zhou, D), Win (Staff), Spr (Schwarz, K)*

#### **CS 106X. Programming Abstractions (Accelerated)**

(Same as ENGR 70X) Intensive version of 106B for students with a strong programming background interested in a rigorous treatment of the topics at an accelerated pace. Additional advanced material and more challenging projects. Prerequisite: excellence in 106A or equivalent, or consent of instructor. GER:DB-EngrAppSci

3-5 units, *Aut (Cain, G)*

#### **CS 107. Computer Organization and Systems**

Introduction to the fundamental concepts of computer systems. Explores how computer systems execute programs and manipulate data, working from the C programming language down to the microprocessor. Topics covered include: the C programming language, data representation, machine-level code, computer arithmetic, elements of code compilation, memory organization



and management, and performance evaluation and optimization. Prerequisites: 106B or X, or consent of instructor. GER:DB-EngrAppSci

3-5 units, *Aut (Zelenski, J), Win (Cain, G), Spr (Zelenski, J)*

### CS 108. Object-Oriented Systems Design

Software design and construction in the context of large OOP libraries. Taught in Java. Topics: OOP design, design patterns, testing, graphical user interface (GUI) OOP libraries, software engineering strategies, approaches to programming in teams. Prerequisite: 107. GER:DB-EngrAppSci

3-4 units, *Aut (Young, P), Win (Young, P)*

### CS 109. Introduction to Probability for Computer Scientists

Topics include: counting and combinatorics, random variables, conditional probability, independence, distributions, expectation, point estimation, and limit theorems. Applications of probability in computer science including machine learning and the use of probability in the analysis of algorithms. Prerequisites: 103, 106B or X, MATH 51 or equivalent. GER:DB-EngrAppSci

3-5 units, *Win (Sahami, M), Spr (Sahami, M)*

### CS 109L. Statistical Computing with R Laboratory

Supplemental lab to CS109. Introduces the R programming language for statistical computing. Topics include basic facilities of R including mathematical, graphical, and probability functions, building simulations, introductory data fitting and machine learning. Provides exposure to the functional programming paradigm. Corequisite: CS109.

1 unit, *Win (Sahami, M; Rothfels, J), Spr (Sahami, M; Rothfels, J)*

### CS 110. Principles of Computer Systems

Principles and practice of engineering of computer software and hardware systems. Topics include: techniques for controlling complexity; strong modularity using client-server design, virtual memory, and threads; networks; atomicity and coordination of parallel activities; security, and encryption; and performance optimizations. Prerequisite: 107. GER:DB-EngrAppSci

3-5 units, *Aut (Rosenblum, M), Win (Rosenblum, M)*

### CS 116. From Nand to Tetris

Imagine starting with nothing more than a vast supply of Nand gates, and then building, step by step, a general purpose computer that can run Tetris, or any other game that you fancy. That's precisely what we'll do in this course. In the process, you will learn how to construct a simple hardware platform, and how to develop an assembler, a virtual machine, a compiler for a simple Java-like language, and a basic operating system. Open to undergraduate and graduate students of all levels. Prerequisites: programming experience (Introduction to CS or equivalent).

3 units, *Spr (Staff)*

### CS 121. Introduction to Artificial Intelligence

(Only one of 121 or 221 counts towards any CS degree program.) Concepts, representations, and techniques used in building practical computational systems (agents) that appear to display artificial intelligence (AI), through the use of adaptive information processing algorithms. Topics: history of AI, reactive systems, heuristic search, planning, constraint satisfaction, knowledge representation and uncertain reasoning, machine learning, classification, applications to language, and vision. Prerequisites: 103 or 103B, and facility with differential calculus, vector algebra, and probability theory. GER:DB-EngrAppSci

3 units, *not given this year*

### CS 124. From Languages to Information

(Same as LINGUIST 180, LINGUIST 280) Automated processing of less structured information: human language text and speech, web pages, social networks, genome sequences, with goal of automatically extracting meaning and structure. Methods include: string algorithms, automata and transducers, hidden Markov models, graph algorithms, XML processing. Applications such as information retrieval, text classification, social network models, machine translation, genomic sequence alignment, word meaning extraction, and speech recognition. Prerequisite: CS103, CS107, CS109.

3-4 units, *Win (Jurafsky, D)*

### CS 140. Operating Systems and Systems Programming

Operating systems design and implementation. Basic structure; synchronization and communication mechanisms; implementation

of processes, process management, scheduling, and protection; memory organization and management, including virtual memory; I/O device management, secondary storage, and file systems. Prerequisite: CS 110. GER:DB-EngrAppSci

3-4 units, *Win (Ousterhout, J)*

### CS 142. Web Applications

Concepts and techniques used in constructing interactive web applications. Browser-side web facilities such as HTML, cascading stylesheets, javascript, and the document object model. Server-side technologies such as sessions, templates, relational databases, and object-relational mapping. Issues in web security and application scalability. New models of web application deployment. Prerequisites: CS 107 and CS 108.

3 units, *Spr (Ousterhout, J)*

### CS 143. Compilers

Principles and practices for design and implementation of compilers and interpreters. Topics: lexical analysis; parsing theory; symbol tables; type systems; scope; semantic analysis; intermediate representations; runtime environments; code generation; and basic program analysis and optimization. Students construct a compiler for a simple object-oriented language during course programming projects. Prerequisites: 103 or 103B, and 107. GER:DB-EngrAppSci

3-4 units, *Spr (Aiken, A), Sum (Staff)*

### CS 144. Introduction to Computer Networking

Principles and practice. Structure and components of computer networks, packet switching, layered architectures. Applications: web/http, voice-over-IP, p2p file sharing and socket programming. Reliable transport: TCP/IP, reliable transfer, flow control, and congestion control. The network layer: names and addresses, routing. Local area networks: ethernet and switches. Wireless networks and network security. Prerequisite: CS 110. GER:DB-EngrAppSci

3-4 units, *Aut (Levis, P)*

### CS 145. Introduction to Databases

Database design and use of database management systems for applications. The relational model, relational algebra, and SQL, the standard language for creating, querying, and modifying relational databases. XML data including DTDs and XML Schema for validation, and the query and transformation languages XPath, XQuery and XSLT. UML database design, and relational design principles based on functional dependencies and normal forms. Indexes, views, transactions, authorization, integrity constraints, and triggers, and on-line analytical processing (OLAP). Guest speakers from industry and additional advanced topics as time and class interest permits. Prerequisites: 103 and 107 (or equivalent). GER:DB-EngrAppSci

3-4 units, *Aut (Widom, J)*

### CS 147. Introduction to Human-Computer Interaction Design

Introduces fundamental methods and principles for designing, implementing, and evaluating user interfaces. Topics: user-centered design, rapid prototyping, experimentation, direct manipulation, cognitive principles, visual design, social software, software tools. Learn by doing: work with a team on a quarter-long design project, supported by lectures, readings, and studios. Prerequisite: 106B or X or equivalent programming experience.

3-4 units, *Aut (Klemmer, S)*

### CS 147L. Human-Computer Interaction Technology Laboratory

Hands-on introduction to building mobile web applications with html, css, and php. Corequisite: 147. Concurrent enrollment in CS147 required.

1 unit, *Aut (Brandt, J)*

### CS 148. Introduction to Computer Graphics and Imaging

Topics: Image input and output devices such as cameras and displays, graphics hardware and software, input technologies and interactive techniques, typography and page layout, light and color representations, exposure and tone reproduction, image composition and imaging models, digital signal processing, sampling, aliasing and antialiasing, compression, two- and three-dimensional geometry and formations, modeling techniques including curves and surfaces, reflection models and illumination algorithms, and basic methods of animation. Programming assignments using C++ and OpenGL. Prerequisites: CS 107,

MATH 51. GER:DB-EngrAppSci  
3-4 units, Aut (Hanrahan, P), Sum (Staff)

**CS 149. Parallel Computing**

This course is an introduction to parallelism and parallel programming. Most new computer architectures are parallel; programming these machines requires knowledge of the basic issues of and techniques for writing parallel software. Topics: varieties of parallelism in current hardware (e.g., fast networks, multicore, accelerators such as GPUs, vector instruction sets), importance of locality, implicit vs. explicit parallelism, shared vs. non-shared memory, synchronization mechanisms (locking, atomicity, transactions, barriers), and parallel programming models (threads, data parallel/streaming, futures, SPMD, message passing, SIMT, transactions, and nested parallelism). Significant parallel programming assignments will be given as homework. The course is open to students who have completed the introductory CS course sequence through 110 and have taken CS 143. GER:DB-EngrAppSci

3-4 units, Win (Aiken, A; Olukotun, O)

**CS 154. Introduction to Automata and Complexity Theory**

Regular sets: finite automata, regular expressions, equivalences among notations, methods of proving a language not to be regular. Context-free languages: grammars, pushdown automata, normal forms for grammars, proving languages non-context-free. Turing machines: equivalent forms, undecidability. Nondeterministic Turing machines: properties, the class NP, complete problems for NP, Cook's theorem, reducibilities among problems. Prerequisites: 103 or 103B. GER:DB-EngrAppSci

3-4 units, Spr (Trevisan, L)

**CS 155. Computer and Network Security**

For seniors and first-year graduate students. Principles of computer systems security. Attack techniques and how to defend against them. Topics include: network attacks and defenses, operating system holes, application security (web, email, databases), viruses, social engineering attacks, privacy, and digital rights management. Course projects focus on building reliable code. Prerequisite: 140. Recommended: basic Unix. GER:DB-EngrAppSci

3 units, Spr (Boneh, D; Mitchell, J)

**CS 157. Logic and Automated Reasoning**

An elementary exposition from a computational point of view of propositional and predicate logic, axiomatic theories, and theories with equality and induction. Interpretations, models, validity, proof, strategies, and applications. Automated deduction: polarity, skolemization, unification, resolution, equality. Prerequisite: 103 or 103B. GER:DB-EngrAppSci

3 units, Aut (Genesereth, M)

**CS 161. Design and Analysis of Algorithms**

Worst and average case analysis. Recurrences and asymptotics. Efficient algorithms for sorting, searching, and selection. Data structures: binary search trees, heaps, hash tables. Algorithm design techniques: divide-and-conquer, dynamic programming, greedy algorithms, amortized analysis, randomization. Algorithms for fundamental graph problems: minimum-cost spanning tree, connected components, topological sort, and shortest paths. Possible additional topics: network flow, string searching. Prerequisite: 103 or 103B; 109 or STATS 116. GER:DB-EngrAppSci

3-5 units, Aut (Roughgarden, T), Spr (Guibas, L), Sum (Staff)

**CS 164. Computing with Physical Objects: Algorithms for Shape and Motion**

Algorithms and data structures dealing with the representation and manipulation of physical objects and entities in the computer. Computational structures for shape and motion, shape fitting and matching, triangulations and other spatial subdivisions, and low-dimensional search and optimization. Examples relevant to computer graphics, computer vision, robotics and geometric computation emphasizing algorithmic paradigms applicable to multidimensional data. Prerequisites: CS 103 or 103B, and CS 109 or STATS 116, and CS 106B/X or consent of instructor. GER:DB-EngrAppSci

3 units, not given this year

**CS 170. Stanford Laptop Orchestra: Composition, Coding, and Performance**

(Same as MUSIC 128) Classroom instantiation of the Stanford

Laptop Orchestra (SLOrk) which includes public performances. An ensemble of more than 20 humans, laptops, controllers, and special speaker arrays designed to provide each computer-mediated instrument with its sonic identity and presence. Topics and activities include issues of composing for laptop orchestras, instrument design, sound synthesis, programming, and live performance. May be repeated four times for credit.

1-5 units, Spr (Wang, G)

**CS 178. Digital Photography**

Scientific, artistic, and computing aspects of digital photography. Topics: lenses and optics, light and sensors, optical effects in nature, perspective and depth of field, sampling and noise, the camera as a computing platform, image processing and editing, history of photography, computational photography. Counts as a CS elective in the Graphics track. Prerequisites: introductory calculus; students must have a digital camera with manual control over shutter speed and aperture. Loaner cameras may be available. No programming experience required. GER:DB-EngrAppSci

3-5 units, Spr (Levoy, M)

**CS 181. Computers, Ethics, and Public Policy**

(Formerly 201.) Primarily for majors entering computer-related fields. Ethical and social issues related to the development and use of computer technology. Ethical theory, and social, political, and legal considerations. Scenarios in problem areas: privacy, reliability and risks of complex systems, and responsibility of professionals for applications and consequences of their work. Prerequisite: 106B or X. GER:EC-EthicReas

4 units, Aut (Cooper, S), Spr (Cooper, S)

**CS 181W. Computers, Ethics and Public Policy (WIM)**

Writing-intensive version of CS181. Satisfies the WIM requirement for Computer Science and Computer Systems Engineering undergraduates. GER:EC-EthicReas

4 units, Aut (Cooper, S), Spr (Cooper, S)

**CS 191. Senior Project**

Restricted to Computer Science and Computer Systems Engineering students. Group or individual projects under faculty direction. Register using instructor's section number. A project can be either a significant software application or publishable research. Software application projects include substantial programming and modern user-interface technologies and are comparable in scale to shareware programs or commercial applications. Research projects may result in a paper publishable in an academic journal or presentable at a conference. Required public presentation of final application or research results.

1-6 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**CS 191W. Writing Intensive Senior Project**

Restricted to Computer Science and Computer Systems Engineering students. Writing-intensive version of CS191. Register using the section number of an Academic Council member.

3-6 units, Aut (Staff), Win (Staff), Spr (Staff)

**CS 192. Programming Service Project**

Restricted to Computer Science students. Appropriate academic credit (without financial support) is given for volunteer computer programming work of public benefit and educational value.

1-4 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**CS 193A. Android Programming**

Introduction to building programs for the Android platform. The course walks through the key concepts of android programming: android tool chain, application life-cycle, no Moore's law for batteries, views, controls, persistence, custom view drawing, sensors, android intents, networking, threading. The course features ten weekly lectures and a series of small programming projects. A phone is not required to take this course, although a phone makes the projects more engaging. Prerequisites: 106B or Java programming experience at the 106B level.

1 unit, Aut (Parlante, N)

**CS 193C. Client-Side Internet Technologies**

Client-side technologies used to create web sites such as sophisticated Web 2.0 interfaces similar to Google maps. XHTML, CSS, JavaScript, document object model (DOM), AJAX, and Flash. Prerequisite: programming experience at the level of 106A.

3 units, Sum (Staff)

**CS 193D. Professional Software Development with C++**

Programming techniques and methodologies. Language concepts including object-oriented design, memory management, and the standard library. Modern software development concepts such as design patterns, test-driven development, extreme programming, and XML. Prerequisites: basic C++ or significant experience in C or Java. GER:DB-EngrAppSci

*3 units, not given this year*

**CS 193P. iPhone and iPad Application Programming**

Tools and APIs required to build applications for the iPhone and iPad platform using the iOS SDK. User interface designs for mobile devices and unique user interactions using multi-touch technologies. Object-oriented design using model-view-controller paradigm, memory management, Objective-C programming language. Other topics include: object-oriented database API, animation, mobile device power management, multi-threading and performance considerations. Prerequisites: C language and object-oriented programming experience at 106B or X level. Recommended: CS107, UNIX, graphics, databases.

*3 units, Aut (Hegarty, P)*

**CS 193R. Green Computing**

Power is becoming a central issue in designing systems. The amount of energy consumed by data centers has doubled in recent years and minimizing power consumption is one of the primary technical challenges facing today's IT industry. This course will cover various components of power-aware computing and energy usage in systems ranging from tablets/smartphones to data centers. Topics include: power management in modern computing systems, fine grain power measurement of computing systems, software energy efficiency, optimizing active power and idle efficiency, energy-aware computing for small form factor devices (netbooks, tablets, smartphones, etc.), minimizing energy usage in data centers and server farms. Prerequisites: 107, 110.

*3 units, Win (Staff)*

**CS 193S. Scalable Web 2.0 Programming**

Course charts development path for a large scale modern web service. Resource efficiency demands a single developer should be able to build, test and deploy a single codebase using only open source tools and libraries. Difficult to accomplish in practice due to variety of skill sets needed for UI, client, server and database coding. Course framework presented offers solution that does not sacrifice long term scalability and maintainability for rapid development cycles and easy prototyping. Programming projects provide overview of technologies and critical constraints. Prerequisites: CS107, CS108.

*3 units, not given this year*

**CS 194. Software Project**

Design, specification, coding, and testing of a significant team programming project under faculty supervision. Documentation includes a detailed proposal. Public demonstration of the project at the end of the quarter. Prerequisites: CS 110 and CS 161.

*3 units, Spr (Borenstein, J)*

**CS 194W. Software Project (WIM)**

Restricted to Computer Science and Computer Systems Engineering undergraduates. Writing-intensive version of CS194.

*3 units, Spr (Borenstein, J)*

**CS 196. Computer Consulting**

Focus is on Macintosh and Windows operating system maintenance and troubleshooting through hardware and software foundation and concepts. Topics include operating systems, networking, security, troubleshooting methodology with emphasis on Stanford's computing environment. Not a programming course. Prerequisite: 1C or equivalent.

*2 units, Win (Smith, S), Spr (Smith, S)*

**CS 198. Teaching Computer Science**

Students lead a discussion section of 106A while learning how to teach a programming language at the introductory level. Focus is on teaching skills, techniques, and course specifics. Application and interview required; see <http://cs198.stanford.edu>.

*3-4 units, Aut (Sahami, M; Walsh, R; Cuthriell, L), Win (Sahami, M; Cuthriell, L; Walsh, R), Spr (Sahami, M; Walsh, R; Cuthriell, L)*

**CS 199. Independent Work**

Special study under faculty direction, usually leading to a written

report. Letter grade; if not appropriate, enroll in 199P.

*1-6 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**CS 199P. Independent Work**

(Staff)

*1-6 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**CS 210B. Software Project Experience with Corporate Partners**

Continuation of CS210A. Focus is on real-world software development. Corporate partners seed projects with loosely defined challenges from their R&D labs; students innovate to build their own compelling software solutions. Student teams are treated as start-up companies with a budget and a technical advisory board comprised of the instructional staff and corporate liaisons. Teams will typically travel to the corporate headquarters of their collaborating partner, meaning some teams will travel internationally. Open loft classroom format such as found in Silicon Valley software companies. Exposure to: current practices in software engineering; techniques for stimulating innovation; significant development experience with creative freedoms; working in groups; real world software engineering challenges; public presentation of technical work; creating written descriptions of technical work. Prerequisites: 109 or 210A.

*1-4 units, Spr (Borenstein, J)*

**GRADUATE COURSES IN COMPUTER SCIENCE**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**CS 202. Law for Computer Science Professionals**

Intellectual property law as it relates to computer science including copyright registration, patents, and trade secrets; contract issues such as non-disclosure/non-compete agreements, license agreements, and works-made-for-hire; dispute resolution; and principles of business formation and ownership. Emphasis is on topics of current interest such as open source and the free software movement, peer-to-peer sharing, encryption, data mining, and spam.

*1 unit, Win (Hansen, D)*

**CS 204. Computational Law**

Legal informatics based on representation of regulations in computable form. Encoding regulations facilitate creation of legal information systems with significant practical value. Convergence of technological trends, growth of the Internet, advent of semantic web technology, and progress in computational logic make computational law prospects better. Topics: current state of computational law, prospects and problems, philosophical and legal implications. Prerequisite: basic concepts of programming.

*3 units, not given this year*

**CS 205A. Mathematical Methods for Robotics, Vision, and Graphics**

Continuous mathematics background necessary for research in robotics, vision, and graphics. Possible topics: linear algebra; the conjugate gradient method; ordinary and partial differential equations; vector and tensor calculus. Prerequisites: 106B or X; MATH 51 and 113; or equivalents.

*3 units, Aut (Fedkiw, R)*

**CS 205B. Mathematical Methods for Fluids, Solids, and Interfaces**

Numerical methods for simulation of problems involving solid mechanics and fluid dynamics. Focus is on practical tools needed for simulation, and continuous mathematics involving nonlinear hyperbolic partial differential equations. Possible topics: finite element method, highly deformable elastic bodies, plasticity, fracture, level set method, Burgers' equation, compressible and incompressible Navier-Stokes equations, smoke, water, fire, and solid-fluid coupling. Prerequisite: 205A or equivalent.

*3 units, not given this year*

**CS 207. The Economics of Software**

How software products are moved into the marketplace and how the resulting intellectual property is exploited. Concepts that are outside of the common knowledge of computer scientists such as business terms and spreadsheet computations to quantitatively compare alternatives. Goal is to contribute to informed decision

making in high-tech product design, acquisition, production, marketing, selection of business structures, outsourcing, and impact of taxation policies. No specific background required.

*1 unit, Aut (Wiederhold, G)*

### CS 208. Canon of Computer Science

Analysis and discussion of seminal works in computer science. Emphasis on works that changed the course of computing and continue to this day to provoke and stimulate. Course will study foundational ideas that are at the core of personal computing, artificial intelligence, computer systems, computer networks, and more. Through immersion in original literature, we can more deeply comprehend the present state of computing, its origins, its underlying assumptions, and its major open questions. In connecting students with the ideas that shaped computer science, course aims to instill lasting inspiration and a deep understanding of major trends in the field.

*3-4 units, not given this year*

### CS 210A. Software Project Experience with Corporate Partners

Two-quarter project course. Focus is on real-world software development. Corporate partners seed projects with loosely defined challenges from their R&D labs; students innovate to build their own compelling software solutions. Student teams are treated as start-up companies with a budget and a technical advisory board comprised of instructional staff and corporate liaisons. Teams will typically travel to the corporate headquarters of their collaborating partner, meaning some teams will travel internationally. Open loft classroom format such as found in Silicon Valley software companies. Exposure to: current practices in software engineering; techniques for stimulating innovation; significant development experience with creative freedoms; working in groups; real-world software engineering challenges; public presentation of technical work; creating written descriptions of technical work. Prerequisites: 109 or 110.

*3-4 units, Win (Borenstein, J)*

### CS 221. Artificial Intelligence: Principles and Techniques

(Only one of 121 or 221 counts toward any CS degree program.) Topics: search, constraint satisfaction, knowledge representation, probabilistic models, Bayesian networks, machine learning, neural networks, vision, robotics, and natural language processing. Prerequisites: 103 or 103B/X; 106B or 106X; and exposure to probability. Recommended: 107 and facility with basic differential calculus.

*3-4 units, Aut (Thrun, S)*

### CS 222. Rational Agency and Intelligent Interaction

(Same as PHIL 358) For advanced undergraduates, and M.S. and beginning Ph.D. students. Logic-based methods for knowledge representation, information change, and games in artificial intelligence and philosophy. Topics: knowledge, certainty, and belief; time and action; belief dynamics; preference and social choice; games; and desire and intention. Prerequisite: propositional and first-order logic.

*3 units, not given this year*

### CS 223A. Introduction to Robotics

(Same as ME 320) Robotics foundations in modeling, design, planning, and control. Class covers relevant results from geometry, kinematics, statics, dynamics, motion planning, and control, providing the basic methodologies and tools in robotics research and applications. Concepts and models are illustrated through physical robot platforms, interactive robot simulations, and video segments relevant to historical research developments or to emerging application areas in the field. Recommended: matrix algebra.

*3 units, Win (Khatib, O)*

### CS 224M. Multi-Agent Systems

For advanced undergraduates, and M.S. and beginning Ph.D. students. Topics: logics of knowledge and belief, other logics of mental state, theories of belief change, multi-agent probabilities, essentials of game theory, social choice and mechanism design, multi-agent learning, communication. Applications discussed as appropriate; emphasis is on conceptual matters and theoretical foundations. Prerequisites: basic probability theory and first-order logic.

*3 units, Spr (Shoham, Y)*

### CS 224N. Natural Language Processing

(Same as LINGUIST 284) Methods for processing human language information and the underlying computational properties of natural languages. Syntactic and semantic processing from linguistic and algorithmic perspectives. Focus is on modern quantitative techniques in NLP: using large corpora, statistical models for acquisition, translation, and interpretation; and representative systems. Prerequisites: CS124 or CS121/221.

*3-4 units, Aut (Manning, C)*

### CS 224S. Speech Recognition and Synthesis

(Same as LINGUIST 285) Automatic speech recognition, speech synthesis, and dialogue systems. Focus is on key algorithms including noisy channel model, hidden Markov models (HMMs), Viterbi decoding, N-gram language modeling, unit selection synthesis, and roles of linguistic knowledge. Prerequisite: programming experience. Recommended: CS 221 or 229.

*3-4 units, not given this year*

### CS 224U. Natural Language Understanding

(Same as LINGUIST 188, LINGUIST 288) Machine understanding of human language. Computational semantics (determination of word sense and synonymy, event structure and thematic roles, time, aspect, causation, compositional semantics, scopal operators), and computational pragmatics and discourse (coherence, coreference resolution, information packaging, dialogue structure). Theoretical issues, online resources, and relevance to applications including question answering and summarization. Prerequisites: one of LINGUIST 180 / CS 124 / CS 224N,S; and logic such as LINGUIST 130A or B, CS 157, or PHIL150).

*3-4 units, Win (MacCartney, W; Potts, C)*

### CS 224W. Social and Information Network Analysis

(Formerly 322) How do rumors and information spread? Who are the influencers? Can we predict friendships on Facebook? Networks are the core of the WWW, blogs, Twitter and Facebook. They can be characterized by the complex interplay between information content, millions of individuals and organizations that create it, and the technology that supports it. Course will focus on how to analyze the structure and dynamics of large networks, how to model links, and how design algorithms that work with such large networks. Topics: statistical properties of large networks, models of social network structure and evolution, link prediction, network community detection, diffusion of innovation, information propagation, six-degrees of separation, finding influential nodes in networks, disease outbreak detection, networks with positive and negative ties, and connections with work in the social sciences and economics.

*3 units, Aut (Leskovec, J)*

### CS 225A. Experimental Robotics

Hands-on laboratory course experience in robotic manipulation. Topics include robot kinematics, dynamics, control, compliance, sensor-based collision avoidance, and human-robot interfaces. Second half of class is devoted to final projects using various robotic platforms to build and demonstrate new robot task capabilities. Previous projects include the development of autonomous robot behaviors of drawing, painting, playing air hockey, yoyo, basketball, ping-pong or xylophone. Prerequisites: 223A or equivalent.

*3 units, Spr (Khatib, O)*

### CS 225B. Robot Programming Laboratory

For robotics and non-robotics students. Students program mobile robots to exhibit increasingly complex behavior (simple dead reckoning and reactivity, goal-directed motion, localization, complex tasks). Topics: motor control and sensor characteristics; sensor fusion, model construction, and robust estimation; control regimes (subsumption, potential fields); probabilistic methods, including Markov localization and particle filters. Student programmed robot contest. Programming is in C++ on Unix machines, done in teams. Prerequisite: programming at the level of 106B, 106X, 205, or equivalent.

*3-4 units, Aut (Konolige, K)*

### CS 227. Knowledge Representation and Reasoning

Representing knowledge symbolically in a form suitable for automated reasoning, and associated reasoning methods. Combines formal algorithmic analysis with a description of recent

applications. Topics: object-oriented knowledge representation, description logics, inheritance networks, logic programming, propositional satisfiability, constraint satisfaction, planning and scheduling, abductive explanation, tractable reasoning. Prerequisites: familiarity with basic notions in data structures and with techniques in algorithm design and analysis. Computational logic (CS157 or equivalent). Recommended: previous or concurrent course in AI. Knowledge of Lisp or Prolog programming.

3 units, not given this year

### CS 227B. General Game Playing

A general game playing system accepts a formal description of a game to play it without human intervention or algorithms designed for specific games. Hands-on introduction to these systems and artificial intelligence techniques such as knowledge representation, reasoning, learning, and rational behavior. Students create GGP systems to compete with each other and in external competitions. Prerequisite: programming experience. Recommended: 103 or equivalent.

3 units, Spr (Genesereth, M)

### CS 228. Probabilistic Graphical Models: Principles and Techniques

Probabilistic graphical modeling languages for representing complex domains, algorithms for reasoning using these representations, and learning these representations from data. Topics include: Bayesian and Markov networks, extensions to temporal modeling such as hidden Markov models and dynamic Bayesian networks, exact and approximate probabilistic inference algorithms, and methods for learning models from data. Also included are sample applications to various domains including speech recognition, biological modeling and discovery, medical diagnosis, message encoding, vision, and robot motion planning. Prerequisites: basic probability theory and algorithm design and analysis.

3-4 units, Win (Koller, D)

### CS 228T. Probabilistic Graphical Models: Advanced Methods

For students interested in advanced methods in machine learning and probabilistic AI. Describes the theoretical foundations for methods of inference and learning in probabilistic graphical models, allowing for the derivation of properties of these methods and for the development of more advanced methods. Sample topics include advanced methods in Markov chain Monte Carlo, approximate message-passing algorithms for inference derived from an optimization perspective, representation and inference in models involving continuous variables, learning undirected models, learning with hidden variables, and non-parametric Bayesian methods. Prerequisites: CS228; strong mathematical foundation.

3 units, Spr (Koller, D)

### CS 229. Machine Learning

Topics: statistical pattern recognition, linear and non-linear regression, non-parametric methods, exponential family, GLMs, support vector machines, kernel methods, model/feature selection, learning theory, VC dimension, clustering, density estimation, EM, dimensionality reduction, ICA, PCA, reinforcement learning and adaptive control, Markov decision processes, approximate dynamic programming, and policy search. Prerequisites: linear algebra, and basic probability and statistics.

3-4 units, Aut (Ng, A)

### CS 229A. Machine Learning (Applied)

Covers algorithms that allow computers to learn from data. Emphasis on practical skills and methods for applying learning techniques and building practical AI/Learning systems. Course covers commonly used learning techniques (classification, regression, clustering, dimensionality reduction), specific applications (anomaly detection, recommender systems, search), as well as working with big data. Online, self-paced course. Enrollment limited. Consent of instructor required. Prerequisites: Programming at the level of CS106B or 106X, and basic linear algebra such as Math 51.

3-4 units, Aut (Ng, A)

### CS 231A. Introduction to Computer Vision

(Formerly 223B) An introduction to the concepts and applications in computer vision. Topics include: cameras and projection

models, low-level image processing methods such as filtering and edge detection; mid-level vision topics such as segmentation and clustering; shape reconstruction from stereo, as well as high-level vision tasks such as object recognition, scene recognition, face detection and human motion categorization. Prerequisites: linear algebra, basic probability and statistics.

3 units, Aut (Li, F)

### CS 231B. The Cutting Edge of Computer Vision

(Formerly 223C) More than one-third of the brain is engaged in visual processing, the most sophisticated human sensory system. Yet visual recognition technology has fundamentally influenced our lives on the same scale and scope as text-based technology has, thanks to Google, Twitter, Facebook, etc. This course is designed for those students who are interested in cutting edge computer vision research, and/or are aspiring to be an entrepreneur using vision technology. Course will guide students through the design and implementation of three core vision technologies: segmentation, detection and classification on three highly practical, real-world problems. Course will focus on teaching the fundamental theory, detailed algorithms, practical engineering insights, and guide them to develop state-of-the-art systems evaluated based on the most modern and standard benchmark datasets. Prerequisites: CS2223B or equivalent and a good machine learning background (i.e. CS221, CS228, CS229). Fluency

3 units, not given this year

### CS 240. Advanced Topics in Operating Systems

Recent research. Classic and new papers. Topics: virtual memory management, synchronization and communication, file systems, protection and security, operating system extension techniques, fault tolerance, and the history and experience of systems programming. Prerequisite: 140 or equivalent.

3 units, Win (Engler, D), Spr (Engler, D)

### CS 240H. Functional Systems in Haskell

Covers an array of practical issues and techniques that arise when building real-world systems in the Haskell programming language. Topics include the basics of Haskell, laziness, monads, parsers, testing and debugging, performance tuning, interfacing to native code, concurrency and I/O paradigms, language extensions, meta-programming, and applications to the web and security. Concepts will be reinforced through a few individual programming assignments followed by a larger team project. Prior familiarity with Haskell may be helpful but is not required. Prerequisites: CS106B or 106X.

3-4 units, Aut (Mazieres, D)

### CS 241. Secure Web Programming

Building secure Web applications is key to the continued success of the Web. Course will cover the key components and available tools for securing web applications. Discussions on browser security policy and how to properly use it, server-side abstractions for building secure applications, and common errors found in existing applications. Course will include student presentations on course projects.

3 units, alternate years, not given this year

### CS 242. Programming Languages

Central concepts in modern programming languages, impact on software development, language design trade-offs, and implementation considerations. Functional, imperative, and object-oriented paradigms. Formal semantic methods and program analysis. Modern type systems, higher order functions and closures, exceptions and continuations. Modularity, object-oriented languages, and concurrency. Runtime support for language features, interoperability, and security issues. Prerequisite: 107, or experience with Lisp, C, and an object-oriented language.

3 units, Aut (Mitchell, J)

### CS 243. Program Analysis and Optimizations

Program analysis techniques used in compilers and software development tools to improve productivity, reliability, and security. The methodology of applying mathematical abstractions such as graphs, fixpoint computations, binary decision diagrams in writing complex software, using compilers as an example. Topics include data flow analysis, instruction scheduling, register allocation, parallelism, data locality, interprocedural analysis, and garbage collection. Prerequisites: 103 or 103B, and 107.

3-4 units, Win (Lam, M)

### CS 244. Advanced Topics in Networking

Classic papers, new ideas, and research papers in networking. Architectural principles: naming, addressing, routing; congestion control, traffic management, QoS; wireless and mobility; overlay networks and virtualization; network security; switching and routing; content distribution; and proposals for future Internet structures. Prerequisite: 144 or equivalent.

3-4 units, Spr (McKeown, N)

### CS 244B. Distributed Systems

Distributed operating systems and applications issues, emphasizing high-level protocols and distributed state sharing as the key technologies. Topics: distributed shared memory, object-oriented distributed system design, distributed directory services, atomic transactions and time synchronization, application-sufficient consistency, file access, process scheduling, process migration, and storage/communication abstractions on distribution, scale, robustness in the face of failure, and security. Prerequisites: CS 144 and CS 249A.

3 units, Spr (Cheriton, D)

### CS 244C. Readings and Projects in Distributed Systems

Companion project option for 244B. Corequisite: 244B.

3-6 units, not given this year

### CS 244E. Networked Wireless Systems

(Same as EE 384E) Design and implementation of wireless networks and mobile systems. The course will commence with a short retrospective of wireless communication and initially touch on some of the fundamental physical layer properties of various wireless communication technologies. The focus will then shift to design of media access control and routing layers for various wireless systems. The course will also examine adaptations necessary at transport and higher layers to cope with node mobility and error-prone nature of the wireless medium. Finally, it will conclude with a brief overview of other related issues including emerging wireless/mobile applications. Prerequisites: EE 284

3 units, Win (Katti, S)

### CS 245. Database Systems Principles

File organization and access, buffer management, performance analysis, and storage management. Database system architecture, query optimization, transaction management, recovery, concurrency control. Reliability, protection, and integrity. Design and management issues. Prerequisites: 145, 161.

3 units, Win (Garcia-Molina, H)

### CS 246. Mining Massive Data Sets

Distributed file systems: Hadoop, map-reduce; PageRank, topic-sensitive PageRank, spam detection, hubs-and-authorities; similarity search; shingling, minhashing, random hyperplanes, locality-sensitive hashing; analysis of social-network graphs; association rules; dimensionality reduction: UV, SVD, and CUR decompositions; algorithms for very-large-scale mining: clustering, nearest-neighbor search, gradient descent, support-vector machines, classification, and regression; submodular function optimization. Prerequisites: At least one of CS107 or CS145; at least one of CS109 or STAT116, or equivalent.

3 units, Win (Leskovec, J)

### CS 247. Human-Computer Interaction Design Studio

Project-based. Methods used in interaction design including needs analysis, user observation, idea sketching, concept generation, scenario building, storyboards, user character stereotypes, usability analysis, and market strategies. Prerequisites: 147 and 106A or equivalent background in programming.

3-4 units, Win (Heer, J)

### CS 247L. Human Computer Interaction Technology Laboratory

Hands-on introduction to contemporary HCI technologies. Interaction design with Adobe Flash, mobile development, physical computing, and web applications. Corequisite: 247.

1 unit, Win (Heer, J)

### CS 248. Interactive Computer Graphics

Rendering and animation for interactive computer graphics. Topics in rendering include: the graphics pipeline, rasterization, lighting and surface shading, texture mapping and its applications, graphics hardware, and rendering optimization. Topics in animation

include: keyframing and interpolation, physics-based simulation, and character animation. Prerequisite: CS148.

3-4 units, Win (Koltun, V)

### CS 249A. Object-Oriented Programming from a Modeling and Simulation Perspective

Topics: large-scale software development approaches for complex applications, class libraries and frameworks; encapsulation, use of inheritance and dynamic dispatch, design of interfaces and interface/implementation separation, exception handling, smart pointers and reference management, minimalizing dependencies and value-oriented programming. Inheritance: when and why multiple inheritance naming, directories, manager, and disciplined use of design patterns including functors, event notification and iterators. Prerequisites: C, C++, and programming methodology as developed in 106B or X, and 107 (107 may be taken concurrently). Recommended: 193D.

3 units, Aut (Cheriton, D)

### CS 249B. Large-scale Software Development

Software engineering of high quality large-scale complex software with a focus on evolvability, performance and cost. Software development processes, people and practice; audit: integrating invariant checks with production software; concurrency with modular object-oriented programming; collection implementation; generic programming and templates; design of value types; named descriptions for large value types; memory management; controlling placement, locality and consumption; run-time vs. static type checking and identification.

3 units, not given this year

### CS 254. Computational Complexity

An introduction to computational complexity theory. The P versus NP problem; diagonalization and relativization; space complexity, Savitch's algorithm, NL=coNL, Reingold's algorithm; counting problem and #P-completeness; circuit complexity; pseudorandomness, derandomization, and the Natural Proofs barrier; complexity of approximation; quantum computing. Prerequisites: 154 or equivalent; mathematical maturity.

3 units, Win (Trevisan, L)

### CS 255. Introduction to Cryptography

For advanced undergraduates and graduate students. Theory and practice of cryptographic techniques used in computer security. Topics: encryption (single and double key), digital signatures, pseudo-random bit generation, authentication, electronic commerce (anonymous cash, micropayments), key management, PKI, zero-knowledge protocols. Prerequisite: basic probability theory.

3 units, Win (Boneh, D)

### CS 258. Introduction to Programming Language Theory

Syntactic, operational, and semantic issues in the mathematical analysis of programming languages. Type systems and non-context-free syntax. Universal algebra and algebraic data types. Operational semantics given by rewrite rules; confluence and termination. Denotational semantics and elementary domain theory for languages with higher-type functions and recursion. Treatment of side effects. Prerequisites: 154, 157 or PHIL 160A.

3 units, Win (Mitchell, J)

### CS 259. Security Analysis of Network Protocols

General methods for security modeling and analysis, illustrated using network protocol security. Common security protocols and their properties including secrecy, authentication, key establishment, and fairness. Fully automated, finite-state, model-checking techniques. Constraint solving, process algebras, protocol logics, probabilistic model checking, and game theory. Students select a protocol, web component, hardware architecture, or other system to analyze, specify it in a chosen model, use an analysis tool or method to find vulnerabilities and verify properties, and present findings.

3 units, not given this year

### CS 259C. Elliptic Curves in Cryptography

(Same as MATH 250) Discusses the mathematics of elliptic curves and their applications in cryptography. Studies crypto-systems based on elliptic curves and discuss their security. Studies algorithmic aspects of elliptic curves related to crypto-system construction and security. Topics include: elliptic curves over finite fields, attacks on elliptic curve crypto-systems, point

counting, pairing-based cryptography. Suggested background: Math 120 or 152, or CS255.

3 units, Aut (Freeman, D)

### CS 261. Optimization and Algorithmic Paradigms

Algorithms for network optimization: max-flow, min-cost flow, matching, assignment, and min-cut problems. Introduction to linear programming. Use of LP duality for design and analysis of algorithms. Approximation algorithms for NP-complete problems such as Steiner Trees, Traveling Salesman, and scheduling problems. Randomized algorithms. Introduction to online algorithms. Prerequisite: 161 or equivalent.

3 units, Win (Plotkin, S)

### CS 262. Computational Genomics

(Same as BIOMEDIN 262) Applications of computer science to genomics, and concepts in genomics from a computer science point of view. Topics: dynamic programming, sequence alignments, hidden Markov models, Gibbs sampling, and probabilistic context-free grammars. Applications of these tools to sequence analysis: comparative genomics, DNA sequencing and assembly, genomic annotation of repeats, genes, and regulatory sequences, microarrays and gene expression, phylogeny and molecular evolution, and RNA structure. Prerequisites: 161 or familiarity with basic algorithmic concepts. Recommended: basic knowledge of genetics.

3 units, Win (Batzoglou, S)

### CS 263. Algorithms for Modern Data Models

(Same as MS&E 317) We traditionally think of algorithms as running on data available in a single location, typically main memory. In many modern applications including web analytics, search and data mining, computational biology, finance, and scientific computing, the data is often too large to reside in a single location, is arriving incrementally over time, is noisy/uncertain, or all of the above. Paradigms such as map-reduce, streaming, sketching, Distributed Hash Tables, Bulk Synchronous Processing, and random walks have proved useful for these applications. This course will provide an introduction to the design and analysis of algorithms for these modern data models. Prerequisite: Algorithms at the level of CS 261.

3 units, Aut (Goel, A)

### CS 268. Geometric Algorithms

Techniques for design and analysis of efficient geometric algorithms for objects in 2-, 3-, and higher dimensions. Topics: convexity, triangulations and simplicial complexes, sweeping, partitioning, and point location. Voronoi/Delaunay diagrams and their properties. Arrangements of curves and surfaces. Intersection and visibility problems. Geometric searching and optimization. Random sampling methods. Impact of numerical issues in geometric computation. Example applications to robotic motion planning, visibility preprocessing and rendering in graphics, model-based recognition in computer vision, and structural molecular biology. Prerequisite: discrete algorithms at the level of 161. Recommended: 164.

3 units, not given this year

### CS 270. Modeling Biomedical Systems: Ontology, Terminology, Problem Solving

(Same as BIOMEDIN 210) Methods for modeling biomedical systems and for making those models explicit in the context of building software systems. Emphasis is on intelligent systems for decision support and Semantic Web applications. Topics: knowledge representation, controlled terminologies, ontologies, reusable problem solvers, and knowledge acquisition. Recommended: exposure to object-oriented systems, basic biology.

3 units, Win (Musen, M)

### CS 271. Smart Health through Effective Design

(Same as BIOMEDIN 211) Methods of designing and engineering software systems in complex clinical environments. Case studies illustrate factors leading to success or failure of systems. Project assignments involve focused team-based design work. Topics: user and organizational requirements, data and knowledge modeling, component-based system design, system prototyping, and human-systems interaction. Prerequisite: BIOMEDIN 210 recommended, or database or object-oriented programming course.

3 units, Win (Das, A)

### CS 272. Introduction to Biomedical Informatics Research

#### Methodology

(Same as BIOE 212, BIOMEDIN 212, GENE 212) Hands-on software building. Student teams conceive, design, specify, implement, evaluate, and report on a software project in the domain of biomedicine. Creating written proposals, peer review, providing status reports, and preparing final reports. Guest lectures from professional biomedical informatics systems builders on issues related to the process of project management. Software engineering basics. Prerequisites: BIOMEDIN 210, 211, 214, 217 or consent of instructor.

3 units, Spr (Altman, R)

### CS 273A. A Computational Tour of the Human Genome

(Same as BIOMEDIN 273A, DBIO 273A) Introduction to computational biology through an informatic exploration of the human genome. Topics include: genome sequencing (technologies, assembly, personalized sequencing); functional landscape (genes, gene regulation, repeats, RNA genes, epigenetics); genome evolution (comparative genomics, ultraconservation, co-option). Additional topics may include population genetics, personalized genomics, and ancient DNA. Course includes primers on molecular biology, the UCSC Genome Browser, and text processing languages. Guest lectures from genomic researchers. No prerequisites. See <http://cs273a.stanford.edu/>.

3 units, Aut (Batzoglou, S; Bejerano, G)

### CS 274. Representations and Algorithms for Computational Molecular Biology

(Same as BIOE 214, BIOMEDIN 214, GENE 214) Topics: introduction to bioinformatics and computational biology, algorithms for alignment of biological sequences and structures, computing with strings, phylogenetic tree construction, hidden Markov models, Gibbs Sampling, basic structural computations on proteins, protein structure prediction, protein threading techniques, homology modeling, molecular dynamics and energy minimization, statistical analysis of 3D biological data, integration of data sources, knowledge representation and controlled terminologies for molecular biology, microarray analysis, machine learning (clustering and classification), and natural language text processing. Prerequisites: programming skills; consent of instructor for 3 units.

3-4 units, Aut (Altman, R)

### CS 275. Translational Bioinformatics

(Same as BIOMEDIN 217) Analytic, storage, and interpretive methods to optimize the transformation of genetic, genomic, and biological data into diagnostics and therapeutics for medicine. Topics: access and utility of publicly available data sources; types of genome-scale measurements in molecular biology and genomic medicine; analysis of microarray data; analysis of polymorphisms, proteomics, and protein interactions; linking genome-scale data to clinical data and phenotypes; and new questions in biomedicine using bioinformatics. Case studies. Prerequisites: programming ability at the level of CS 106A and familiarity with statistics and biology.

4 units, Spr (Butte, A)

### CS 276. Information Retrieval and Web Search

(Same as LINGUIST 286) Text information retrieval systems; efficient text indexing; Boolean, vector space, and probabilistic retrieval models; ranking and rank aggregation; evaluating IR systems. Text clustering and classification: classification algorithms, latent semantic indexing, taxonomy induction; Web search engines including crawling and indexing, link-based algorithms, and web metadata. Prerequisites: CS 107, CS 109, CS 161.

3 units, Spr (Nayak, P; Manning, C)

### CS 277. Experimental Haptics

Haptics as it relates to creating touch feedback in simulated or virtualized environments. Goal is to develop virtual reality haptic simulators and applications. Theoretical topics: psychophysical issues, performance and design of haptic interfaces, haptic rendering methods for 3-D virtual environments, and haptic simulation and rendering of rigid and deformable solids. Applied topics: the CHAI haptic library; implementation of haptic rendering algorithms; collision detection in 3-D environments; design of real-time models for deformable objects. Guest speakers. Lab/programming exercises; a more open-ended final project.



Enrollment limited to 20. Prerequisite: experience with C++. Recommended: 148 or 248, 223A.

3 units, Win (Conti, F; Salisbury, K)

### CS 278. Systems Biology

(Same as BIOE 310, CSB 278) Experimental and computational approaches to the dissection of complex biological systems. Topics include network structure, non-linear dynamics, numerical modeling approaches, noise, and robustness. Topics are introduced in the context of recent papers from the primary literature.

4 units, alternate years, not given this year

### CS 279. Computational Methods for Analysis and Reconstruction of Biological Networks

Types of interactions, including: regulatory such as transcriptional, signaling, and chromatin modification; protein-protein interactions; and genetic. Biological network structure at scales such as single interaction, small subgraphs, and global organization. Methods for analyzing properties of biological networks. Techniques for reconstructing networks from biological data, including: DNA/protein sequence motifs and sequence conservation; gene expression data; and physical binding data such as protein-DNA, protein-RNA, and protein-protein. Network dynamics and evolution. Prerequisites: biology at the level of BIOSCI 41; computer science and data structures at the level of CS 103 and 106; and probability and statistics at the level of STATS 116 or CS 109.

3 units, not given this year

### CS 294. Research Project in Computer Science

Student teams work under faculty supervision on research and implementation of a large project in some major sub-discipline in computer science. Lectures on state-of-the-art methods related to the particular problem domain. Prerequisites: consent of instructor.

3 units, OCCASIONAL

### CS 294A. Research Project in Artificial Intelligence

Student teams under faculty supervision work on research and implementation of a large project in AI. State-of-the-art methods related to the problem domain. Prerequisites: AI course from 220 series, and consent of instructor.

3 units, Win (Ng, A)

### CS 294H. Research Project in Human-Computer Interaction

Many of the most successful web applications are social, from personalized homepages to social networks. Focus is on fundamental interface design, systems, and algorithms concepts in designing social software. Case-based syllabus covers insights from research and industry. Students contribute to this growing field through a quarter-long, team-based project. Students are required to enter the class with an initial project idea.

3 units, not given this year

### CS 294S. Research Project in Software Systems and Security

Topics vary. Focus is on emerging research themes such as programmable open mobile Internet that spans multiple system topics such as human-computer interaction, programming systems, operating systems, networking, and security. May be repeated for credit. Prerequisites: CS 103 and 107.

3 units, Spr (Lam, M)

### CS 294W. Writing Intensive Research Project in Computer Science

Restricted to Computer Science and Computer Systems Engineering undergraduates. Students enroll in the CS 294W section attached to the CS 294 project they have chosen.

3 units, Win (Ng, A), Spr (Lam, M)

### CS 295. Software Engineering

Software specification, testing, and verification. Emphasis is on current best practices and technology for developing reliable software at reasonable cost. Assignments focus on applying these techniques to realistic software systems. Prerequisites: 108. Recommended a project course such as 140, 143, or 145.

2-3 units, not given this year

### CS 298. Seminar on Teaching Introductory Computer Science

Faculty, undergraduates, and graduate students interested in teaching discuss topics raised by teaching computer science at the introductory level. Prerequisite: consent of instructor.

1-3 units, Aut (Roberts, E)

### CS 300. Departmental Lecture Series

Priority given to first-year Computer Science Ph.D. students. CS Masters students admitted if space is available. Presentations by members of the department faculty, each describing informally his or her current research interests and views of computer science as a whole.

1 unit, Aut (Mitchell, J)

### CS 303. Designing Computer Science Experiments

Introduction to empirical research in computer science. Learn how to design, execute, interpret, and report on computer science experiments. Conducting empirical work and using experiments to build theory is one of the major ways to move computer science forward, but these issues are often omitted from computer science curricula. Course features case studies drawn from artificial intelligence, systems, and human-computer interaction. Emphasizes the decision-making aspects of research and the logic behind research procedures.

3 units, Spr (Klemmer, S)

### CS 309. Industrial Lectureships in Computer Science

Guest computer scientist. By arrangement. May be repeated for credit. (Staff)

1 unit, OCCASIONAL

### CS 309A. Cloud Computing

For technology and business students. The shift from traditional software model of disconnected development and CD-ROM deployment to engineering and delivery on the Internet as a service. Guest industry experts are typically CEOs of public companies who are delivering applications, platform or compute and storage cloud based services.

1 unit, Aut (Chou, T)

### CS 315A. Parallel Computer Architecture and Programming

The principles and tradeoffs in the design of parallel architectures. Emphasis is on naming, latency, bandwidth, and synchronization in parallel machines. Case studies on shared memory, message passing, data flow, and data parallel machines illustrate techniques. Architectural studies and lectures on techniques for programming parallel computers. Programming assignments on one or more commercial multiprocessors. Prerequisites: EE 282, and reasonable programming experience.

3 units, not given this year

### CS 315B. Parallel Computing Research Project

Advanced topics and new paradigms in parallel computing including parallel algorithms, programming languages, runtime environments, library debugging/tuning tools, and scalable architectures. Research project. Prerequisite: consent of instructor.

3 units, not given this year

### CS 319. Topics in Digital Systems

Advanced material is often taught for the first time as a topics course, perhaps by a faculty member visiting from another institution. May be repeated for credit.

3 units, OCCASIONAL

### CS 321. Information Processing for Sensor Networks

Design and implementation of algorithms and protocols for performing information processing tasks in sensor networks, including routing, data dissemination and aggregation, information discovery and brokerage, service establishment (localization, time synchronization), sensor tasking and control, and distributed data storage. Techniques from signal processing, networking, energy-aware computing, distributed databases and algorithms, and embedded systems and platforms. Physical, networking, and application layers and design trade-offs across the layers. Prerequisites: linear algebra and elementary probability, networking background at the level of 144A or EE 284.

3-4 units, not given this year

### CS 324. Robot Perception

Advanced instruction and project work on robot perception, primarily focused on perception for manipulating objects, but this can include perception of people and other moving objects. Tools such as the Robot Operating System (ROS), the Open Source Computer Vision Library (Open CV), the Point Cloud Processing Library (PCL), and the Navigation, Planning, and Manipulation stacks on the PR2 robot. Review of the principles and code behind these tools so that the student has the basics to do state-of-the-art, publishable work in mobile robotic manipulation. Work is done on



real robots. Limited enrollment. Recommended: CS 223A, CS 223B.

*3 units, not given this year*

### CS 326A. Motion Planning

Computing object motions in computer graphics, geometrical computing, robotics, or artificial intelligence for applications such as design, manufacturing, robotics, animated graphics, surgical planning, drug design, assembly planning, graphic animation of human figures, humanoid robots, inspection and surveillance, simulation of crowds, and biology. Path planning methods to generate collision-free paths among static obstacles. Extensions include uncertainty, mobile obstacles, manipulating moveable objects, maneuvering with kinematic constraints, and making and breaking contacts. Configuration space, geometric arrangements, and random sampling. Theoretical methods.

*3 units, not given this year*

### CS 327A. Advanced Robotic Manipulation

Advanced control methodologies and novel design techniques for complex human-like robotic and bio mechanical systems. Class covers the fundamentals in operational space dynamics and control, elastic planning, human motion synthesis. Topics include redundancy, inertial properties, haptics, simulation, robot cooperation, mobile manipulation, human-friendly robot design, humanoids and whole-body control. Additional topics in emerging areas are presented by groups of students at the end-of-quarter mini-symposium. Prerequisites: 223A or equivalent.

*3 units, not given this year*

### CS 328. Topics in Computer Vision

Fundamental issues of, and mathematical models for, computer vision. Sample topics: camera calibration, texture, stereo, motion, shape representation, image retrieval, experimental techniques. May be repeated for credit. Prerequisites: 205, 223B, or equivalents.

*3 units, OCCASIONAL*

### CS 329. Topics in Artificial Intelligence

Advanced material is often taught for the first time as a topics course, perhaps by a faculty member visiting from another institution. May be repeated for credit.

*3 units, OCCASIONAL*

### CS 331. Advanced Reading in Computer Vision

(Formerly CS323) The field of computer vision has seen an explosive growth in past decade. Much of recent effort in vision research is towards developing algorithms that can perform high-level visual recognition tasks on real-world images and videos. With development of Internet, this task becomes particularly challenging and interesting given the heterogeneous data on the web. Course will focus on reading recent research papers that are focused on solving high-level visual recognition problems, such as object recognition and categorization, scene understanding, human motion understanding, etc. Project required. Prerequisite: some experience in research with one of the following fields: computer vision, image processing, computer graphics, machine learning.

*3 units, not given this year*

### CS 340. Topics in Computer Systems

Topics vary every quarter, and may include advanced material being taught for the first time. May be repeated for credit.

*3-4 units, OCCASIONAL*

### CS 340V. Networked Systems for Virtual Worlds

Open to graduate students and advanced undergraduates. Systems and networking aspects of building large, distributed virtual 3D environments, with a focus on scalability, consistency, security, fairness, and federation. Topics include existing architectures, naming, routing, caching, migration, interoperability, and attribution. Open-ended research project. Prerequisite: some systems and networking background. May be repeated for credit.

*3-4 units, not given this year*

### CS 341. Project in Mining Massive Data Sets

Team project in data-mining of very large-scale data, including the problem statement and implementation and evaluation of a solution; some lectures on relevant materials will be given: Hadoop, Hive, Amazon EC2; other topics of possible relevance to some projects: computational advertising and the adwords problem; graph partitioning and community detection; extracting relations from the Web; stream data processing.

*3 units, Spr (Rajaraman, A; Ullman, J; Leskovec, J)*

### CS 342. Programming Language Design

Tools for analysis and optimization of iterative coding systems. LDPC codes, Turbo codes, RA codes, optimized ensembles, message passing algorithms, density evolution, analytic techniques. Prerequisite: 376A.

*3 units, not given this year*

### CS 343. Advanced Topics in Compilers

Topics change every year. May be repeated for credit. Prerequisite: 243.

*3 units, Spr (Engler, D)*

### CS 344. Topics in Computer Networks

High-performance embedded system design. Student teams of two software engineers (C experience required) and one hardware engineer (Verilog experience required) build a fully functioning Internet router. Work in teams of three. How router interoperates with others in class. Open-ended design challenge judged by panel of industry experts. Prerequisites: CS 144, 244, or network programming experience.

*3 units, not given this year*

### CS 344B. Advanced Topics in Distributed Systems

Continuation of 244B. The use of distributed systems research in practical systems. New applications due to the growth in high-bandwidth connections. Distributed systems knowledge and techniques from research and system implementations, and active research topics. Readings include research publications.

*2 units, not given this year*

### CS 344E. Advanced Wireless Networks

Networking research in wireless systems. Topics include: multi-channel/multi-radio systems, routing, coding, physical layer hints, low power, mesh networking, interference cancellation, technological trends, and protocol design. Students implement and test research ideas on SWAN, a WiFi testbed.

*3 units, not given this year*

### CS 345. Advanced Topics in Database Systems

Content varies. May be repeated for credit with instructor consent. Prerequisite: 145. Recommended: 245.

*3 units, OCCASIONAL*

### CS 347. Parallel and Distributed Data Management

The principles and system organization of distributed and parallel databases. Data fragmentation and distribution, distributed database design, query processing and optimization, distributed concurrency control, reliability and commit protocols, and replicated data management. Data management in peer-to-peer systems. Data management in the cloud using map-reduce and other massive parallelism techniques.

*3 units, Spr (Garcia-Molina, H)*

### CS 348A. Computer Graphics: Geometric Modeling

The mathematical tools needed for the geometrical aspects of computer graphics and especially for modeling smooth shapes. Fundamentals: homogeneous coordinates, transformations, and perspective. Theory of parametric and implicit curve and surface models: polar forms, Bezier arcs and de Casteljau subdivision, continuity constraints, B-splines, tensor product, and triangular patch surfaces. Subdivision surfaces and multiresolution representations of geometry. Representations of solids and conversions among them. Surface reconstruction from scattered data points. Geometry processing on meshes, including simplification. Prerequisite: linear algebra. Recommended: 164, 248.

*3-4 units, Win (Guibas, L)*

### CS 348B. Computer Graphics: Image Synthesis Techniques

Intermediate level, emphasizing the sampling, shading, and display aspects of computer graphics. Topics: local and global illumination methods including radiosity and distributed ray tracing, texture generation and rendering, volume rendering, strategies for anti-aliasing and photo-realism, human vision and color science as they relate to computer displays, and high-performance architectures for graphics. Written assignments and programming projects. Prerequisite: 248 or equivalent. Recommended: Fourier analysis or digital signal processing.

*3-4 units, Spr (Hanrahan, P)*

**CS 349. Topics in Programming Systems**

Advanced material is often taught for the first time as a topics course, perhaps by a faculty member visiting from another institution. May be repeated for credit.

3 units, OCCASIONAL

**CS 349C. Topics in Programming Systems: Readings in Distributed Systems**

Discussion of research publications that are of current interest in distributed systems. Students are expected to read all papers, and sign up for presentation of one paper. The course itself is 1 unit. Those interested in working on a project along with the readings should enroll for 3 units.

1-3 units, not given this year

**CS 354. Topics in Circuit Complexity**

An overview of circuit complexity, focusing on limitations of solving computational problems with circuits. Classical methods: diagonalization; the gate elimination method; the method of random restrictions; approximating circuits with polynomials. Connections between circuit-analysis algorithms and circuit complexity: learning circuits via queries; pseudorandomness and derandomization; satisfiability algorithms. Prerequisite: CS254 or the equivalent mathematical maturity.

3 units, Aut (Williams, R)

**CS 355. Advanced Topics in Cryptography**

Topics: pseudo-random generation, zero knowledge protocols, elliptic curve systems, threshold cryptography, security analysis using random oracles, lower and upper bounds on factoring and discrete log. May be repeated for credit. Prerequisite: 255.

3 units, not given this year

**CS 357. Advanced Topics in Formal Methods**

Topics vary annually. Possible topics include automata on infinite words, static analysis methods, runtime analysis methods, verification of real-time and hybrid systems, and formalization of middleware services. May be repeated for credit. Prerequisite: 256.

3 units, Aut (Aiken, A; Dill, D)

**CS 358. Topics in Programming Language Theory**

Topics of current research interest in the mathematical analysis of programming languages, structured operational semantics, domain theory, semantics of concurrency, rich type disciplines, problems of representation independence, and full abstraction. See Time Schedule or Axxess for current topics. May be repeated for credit. Prerequisites: 154, 157, 258, or equivalents. (Staff)

3 units, OCCASIONAL

**CS 359. Topics in the Theory of Computation**

Advanced material is often taught for the first time as a topics course, perhaps by a faculty member visiting from another institution. May be repeated for credit.

3 units, OCCASIONAL

**CS 359G. Graph Partitioning and Expanders**

Three topics related to the mathematics of expander graphs: (1) Approximation algorithms for finding a sparse balanced cut in a graph (spectral partitioning, Leighton-Rao algorithm, and Arora-Rao-Vazirani algorithm); (2) Explicit construction of expander graphs (combinatorial and algebraic); and (3) Analysis of Markov-Chain Monte-Carlo algorithm via the estimation of the convergence of certain random walks. Recommended: a basic course in linear algebra and a course on algorithms.

3 units, not given this year

**CS 361A. Advanced Algorithms**

Advanced data structures: union-find, self-adjusting data structures and amortized analysis, dynamic trees, Fibonacci heaps, universal hash function and sparse hash tables, persistent data structures. Advanced combinatorial algorithms: algebraic (matrix and polynomial) algorithms, number theoretic algorithms, group theoretic algorithms and graph isomorphism, online algorithms and competitive analysis, strings and pattern matching, heuristic and probabilistic analysis (TSP, satisfiability, cliques, colorings), local search algorithms. May be repeated for credit. Prerequisite: 161 or 261, or equivalent.

3 units, not given this year

**CS 361B. Advanced Algorithms**

Topics: fundamental techniques used in the development of exact and approximate algorithms for combinatorial optimization

problems such as generalized flow, multicommodity flow, sparsest cuts, generalized Steiner trees, load balancing, and scheduling. Using linear programming, emphasis is on LP duality for design and analysis of approximation algorithms; interior point methods for LP. Techniques for development of strongly polynomial algorithms. Prerequisites: 161 or 261, or equivalent.

3 units, Spr (Plotkin, S)

**CS 364A. Algorithmic Game Theory**

Topics at the interface of theoretical computer science and game theory such as: algorithmic mechanism design; combinatorial and competitive auctions; congestion and potential games; cost sharing; existence, computation, and learning of equilibria; game theory and the Internet; network games; price of anarchy; and selfish routing. Prerequisites: 154N and 161, or equivalents.

3 units, not given this year

**CS 364B. Topics in Algorithmic Game Theory**

Topics on the interface of theoretical computer science and game theory. May be taken prior to 364A; may be repeated for credit. Prerequisites: 154N and 161, or equivalents.

3 units, not given this year

**CS 365. Randomized Algorithms**

(Same as CME 309) Design and analysis of algorithms that use randomness to guide their computations. Topics include: basic tools, from probability theory and probabilistic analysis that are recurrent in algorithmic applications; randomized complexity theory and game-theoretic techniques; algebraic techniques, probability amplification and derandomization. Applications: sorting and searching, data structures, combinatorial optimization and graph algorithms, geometric algorithms and linear programming, approximation and counting problems, similarity search and metric embeddings, online algorithms. Prerequisites: CS 161 and STAT 116, or equivalents and instructor consent.

3 units, Win (Goel, A)

**CS 369. Topics in Analysis of Algorithms**

Advanced material is often taught for the first time as a topics course, perhaps by a faculty member visiting from another institution. May be repeated for credit.

3 units, OCCASIONAL

**CS 369N. Beyond Worst-Case Analysis**

Advanced material is often taught for the first time as a topics course, perhaps by a faculty member visiting from another institution. May be repeated for credit.

3 units, Aut (Roughgarden, T)

**CS 374. Algorithms in Biology**

(Same as BIOMEDIN 374) Algorithms and computational models applied to molecular biology and genetics. Topics vary annually. Possible topics include biological sequence comparison, annotation of genes and other functional elements, molecular evolution, genome rearrangements, microarrays and gene regulation, protein folding and classification, molecular docking, RNA secondary structure, DNA computing, and self-assembly. May be repeated for credit. Prerequisites: 161, 262 or 274, or BIOCHEM 218, or equivalents.

2-3 units, Aut (Batzoglou, S)

**CS 376. Research Topics in Human-Computer Interaction**

Prepares students to conduct original HCI research by reading and discussing seminal and cutting-edge research papers. This broad introduction covers topics in design, social software, input techniques, mobile, and ubiquitous computing. Student pairs perform a quarter-long mini research project; students are encouraged to select topics that leverage larger research efforts on campus. For undergraduates, CS147 is a prerequisite.

3-4 units, Spr (Klemmer, S)

**CS 377. Topics in Human-Computer Interaction**

Contents change each quarter. May be repeated for credit. See <http://hci.stanford.edu/academics> for offerings.

2-3 units, OCCASIONAL

**CS 377H. Topics in Learning and Technology: Core Mechanics for Learning**

(Same as COMM 180, COMM 280, EDUC 328X) Contents of the course change each year. The course can be repeated. In game play, core mechanics refers to the rules of interaction that drive the game forward. This class will consider whether there are core

mechanics that can drive learning forward, and if so, how to build them into learning environments.

3 units, Win (Schwartz, D)

### CS 377I. Prototyping Interactive Systems

Students learn a principled approach to rapid prototyping techniques of interactive systems, with an emphasis on successful redesign with users and exploring alternatives within a design space. Covers the scientific and design-based foundations of participatory design. In small groups, students apply these principles in a series of hands-on exercises for finding out about users, creating rapid prototypes, and evaluating multiple design alternatives. Techniques include: critical incident interviews, interactive thread, technology probes, video brainstorming, design spaces, participatory design workshops, branching scenarios, paper and video prototyping, interaction tables, co-adaptive instruments and generative walkthroughs. While CS147 Introduction to HCI is highly recommended, there are no formal prerequisites and no programming requirements.

4 units, Win (Mackay, W)

### CS 377L. Learning in a Networked World

(Same as EDUC 298) Foundations, theories and empirical studies for interdisciplinary advances in how we conceive of the potentials and challenges associated with lifelong, lifewide and life-deep learning in a networked world given the growth of always-on cyberinfrastructure for supporting information and social networks across space and time with personal computers, netbooks, and mobiles.

3 units, not given this year

### CS 378. Phenomenological Foundations of Cognition, Language, and Computation

Critical analysis of theoretical foundations of the cognitive approach to language, thought, and computation. Contrasts of the rationalistic assumptions of current linguistics and artificial intelligence with alternatives from phenomenology, theoretical biology, critical literary theory, and socially-oriented speech act theory. Emphasis is on the relevance of theoretical orientation to the design, implementation, and impact of computer systems as it affects human-computer interaction.

3-4 units, Aut (Winograd, T)

### CS 379. Interdisciplinary Topics

Advanced material is often taught for the first time as a topics course, perhaps by a faculty member visiting from another institution. May be repeated for credit.

3 units, OCCASIONAL

### CS 379C. Computational Models of the Neocortex

In this course we explore the problem of modeling the primate cortex with an emphasis on the primary sensory areas and their related association areas, using probabilistic graphical models and modern variants of artificial neural networks. Class lectures and invited speakers will focus on the problems of biological learning, inference, and attention. Student projects will cover a range of computational models with an emphasis on classifying biological motion, coding for natural image sequences, and modeling sensory association areas spanning multiple sensory modalities. Primary sources include literature in computational and cognitive neuroscience, machine learning, and other fields that bear on how biological and engineered systems make sense of the world. Prerequisites: basic probability theory, algorithms, and statistics.

3 units, Spr (Dean, T)

### CS 379L. Designing Liberation Technology

(Same as POLISCI 337T) Small project teams work with NGOs to design new technologies for promoting development and democracy. Students conduct observations to identify needs, generate concepts, create prototypes, and test their appropriateness. Some projects may continue past the quarter toward full-scale implementation. Taught through the Hasso Plattner Institute of Design at Stanford (<http://dschool.stanford.edu>). Enrollment limited. Application required. Prerequisites: consent of instructor(s). Design Institute class; see <http://dschool.stanford.edu>.

3-4 units, Spr (Winograd, T)

### CS 390A. Curricular Practical Training

Educational opportunities in high technology research and development labs in the computing industry. Qualified computer science students engage in internship work and integrate that work

into their academic program. Students register during the quarter they are employed and complete a research report outlining their work activity, problems investigated, results, and follow-on projects they expect to perform. 390 A, B, and C may each be taken once.

1 unit, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### CS 390B. Curricular Practical Training

Educational opportunities in high technology research and development labs in the computing industry. Qualified computer science students engage in internship work and integrate that work into their academic program. Students register during the quarter they are employed and complete a research report outlining their work activity, problems investigated, results, and follow-on projects they expect to perform. 390A,B,C may each be taken once.

1 unit, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### CS 390C. Curricular Practical Training

Educational opportunities in high technology research and development labs in the computing industry. Qualified computer science students engage in internship work and integrate that work into their academic program. Students register during the quarter they are employed and complete a research report outlining their work activity, problems investigated, results, and follow-on projects they expect to perform. 390A,B,C may each be taken once.

1 unit, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### CS 393. Computer Laboratory

For CS graduate students. A substantial computer program is designed and implemented; written report required. Recommended as a preparation for dissertation research. Register using the section number associated with the instructor. Prerequisite: consent of instructor.

1-9 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### CS 395. Independent Database Project

For graduate students in Computer Science. Use of database management or file systems for a substantial application or implementation of components of database management system. Written analysis and evaluation required. Register using the section number associated with the instructor. Prerequisite: consent of instructor.

1-6 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### CS 399. Independent Project

Letter grade only.

1-9 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### CS 399P. Independent Project

Graded satisfactory/no credit.

1-9 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### CS 402. Beyond Bits and Atoms: Designing Technological Tools

(Same as EDUC 236X) Practicum in designing and building technology-enabled curricula and learning environments. Students use software toolkits and state-of-the-art fabrication machines to design educational software, educational toolkits, and tangible user interfaces. How to design low-cost technologies, particularly for urban school in the US and abroad. The constructionist learning design perspective, critical pedagogy, and the application of complexity sciences in education.

3-5 units, Spr (Blikstein, P)

### CS 402L. Beyond Bits and Atoms - Lab

(Same as EDUC 211X) This course is a hands-on lab in the prototyping and fabrication of tangible technologies, with a special focus in learning and education. We will learn how to use state-of-the-art fabrication machines (3D printers, 3D scanners, laser cutters, routers) to design educational toolkits, educational toys, science kits, and tangible user interfaces. A special focus of the course will be to design low-cost technologies, particularly for urban school in the US and abroad.

1-3 units, Win (Blikstein, P), Spr (Blikstein, P)

### CS 422. Intelligent Avatar Laboratory

In this small lab course students will implement intelligent behaviors for autonomous avatars in virtual worlds. Working either individually or in pairs, students will be given a brief tutorial on the software environment, will design a behavior for the

autonomous avatar(s), and once that is approved, will implement the behavior. The programs can control a single avatars, or orchestrate a behavior of multiple avatars. This is an experimental class and enrollment will be limited this year. Prerequisites: CS106B or X, or equivalent. Experience with virtual worlds (such as Second Life or World of Warcraft) a plus.

3 units, not given this year

#### **CS 424M. Computational Modeling in Cognitive and Social Science**

(Same as EDUC 390X) Computational modeling and data-mining are dramatically changing the physical sciences, and more recently also the social and behavioral sciences. Traditional analysis techniques are insufficient to investigate complex dynamic social phenomena as social networks, online gaming, diffusion of innovation, opinion dynamics, classroom behavior, and other complex adaptive systems. In this course, we will learn about how modeling, network theory, and basic data-mining can support research in cognitive, and social sciences, in particular around issues of learning, cognitive development, and educational policy.

3-4 units, Win (Blikstein, P)

#### **CS 424P. Extracting Social Meaning and Sentiment**

(Same as LINGUIST 287) Methods for extracting social meaning (speaker perspectives, emotions and attitudes) from text and speech. Topics include sentiment analysis and summarization, detection of deception, sarcasm, emotion, and personality. Analysis of meaning-bearing characteristics of the speaker and topic, including text, discourse, prosodic and other cues. Prerequisite: CS 124 or 221 or 229 or permission of instructors.

3 units, not given this year

#### **CS 431. High-Level Vision: Object Representation**

(Same as PSYCH 250) (Formerly CS423 High-Level Vision: Behaviors, Neurons, and Computational Models) Interdisciplinary seminar focusing on understanding how computations in the brain enable rapid and efficient object perception. Covers topics from multiple perspectives drawing on recent research in Psychology, Neuroscience, Computer Science and Applied Statistics. Emphasis on discussing recent empirical findings, methods and theoretical debates in the field. Topics include: theories of object perception, neural computations underlying invariant object perception, how visual exemplars and categories are represented in the brain, what information is present in distributed activations across neural populations and how it relates to object perception, what modern statistical and analytical tools there are for multi-variate analysis of brain activations.

1-3 units, Spr (Li, F; Grill-Spector, K)

#### **CS 442. High Productivity and Performance with Domain-specific Languages in Scala**

Introduction to developing domain specific languages (DSLs) for productivity and performance using the Scala programming language. Goal is to equip students with the knowledge and tools to develop DSLs that can dramatically improve the experience of using high performance computation in important scientific and engineering domains. Aimed at two sorts of students: domain experts who can define key domain specific language elements that capture domain knowledge, and computer scientists who can implement these DSLs using a new DSL framework in Scala. First half of the course will focus on understanding the infrastructure for implementing DSLs in Scala and developing techniques for defining good DSLs. Second half of the course will focus on example DSLs that provide both high-productivity and performance. During the second half of the course groups of students will develop and implement their own DSLs using the Delite DSL process of implementing DSLs for parallel computation. Prerequisites

3 units, Spr (Olukotun, O)

#### **CS 447. Software Design Experiences**

Small teams develop technology prototypes combining product and interaction design. Focus is on software and hardware interfaces, interaction, design aesthetics, and underpinnings of successful design including a reflective, interactive design process, group dynamics of interdisciplinary teamwork, and working with users. Prerequisite: CS 247A.

3-4 units, not given this year

#### **CS 448. Topics in Computer Graphics**

Topic changes each quarter. Recent topics: computational photography, data visualization, character animation, virtual worlds, graphics architectures, advanced rendering. See <http://graphics.stanford.edu/courses> for offerings and prerequisites. May be repeated for credit.

3-4 units, OCCASIONAL

#### **CS 448B. Data Visualization**

Techniques and algorithms for creating effective visualizations based on principles from graphic design, visual art, perceptual psychology, and cognitive science. Topics: graphical perception, data and image models, visual encoding, graph and tree layout, color, animation, interaction techniques, automated design. Lectures, reading, and project. Prerequisite: one of 147, 148, or equivalent.

3 units, Aut (Heer, J)

#### **CS 450. Introduction to Biotechnology**

Academic and industrial experts discuss latest developments in fields such as bioenergy, green process technology, the production of industrial chemicals from renewable resources, protein pharmaceutical production, industrial enzyme production, stem cell applications, medical diagnostics, and medical imaging. Discussions of biotechnology ethics, business and patenting issues, and entrepreneurship in biotechnology.

3 units, not given this year

#### **CS 468. Geometry Processing Algorithms**

Contents of this course change with each offering. Past offerings have included geometric matching, surface reconstruction, collision detection, computational topology, etc. May be repeated for credit. Fall quarter 2010/11 topic will be Geometry Processing Algorithms. Techniques for modeling and efficient processing of polygonal geometric models. Topics: data structures for polygonal models, discrete differential geometry, mesh parameterization, mesh simplification and remeshing reconstruction from point clouds, mesh editing and deformation, geometric image editing. Recommended: 164.

3 units, Spr (Ben Chen Bolocan, M)

#### **CS 476A. Music, Computing, and Design I: Software Paradigms for Computer Music**

(Same as MUSIC 256A) Software design and implementation for computer audio. Strategies, best practices, and tradeoffs in building audio software systems of various sizes (S, M, L, XL), with a focus on interactive (real-time) systems. Lectures examine high-level designs as well as dissect code in a hands-on manner. Course work includes small programming assignments and a final software project. This course is the prerequisite for MUSIC 256B. Prerequisite: experience in C/C++ and/or Java.

1-4 units, Aut (Wang, G)

#### **CS 476B. Music, Computing, Design II: Mobil Music**

(Same as MUSIC 256B) Aesthetic, design, and implementation of mobile music, centered around the modern super smartphones such as the iPhone). Similarities and intrinsic differences between mobile and traditional computing and design for music. Topics include mobile software design, social and cloud computing, mobile interface design, and programming phones, in the service of music. Prerequisite: MUSIC 256A.

1-4 units, Win (Wang, G)

#### **CS 478. Computational Photography**

(Formerly CS448A) Sensing strategies and algorithmic techniques that extend traditional digital photography, with a focus on mobile devices. Topics: high-dynamic-range imaging; coded aperture and exposure; panoramic stitching; light-field imaging; image stabilization, processing and enhancement; programmable cameras. Lectures, readings, and project. Prerequisite: 178 or equivalent.

3-4 units, Win (Staff)

#### **CS 499. Advanced Reading and Research**

For CS graduate students. Register using the section number associated with the instructor. Prerequisite: consent of instructor.

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

#### **CS 545. Database and Information Management Seminar**

Current research and industrial innovation in database and information systems.

1 unit, Win (Widom, J)

**CS 546. Seminar on Liberation Technologies**

(Same as POLISCI 337S) This one-unit seminar will present speakers relevant in a variety of ways to how various forms of information technology are being used to defend human rights, improve governance, deepen democracy, empower the poor, promote economic development, protect the environment, enhance public health, and pursue a variety of other social goods.

*1 unit, Aut (Winograd, T; Cohen, J), Win (Diamond, L; Winograd, T)*

**CS 547. Human-Computer Interaction Seminar**

Weekly speakers. May be repeated for credit.

*1 unit, Aut (Winograd, T), Win (Winograd, T), Spr (Winograd, T)*

**CS 548. Internet and Distributed Systems Seminar**

Guest speakers from academia and industry. May be repeated for credit.

*1 unit, not given this year*

**CS 571. Surgical Robotics Seminar**

Surgical robots developed and implemented clinically on varying scales. Seminar goal is to expose students from engineering, medicine, and business to guest lecturers from academia and industry. engineering and clinical aspects connected to design and use of surgical robots, varying in degree of complexity and procedural role.

*1 unit, Spr (Barbagli, F)*

**CS 801. TGR Project**

*0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**CS 802. TGR Dissertation**

*0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

## DANCE (DANCE) COURSES

### UNDERGRADUATE COURSES IN DANCE

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**DANCE 13AX. Ballet Intensive**

Rigorous daily practice that will challenge and expand students' understanding of and perspective on the art form. Focus on strengthening technique, exploring ballet as an expressive form and performing art, and developing an artistic voice.

*2 units, Aut (Elliott, K; Maffre, M)*

**DANCE 27. Faculty Choreography**

Rehearsal and performance of faculty choreography. Selection by audition and invitation. May be repeated for credit.

*1 unit, Aut (Frank, D), Win (Frank, D)*

**DANCE 28. Choreography: Color Purple**

Students in this class will participate in the choreographic process that will ultimately lead to the dance and movement vocabulary of the Drama production of the Color Purple. Taken through permission of the instructor.

*1 unit, Win (Hayes, A)*

**DANCE 30. Chocolate Heads Dance and Performance Workshop**

Students in the Chocolate Heads Workshop will participate in the construction of a new dance-driven and musical performance work drawn from performance styles and various contemporary dances from around the world. Dancers, musicians and performance artists from diverse backgrounds (Social dance-current styles, Western Classical, West African, Musical Theater, other contemporary forms) will collaborate with the director to create an original work. Students will gain compositional and performance training. May be repeated for credit.

*1 unit, Aut (Hayes, A)*

**DANCE 43. Liquid Flow: Introduction to Dance and Movement**

Body expression, articulation, and anatomical basics through Contemporary Dance technique and other somatic practices such as tai chi and yoga. Emphasis is on development of awareness of the body in space and organic fluidity of motion. Exploration of improvisation and creativity. May be repeated for credit

*1 unit, Aut (Hayes, A)*

**DANCE 46. Social Dances of North America I**

Introduction to the partner dances found in American popular culture: waltz, swing, tango, club two step, cha cha, merengue, and salsa. May be repeated for credit. (AU)

*1 unit, Aut (Powers, R), Win (Powers, R), Spr (Powers, R)*

**DANCE 48. Beginning Ballet**

Fundamentals of ballet technique including posture, placement, the foundation steps, and ballet terms; emphasis on the development of coordination, balance, flexibility, sense of lines, and sensitivity to rhythm and music. May be repeated for credit.

*1 unit, not given this year*

**DANCE 51. Congolese Dance**

(Same as AFRICAST 51, AFRICAAM 51) Movements and choreography from Central Africa. Elements unique to all African dance movement: body isolation, polyrhythmic movement, and body posture. Live drumming. Open to all levels of dancers.

*1 unit, alternate years, not given this year*

**DANCE 56. Ballet Repertory**

Live collaboration with choreographer during bi-weekly rehearsals focusing on the creation of a new dance to be performed during the Spring Dance Division performance series and to be integrated in the Dance Division repertory. The course is designed to engage students in developing adaptability of technique, and artistic voice.

*1 unit, not given this year*

**DANCE 57. Dance Repertory: Anna Sokolow**

Anna Sokolow's Rooms In conjunction with a traveling photographic exhibit on Master Choreographer Anna Sokolow -- on display at Stanford Hillel Winter Quarter -- the Dance Division will re-stage four sections of Anna Sokolow's signature dance masterpiece Rooms. The work will be set by guest artist Lorrie May, the head of the Sokolow Foundation and a leading interpreter of Sokolow's choreography. May will be assisted in rehearsal by Diane Frank. Students perform the work of visiting artist with faculty supervision. Audition or invitation. May be repeated for credit.

*1 unit, Win (Frank, D)*

**DANCE 58. Beginning Hip Hop**

Steps and styling in one of America's 21st-century vernacular dance forms. May be repeated for credit.

*1 unit, Aut (Reddick, R)*

**DANCE 59. Intermediate-Advanced Hip-Hop**

Steps and styling in one of America's 21st-century vernacular dance forms. May be repeated for credit.

*1 unit, Aut (Reddick, R)*

**DANCE 60. The Evolution of Hip Hop and the Dance Stage: From Broadway to Hollywood and MTV**

The repertory of Hip Hop history through steps and choreography. May be repeated for credit.

*1 unit, not given this year*

**DANCE 63. Beginning Contemporary and Beginning Dance Making**

This course offers beginning study in technique, placement, principles and musical approach current in contemporary dance as well as basic instruction in dance makings. Time will be split evenly on each area of instruction.

*1 unit, Win (Moses, R)*

**DANCE 69. The Athletic Body in Dance**

Aesthetics to conditioning, this course provides instruction in the fundamentals of the goal-oriented body in artistic practice. Emphasis will be placed on using sports movement as a base for training in dance.

*1 unit, Aut (Moses, R)*

**DANCE 100. Student Choreography: Studio to Stage**

Student choreography developed under close faculty guidance, leading to performance. Requirement for students working towards performance on major Division concerts. May be repeated for credit.

*1 unit, not given this year*

**DANCE 103. Dance, Text and Gesture**

Workshop geared for dance, spoken word and dramatic performers who want to explore and gain facility with written and spoken word text in relation to various modes of choreographic

development and gestural vocabulary. Students will also both create original compositions and draw from existing texts, as well as participate in guest workshops by Bay Area Spoken Word artists. May be repeated for credit. All levels welcome.

*1 unit, Win (Hayes, A)*

**DANCE 105. Contemporary Afro Styles and Dancemaking**

Studio class with live percussion and electronic accompaniment, which studies traditional to current African diaspora dances. This course also looks at contemporary African American artistic expression and the aesthetic sensibility that is rendered through cultural activities such as: current social dances, marching bands, street style and motion, step shows, vocal styles. . All levels welcome May be repeated for credit

*2 units, Aut (Hayes, A)*

**DANCE 108. Hip Hop Meets Broadway**

What happens when Hip Hop meets Fosse, Aida, Dream Girls and In the Heights? The most amazing collaboration of Hip Hop styles adapted to some of the most memorable Broadway Productions. This class will explore the realm between Hip Hop Dance and the Broadway Stage. Infusing Acting thru dance movement and exploring the Art of Lip Sync thru Hip Hop Dance styles.

*1 unit, Spr (Reddick, R)*

**DANCE 120. Hip Hop/Pop Fusion and Urban Dance:**

**Choreography**

This class will focus on defining, developing, and exploring stylistic elements in the many variations of Hip Hop and Urban Dance Styles. Visiting Hip Hop professionals will perform.

*1 unit, not given this year*

**DANCE 121. The Day Before Hip Hop: Lecture and Technique**

Lecture and technique study of Hip hop dance (street dance) technique and Hip-hop dance history prior to the existence of the umbrella term “Hip-hop”. Fundamental history of various street dance styles which may or may not fall under the umbrella term of Hip hop; technical foundation rooted in an Afro-centric approach to movement that is dynamic, fluid and rhythmically diverse in space.

*1 unit, not given this year*

**DANCE 131. Beginning/Intermediate Ballet**

Structured studio practice reviewing the basics of ballet technique including posture, placement, the foundation steps and ballet terms, and progressing to more complex positions and combination of steps. Emphasis is placed on improving forms, developing coordination and connectivity, securing balance, increasing strength, flexibility, sense of lines, and sensitivity to rhythm and music.

*1 unit, Aut (Elliott, K), Win (Maffre, M), Spr (Elliott, K)*

**DANCE 133. History of the Waltz**

From Vienna in 1800. Redowa and mazurka, waltz variations, the 20th-century hesitation waltz, Parisian valse musette, and 30s Boston and waltz swing. Studio technique with performance practice for stage. May be repeated for credit two times.

*1 unit, Win (Powers, R)*

**DANCE 138. Mind in Motion: Knowledge Creation Through Dance Practice and Design Thinking**

Dance technique and movement fundamentals drawn from Liquid Flow. Looking at the body as the source of design, students will also look at concepts and principles drawn from design and engineering through a tactile, kinetic and kinesthetic lens. Improvisation and creative composition throughout the course.

*1 unit, Win (Hayes, A)*

**DANCE 140. Intermediate Modern Dance**

Intermediate technique. Improvisation and composition in directed studies. May be repeated for credit.

*1 unit, Spr (Frank, D)*

**DANCE 141. Advanced Modern Dance**

Advanced dance technique. Complex movement combinations intended to build skills necessary to meet performance demands of contemporary concert dance. Studio work supplemented by professional concert attendance, readings, and participation in culminating informal showing. Intermediate/advanced skill level or permission of instructor required. May be repeated for credit.

*2 units, Aut (Frank, D), Win (Frank, D), Spr (Moses, R)*

**DANCE 144. Intermediate Modern Jazz Dance**

Practical skills of intermediate technique will focus on elements of contemporary jazz dance. Los Angeles, Broadway, and video dance styles will be covered. Studio work will focus on phrasing, endurance, technical proficiency, and musicality. Course includes viewing of a professional live performance. May be repeated for credit.

*1 unit, not given this year*

**DANCE 146. Social Dances of North America II**

Intermediate survey of dances in American popular culture: Lindy hop, Viennese waltz, cross-step waltz, foxtrot, and hustle. May be repeated for credit. Prerequisite: Dance 46 or equivalent.

*1 unit, Aut (Powers, R), Spr (Powers, R)*

**DANCE 149. Advanced Ballet**

Continuation of 148. Development of professional level ballet technique with increased complexity of forms and combination of steps. Emphasis is on classical and contemporary ballet technique. Open to men and women. Optional pointe work. May be repeated for credit.

*2 units, Aut (Elliott, K), Win (Elliott, K), Spr (Maffre, M)*

**DANCE 151. Dance and Theater and Music Workshop: New Shows**

New Shows: students in this course will work collaboratively to create a new artistic work. Emphasis will be placed on dance: s relationship to dialogue and music. This course will provide students with a basic understanding of the development, creation and staging of original performance pieces.

*1 unit, Aut (Moses, R)*

**DANCE 152. Dance and the Visual Arts: A New Public Dialogue**

A New Public Dialogue consists of a series of project-based classes that aim to engage students through seminars and labs. This quarter, the labs will be directly related to the development and implementation of two dance-based installations at the Cantor Arts Center exploring Rodin's fascination with the dancing body, and will involve workshops with eminent local dance artist Alonzo King. The seminars will include focused inquiries into the meaning of the body in public spaces, theories of perception and the correlations between performance and society, and will incorporate related reading, guest lectures, video documentaries, and writing assignments.

*1 unit, Aut (Maffre, M)*

**DANCE 156. Social Dances of North America III**

Advanced survey of the partner dances found in American popular culture: waltz, redowa, Bohemian National Polka, tango, cha cha, salsa, samba. May be repeated for credit. Prerequisite: Dance 46 or equivalent experience.

*1 unit, Win (Powers, R)*

**DANCE 160. Dance and History: From Postwar to Postmodernism**

(Same as DRAMA 160, DRAMA 260) The cultural and historical unfolding of the genre of contemporary performance known as postmodern dance over the past six decades. Dance history used to trace the effects of visual art and movement experimentalists as they have teamed up since the first decades of the 20th century, redrawing the boundaries of live art and dance performance. GER:DB-Hum, EC-Gender

*4 units, not given this year*

**DANCE 162H. Baroque Modernities: Dance, Theater, Film, Political Theory**

(Same as DRAMA 162H) What do seventeenth-century choreography and dramaturgy contribute to (mean to) choreographic and theatrical modernity? How can we explain the recurrent baroque phenomenon across the twentieth century -- becoming particularly prominent in the 1980s -- beyond the historicist accounts of theatrical reconstruction? How does the baroque locate itself within cultural modernity? This seminar asks this question of choreography at several junctures: The analysis of seventeenth century baroque spectacle that fashioned dance and theatre into political tools of monarchical sovereignty; Twentieth-century literature on the Baroque that destabilizes received notions of subjectivity and political sovereignty; Twentieth-century choreography and film that deploys baroque figures and techniques. Thus, our material shall range from seventeenth-

century dance and theater to contemporary dance, film and literature.

4 units, Win (Staff)

#### **DANCE 190. Special Research**

Topics related to the discipline of dance. May be repeated for credit.

1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

#### **DANCE 191. Independent Research**

Individual supervision of off-campus internship. Prerequisite: consent of instructor.

1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

#### **DANCE 197. Dance in Prisons: The Arts, Juvenile Justice, and Rehabilitation in America**

Participatory seminar. The nexus of art, community, and social action, using dance to study how the performing arts affect self-construction, perception and experiences of embodiment, and social control for incarcerated teenagers in Santa Clara Juvenile Hall. Service Learning Course (certified by Haas Center). GER:DB-Hum, EC-AmerCul

4 units, not given this year

### **GRADUATE COURSES IN DANCE**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

#### **DANCE 290. Special Research**

Individual project on the work of any choreographer, period, genre, or dance-related topic. May be repeated for credit.

1-18 units, Aut (Staff), Win (Ross, J), Spr (Staff), Sum (Staff)

## DEMOCRACY, DEVELOPMENT, AND THE RULE OF LAW (DDRL) COURSES

### **UNDERGRADUATE COURSES IN DEMOCRACY, DEVELOPMENT, AND THE RULE OF LAW**

Primarily for undergraduates; graduate students may enroll with consent of adviser.

#### **DDRL 189. Honors Research Methods for Democracy, Development, and the Rule of Law**

This course is for all CDDRL Senior Honors Students in the 2011-12 class

3 units, Spr (Stoner-Weiss, K)

#### **DDRL 190. Interschool Honors Program on Democracy, Development, and the Rule of Law**

Students from different schools meet in a year-long seminar to discuss, analyze, and conduct research on issues pertaining to Democracy, Development, and the Rule of Law (DDRL). This will combine research methods and policy evaluations in preparation for an honors thesis to be submitted by each student. All students must submit a thesis to receive a grade for this course.

3 units, Aut (Stoner-Weiss, K), Win (Stoner-Weiss, K)

## DERMATOLOGY (DERM) COURSES

### **UNDERGRADUATE COURSES IN DERMATOLOGY**

Primarily for undergraduates; graduate students may enroll with consent of adviser.

#### **DERM 199. Undergraduate Research**

Allows for qualified students to undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### **GRADUATE COURSES IN DERMATOLOGY**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

#### **DERM 370. Medical Scholars Research**

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

4-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

#### **DERM 399. Graduate Research**

Allows for qualified students to undertake investigations sponsored by individual faculty members. Opportunities are available in dermatopathology, histochemistry, electron microscopy, biochemistry, tissue culture, quantitative and qualitative evaluation of peripheral vascular disease and sweating, immunofluorescent microscopy, connective tissue molecular biology, and wound healing. Prerequisite: consent of instructor.

1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

## DEVELOPMENTAL BIOLOGY (DBIO) COURSES

### **UNDERGRADUATE COURSES IN DEVELOPMENTAL BIOLOGY**

Primarily for undergraduates; graduate students may enroll with consent of adviser.

#### **DBIO 11N. Human Development: Egg to Embryo**

Considers aspects of the developmental biology of human eggs and the first three weeks of human development. Topics include activation of sperm and eggs during the fertilization process, sperm motility and chemotaxis, cell recognition and immuno-contraception, onset of embryonic transcription, control of cell division, ethical and biological limitations to cloning, and the early establishment of pattern in the human embryo. Social and ethical concerns regarding infertility and the use of human pre-embryos in research are also considered. Readings include current review articles from medical and biological literature. Prerequisite: Advanced-placement Biology. GER: DB-NatSci

3 units, alternate years, not given this year

#### **DBIO 12Q. The Evolution and Development of the Human Hand**

Evolution of the human hand in the context of primate evolution; roles of the human hand in tool use, manufacture, art, music, and communication. Development of the hand: embryonic axes, appearance of the digit program, roles of cell death, molecular bases of normal and abnormal hand patterns. Prerequisite: advanced placement biology.

3-4 units, not given this year

#### **DBIO 156. Human Developmental Biology and Medicine**

(Same as HUMBIO 156A) The biological, medical, and social aspects of normal and abnormal human development. Topics: in vitro fertilization and embryo transfer; gene and cell therapy; gametogenesis; pattern formation in the nervous system and limb development; gene and grand multiple pregnancies; prematurity, in utero effects of teratogens; sex determination and differentiation; growth control; gigantism and dwarfism; neural tube defects; cardiac morphogenesis; progress in the developmental biology of humans. Limited enrollment. Prerequisites: Human Biology or Biology core, or consent of instructor.

3-4 units, NEXTYEAR

#### **DBIO 199. Undergraduate Research**

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)



## GRADUATE COURSES IN DEVELOPMENTAL BIOLOGY

Primarily for graduate students; undergraduates may enroll with consent of instructor.

### DBIO 201. Development and Disease Mechanisms

Mechanisms that direct human development from conception to birth. Conserved molecular and cellular pathways regulate tissue and organ development; errors in these pathways result in congenital anomalies and human diseases. Topics: molecules regulating development, cell induction, developmental gene regulation, cell migration, programmed cell death, pattern formation, stem cells, cell lineage, and development of major organ systems. Emphasis on links between development and clinically significant topics including infertility, assisted reproductive technologies, contraception, prenatal diagnosis, multiparity, teratogenesis, inherited birth defects, fetal therapy, adolescence, cancer, and aging.

4 units, Aut (Porzig, E; Kingsley, D; Kim, S; Scott, M)

### DBIO 202. Assisted Reproductive Technologies

(Same as OBGYN 202, HUMBIO 150A) Primary and current literature in basic and clinical science aspects of assisted reproductive technologies (ART), and demonstrations of current ART techniques including in vitro fertilization and embryo culture, and micromanipulation procedures such as intracytoplasmic sperm injection and embryo biopsy and cryopreservation. Class only may be taken for 1 unit. 2 units includes papers and attendance at clinical demonstrations. 3 units includes a term paper. Recommended: DBIO 201, or consent of instructors.

1-3 units, Win (Staff)

### DBIO 203. Advanced Genetics

(Same as BIO 203, GENE 203) For graduate students in Bioscience programs; may be appropriate for graduate students in other programs. Focused on application of the genetics toolbox to problems in modern biology research. Topics covered include analytic methods, genetic manipulation, genome analysis, and human genetics. Lectures and faculty-led discussion sections with evaluation of papers. Students with minimal experience in genetics should prepare by working out problems in college level textbooks.

4 units, Aut (Stearns, T; Bustamante, C; Fire, A; Sidow, A)

### DBIO 210. Developmental Biology

Current areas of research in developmental biology. How organismic complexity is generated during embryonic and post-embryonic development. The roles of genetic networks, induction events, cell lineage, maternal inheritance, cell-cell communication, and hormonal control in developmental processes in well-studied organisms such as vertebrates, insects, and nematodes. Team-taught. Students meet with faculty to discuss current papers from the literature. Prerequisite: graduate standing, consent of instructor. Recommended: familiarity with basic techniques and experimental rationales of molecular biology, biochemistry, and genetics.

5 units, Spr (Staff)

### DBIO 215. Frontiers in Biological Research

(Same as BIOC 215, GENE 215) Literature discussion in conjunction with the Frontiers in Biological Research seminar series in which investigators present current work. Students and faculty meet beforehand to discuss papers from the speaker's primary research literature. Students meet with the speaker after the seminar to discuss their research and future direction, commonly used techniques to study problems in biology, and comparison between the genetic and biochemical approaches in biological research.

1 unit, Aut (Harbury, P; Villeneuve, A; Calos, M), Win (Harbury, P; Villeneuve, A; Calos, M)

### DBIO 221. Current Issues in Aging

(Same as GENE 221) Current research literature on genetic mechanisms of aging in animals and human beings. Topics include: mitochondria mutations, insulin-like signaling, sirtuins, aging in flies and worms, stem cells, human progeria, and centenarian studies. Prerequisite: GENE 203.

2 units, Spr (Staff), alternate years, not given next year

### DBIO 257. The Biology of Stem Cells

(Same as HUMBIO 157) The role of stem cells in human

development and potential for treating disease. Guest lectures by biologists, ethicists, and legal scholars. Prerequisites: 2A,B, or consent of instructor.

3 units, not given this year

### DBIO 273A. A Computational Tour of the Human Genome

(Same as BIOMEDIN 273A, CS 273A) Introduction to computational biology through an informatic exploration of the human genome. Topics include: genome sequencing (technologies, assembly, personalized sequencing); functional landscape (genes, gene regulation, repeats, RNA genes, epigenetics); genome evolution (comparative genomics, ultraconservation, co-option). Additional topics may include population genetics, personalized genomics, and ancient DNA. Course includes primers on molecular biology, the UCSC Genome Browser, and text processing languages. Guest lectures from genomic researchers. No prerequisites. See <http://cs273a.stanford.edu/>.

3 units, Aut (Batzoglou, S; Bejerano, G)

### DBIO 299. Directed Reading in Developmental Biology

Prerequisite: consent of instructor.

1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### DBIO 370. Medical Scholars Research

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

4-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### DBIO 399. Graduate Research

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### DBIO 802. TGR Dissertation

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

## DIVISION OF LITERATURES, CULTURES, AND LANGUAGES (DLCL) COURSES

### UNDERGRADUATE COURSES IN DIVISION OF LITERATURES, CULTURES, AND LANGUAGES

Primarily for undergraduates; graduate students may enroll with consent of adviser.

#### DLCL 99. Multimedia Course Lab

Designed to supplement the literature curriculum of existing undergraduate courses in DLCL departments in which a multimedia component may benefit collaborative or individual research projects. Taken for credit at the discretion of the instructor or the departmental literature course.

1 unit, Aut (Chandler, Z), Win (Chandler, Z), Spr (Chandler, Z)

#### DLCL 151. Monster Mothers and Critical Relations

(Same as DLCL 251) An inquiry into the principal modalities of the maternal figure as constructed in representative European, Asian, and American texts, including those of Euripedes, Balzac, Fontane, James, Tanizaki, Garcia Lorca, and Bazin. Such canonical literary works will be read with methodical attention to the relationship between primary texts and given analytical frameworks in Barthes, Benjamin, Freud, Kristeva, and Said, incorporating strategies of research.

3-5 units, not given this year

#### DLCL 189. Honors Thesis Seminar

For undergraduate majors in DLCL departments; required for honors students. Planning, researching, and writing an honors thesis. Oral presentations and peer workshops. Research and writing methodologies, and larger critical issues in literary studies.

5 units, Aut (Hoyos, H)



## GRADUATE COURSES IN DIVISION OF LITERATURES, CULTURES, AND LANGUAGES

Primarily for graduate students; undergraduates may enroll with consent of instructor.

### DLCL 200. Teaching of Second Language Literatures

Focus is on literacy development in a second language, emphasizing literary texts, and assessing the learners' second-language linguistic level and requisite background knowledge with regard to particular literary texts. Instructional strategies and feedback techniques for written and oral work.

3 units, Aut (Bernhardt, E)

### DLCL 201. The Learning and Teaching of Second Languages

Learning perspective rather than traditional teaching methods. Focus is on instructional decision making within the context of student intellectual and linguistic development in university settings to different populations. Readings in second-language acquisition. Might be repeatable for credit.

3 units, Spr (Bernhardt, E)

### DLCL 220. Humanities Education

Humanities Education explores issues concerning teaching and learning in the humanities, including research on student learning, innovation in pedagogy, the role of new technologies in humanities instruction, and professional issues for humanities teachers at all educational levels.

1 unit, Aut (Staff), Win (Berman, R), Spr (Berman, R)

### DLCL 221. Performance

The Performance Group brings together diverse departments within the DLCL with other disciplines, such as Drama, to achieve a cross-pollination: to reinvigorate performance theory through our own consciously re-mediated research interests, methodologies, and forms of scholarly expression. Drawn to topics involving space, temporality, and embodiment, we still want to do things with words.

1 unit, Aut (Staff), Win (Greenleaf, M; Phelan, P), Spr (Greenleaf, M; Phelan, P; Erman, I)

### DLCL 222. Philosophy and Literature

The Focal Group in Philosophy and Literature brings together scholars and students from eight departments to investigate questions in aesthetics and literary theory, philosophically-inflected literary texts, and the form of philosophical writings. Fields of interest include both continental and analytic philosophy, as well as cognitive science, political philosophy, rational choice theory, and related fields.

1 unit, Aut (Staff), Win (Landy, J; Anderson, L), Spr (Landy, J; Anderson, L)

### DLCL 223. Renaissances

The Renaissances Group brings together faculty members and students from over a dozen departments at Stanford to consider the present and future of early modern studies (provisionally framed as a period spanning the fourteenth through the seventeenth centuries) within the humanities. Taking seriously the plural form of the group's name, we seek to explore the early modern period from the widest range of disciplinary, cultural, linguistic, and geographical perspectives possible.

1 unit, Aut (Staff), Win (Alduy, C; Greene, R; Barletta, V; Springer, C), Spr (Greene, R; Springer, C; Barletta, V; Alduy, C)

### DLCL 224. Workshop in Poetics

The Workshop in Poetics is concerned with the theoretical and practical dimensions of the reading and criticism of poetry. During the three years of its existence, the Workshop has become a central venue at Stanford enabling participants to share their individual projects in a general conversation outside of disciplinary and national confinements. The two dimensions that the workshop sees as urgent are: poetics in its specificity as an arena for theory and interpretive practice, and historical poetics as a particular set of challenges for the reader and scholar.

1 unit, Aut (Staff), Win (Greene, R), Spr (Greene, R)

### DLCL 251. Monster Mothers and Critical Relations

(Same as DLCL 151) An inquiry into the principal modalities of the maternal figure as constructed in representative European,

Asian, and American texts, including those of Euripedes, Balzac, Fontane, James, Tanizaki, Garcia Lorca, and Bazin. Such canonical literary works will be read with methodical attention to the relationship between primary texts and given analytical frameworks in Barthes, Benjamin, Freud, Kristeva, and Said, incorporating strategies of research.

3-5 units, not given this year

### DLCL 308. Comparative Literature Colloquium

Participants discuss and critique work presented by graduate students and faculty in the DLCL. Work may include conference or seminar papers, thesis chapters, or works-in-progress. Feedback focuses on writing and argumentation, and more general responses to the subject matter. Meetings open to the public. May be repeated for credit.

1-2 units, Aut (Staff), Win (Palumbo-Liu, D), Spr (Palumbo-Liu, D)

### DLCL 309. Teaching of Literature

Prepares graduate students in DLCL departments to teach literature at the undergraduate level. Topics include: the opportunities and problems of transposing a research project into a feasible course; the logic of syllabi and reading lists; the structuring of a course from week to week; and other matters relevant to first-time teachers of literature. Supervised by the graduate affairs committee of the DLCL. May be repeated for credit.

1-2 units, Win (Edelstein, D)

### DLCL 310. The Development of a Dissertation from Prospectus to Defense

Meets regularly throughout the year to advise and support dissertation-level students as they prepare a prospectus, begin writing, submit chapters, and complete their projects. Focus of the workshop shifts from term to term as appropriate to the participants. Supervised by the graduate affairs committee of the DLCL. May be repeated for credit.

1-2 units, Win (Staff)

### DLCL 311. Professional Workshop

Meets regularly throughout the year to discuss issues in the professional study of literature. Topics include the academic job market and the challenges of research and teaching at different types of institutions. Supervised by the graduate affairs committee of the DLCL. May be repeated for credit.

1-2 units, Aut (Staff)

### DLCL 349. LITERARY THEORY

(Same as COMPLIT 349, SLAVLIT 349, ILAC 349) Advanced survey course of key schools in literary theory, from formalism onwards. Emphasis is on the discussion of primary sources. Topics include structuralism, ideology critique, psychoanalysis, reception aesthetics, deconstruction, feminism, and post-colonialism. Readings by Barthes, Bakhtin, Benjamin, Borges, Derrida, de Man, Foucault, Freud, Iser, Lacan, Shklovsky, and Spivak, among others.

3-5 units, Aut (Hoyos, H; Skakov, N)

### DLCL 349. LITERARY THEORY

(Same as COMPLIT 349, SLAVLIT 349, ILAC 349) Advanced survey course of key schools in literary theory, from formalism onwards. Emphasis is on the discussion of primary sources. Topics include structuralism, ideology critique, psychoanalysis, reception aesthetics, deconstruction, feminism, and post-colonialism. Readings by Barthes, Bakhtin, Benjamin, Borges, Derrida, de Man, Foucault, Freud, Iser, Lacan, Shklovsky, and Spivak, among others.

3-5 units, Aut (Staff)

## DRAMA (DRAMA) COURSES

### UNDERGRADUATE COURSES IN DRAMA

Primarily for undergraduates; graduate students may enroll with consent of adviser.

#### DRAMA 10AX. Acting Intensive: Theatre and Beyond, Into the World of Film

Introduction to the craft of acting for film and reinforcement of basic concepts for the experienced student. Skill-building in the areas of acting, movement, voice, and speech, utilizing material

from the film and theater. In-depth work on technique, utilization of action, specificity of language, personalization, emotional truth, character, and given circumstance. Blocking of scenes live performance and video recording of performances. Final performance of the two scenes in a showcase afternoon.

2 units, Aut (Kostopoulos, K)

**DRAMA 10N. Arts and Ideas: 20th Century Art in Conflict**

(F,Sem) Stanford Introductory Seminar. The second quarter of Art & Ideas builds on the examples of Modernism students in Arts and Ideas studied in the first quarter. The Frosh Seminar *20th-Century Art in Conflict*, will focus on drama and film that experiments with new possibilities of form, shaping the direction of later artistic practice. We will trace how the political and aesthetic concerns of the 20th century reflect and exploit new technologies, both in theater and film, altering the position and function of author, actor, director, and audience. GER:IHUM-3

4 units, Spr (Rehm, R)

**DRAMA 11AX. Set Design**

How ideas in fine art, architecture, and installation inform the practice of theatre set design. Traditional techniques of stage scenery design, basic drafting and model making guide the process of designing a set for an opera or play in this hands-on workshop.

2 units, not given this year

**DRAMA 11N. Dramatic Tensions: Theater and the Marketplace**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Tension between artistic and commercial forces in modern theater; the conflicted state of the art form. Sources include major and emerging contemporary figures in commercial, fringe, and nonprofit theater in the U.S. and UK. Visits with writers, directors, and dramaturges. GER:DB-Hum

4 units, Win (Freed, A)

**DRAMA 12AX. Sketch Comedy and Improvisation**

Explore improvisation and sketch comedy in an intensive ensemble and create an original show. Pure improvisational theater techniques. Concepts covered include spontaneity, shared control, creative collaboration, narrative, and status. Students apply those skills to writing and staging scripted monologues, two-handers, and ensemble sketches. Students create an original show with the entire class.

2 units, not given this year

**DRAMA 12N. Antigone: From Ancient Democracy to Contemporary Dissent**

(F,Sem) (Same as CLASSGEN 6N) Stanford Introductory Seminar. Preference to freshmen. Tensions inherent in the democracy of ancient Athens; how the character of Antigone emerges in later drama, film, and political thought as a figure of resistance against illegitimate authority; and her relevance to contemporary struggles for women's and workers' rights and national liberation. Readings and screenings include versions of *Antigone* by Sophocles, Anouilh, Brecht, Fugard/Kani/Ntshona, Paulin, Glowacki, Gurney, and von Trotta. GER:DB-Hum, EC-Gender

4 units, Aut (Rehm, R; Miller, D)

**DRAMA 12SC. Playwriting Lab: The Art of Dramatic Writing**

Workshop. Each student develops an original script which is presented in theater by the other students. How to develop, expand, and condition the creative mind. Topics including dramatic action, text and subtext, characterization, language, and style. Students function as a theatrical collective where each has the opportunity to participate in reading and serving the vision of each student-author.

2 units, not given this year

**DRAMA 13N. Law and Drama**

(F,Sem) Stanford Introductory Seminar. Preference to Freshmen. Beyond the obvious traits that make a good (court room) drama, theater and jurisprudence have much more in common. Just as drama is engaged not only in entertainment but also in examination of social conventions and mechanisms, so law is not only concerned with dispensing justice but with shaping and maintaining a viable human community. In this class we will read and discuss a series of plays in which court proceedings are at the center of dramatic action and concluding with an investigation of the new genre of documentary drama.

4 units, Aut (Jakovljevic, B)

**DRAMA 17N. Latino/Latina Performance in the United States** (F,Sem) (Same as CHICANST 160N, CSRE 160N) Stanford Introductory Seminar. Preference to freshmen. This course will introduce works by U.S. Latino and Latina performance artists producing from the margins of the mainstream Euro-American theater world. We will examine how performance art serves as a kind of dramatized political forum for Latino/a artists, producing some of the most transgressive explorations of queer and national/ethnic identities in the U.S. today. By the course's conclusion, each student will create and perform in a staged reading of an original performance piece. GER:DB-Hum, EC-AmerCul

3 units, Win (Moraga, C)

**DRAMA 20. Acting for Non-Majors**

(Same as DRAMA 124D) A class designed for all interested students. Creative play, ensemble work in a supportive environment. Designed for the student to experience a range of new creative skills, from group improvisation to partner work. Introductory work on freeing the natural voice and physical relaxation. Emphasis on rediscovering imaginative and creative impulses. Movement improvisation, listening exercises, and theater games release the energy, playfulness and willingness to take risks that is the essence of free and powerful performance. Course culminates with work on dramatic text.

1-3 units, Aut (Kostopoulos, K), Win (Kostopoulos, K), Spr (Kostopoulos, K), Sum (Staff)

**DRAMA 22. Scene Work**

For actors who complete substantial scene work with graduate directors in the graduate workshop.

1-2 units, Aut (Staff), Win (Staff), Spr (Staff)

**DRAMA 25N. Science-in-Theatre: A New Genre?**

(S,Sem) (Same as CHEM 25Q) Stanford Introductory Seminar. Preference to sophomores. How scientists acquire their rules, mores, and idiosyncrasies through a form of intellectual osmosis in a mentor-disciple relationship. Scientists represented as Franksteins or nerds, rather than normal. Why more intellectually challenging plays have appeared on the Anglo-American theatre scene where scientific behavior and even science are presented accurately. Students engage in a playwriting experiment.

3 units, Win (Djerassi, C)

**DRAMA 28. Makeup for the Stage**

Techniques of make-up application and design for the actor and artist including corrective, age, character, and fantasy. Emphasis placed on utilizing make-up for development of character by the actor. Limited enrollment.

2 units, Aut (Strayer, C)

**DRAMA 29. Theater Performance: Acting**

Students cast in department productions receive credit for their participation as actors; 1-2 units for graduate directing workshop projects and 1-3 units for major productions (units determined by instructor). May be repeated for credit. Prerequisite: consent of instructor.

1-3 units, Aut (Staff), Win (Staff), Spr (Staff)

**DRAMA 30. How Theater is Designed**

Team-taught. An introduction to theatrical set, costume and lighting design. Emphasis on balancing practical skill with conceptual ideas for live stage performance. Hands-on projects.

4 units, Aut (Gambatese, E; Ramsaur, M; Strayer, C)

**DRAMA 31. Introduction to Lighting and Production**

How light contributes to the creation of mood and atmosphere and different kinds of visibility in theatrical storytelling. The use of controllable qualities of light including color, brightness, angle, and movement in the theatrical process of creative scenography. Hands-on laboratory time.

4 units, Win (Ramsaur, M)

**DRAMA 32F. History of Costume and Fashion from 1500 to the Present**

The evolution of fashion and costume with an emphasis on the relationship between social, cultural, and political events and clothing style. Attention to major designers and creators and their shaping of resultant fashion and artistry in clothing.

4 units, Win (Strayer, C)

**DRAMA 34. Stage Management Techniques**

The production process, duties, and responsibilities of a stage manager. Skills needed to stage manage a production.

2 units, Aut (Apperson, L)

**DRAMA 34S. Fundamentals of Sound in Performance: Theory and Technique**

This course offers students a basis for producing audio for a variety of live performance genres, particularly theater and dance. In its workshop component, students will build technical skills, including audio sourcing and manipulation, show control, and signal chain management. The theoretical components of the course emphasize the unique demands of audio for live performance. Connections to sound installation and interactive sound design, including video games, are also emphasized. No prior experience with audio technology is necessary

4 units, Aut (St. Clair, M)

**DRAMA 39. Theatre Crew**

Under faculty guidance, working backstage on Drama Department productions. Open to any student interested in gaining back stage experience. Night and weekend time required.

1-3 units, Aut (Apperson, L; Ramsaur, M), Win (Apperson, L; Ramsaur, M), Spr (Apperson, L; Ramsaur, M), Sum (Staff)

**DRAMA 39D. Theater Performance: Prosser Stage Management**

For students stage managing a Department of Drama Senior Project or Assistant Stage managing a Department Drama production

2-4 units, Aut (Staff), Win (Staff), Spr (Staff)

**DRAMA 101H. How Theater Thinks: Introduction to Theater and Performance**

Gateway course for majors and students considering the Drama major. Theater practices and techniques such as space, actor, language, props, and composition: what is unique about them and how they address the spectator. Sources include plays and theoretical texts.

3-5 units, Win (Menon, J)

**DRAMA 101P. How Practice Practices**

(Same as DRAMA 341) This course will investigate practice in the context of theater, dance, performance and interdisciplinary work. We will consider the totality of the human experience as it applies to building a practice. Participants will be challenged to engage more fully in their everyday activities as well as to design their activities to respond to their artistic aspirations. Through class exercises, discussions, readings and assignments, as well as learning about the activities of other practitioners, participants will be challenged to build practices that are personally rigorous, socially grounded and aesthetically daring.

4 units, Spr (Carlson, A)

**DRAMA 103. Beginning Improvising**

The improvisational theater techniques that teach spontaneity, cooperation, team building, and rapid problem solving, emphasizing common sense, attention to reality, and helping your partner. Based on TheatreSports by Keith Johnstone. Readings, papers, and attendance at performances of improvisational theater. Limited enrollment.

3 units, Aut (Klein, D), Win (Klein, D)

**DRAMA 105V. Improv & Design**

Improv & Design is a wildly practical class exploring the intersection of Improvisational Theater & Design Thinking. The class is for: Improvisers who want to practice using their skills in other domains. Improvisers who want to learn about design thinking. Designers who want to deepen their core skills in collaboration, creativity, empathy, acting and rich scenario prototyping. Undergraduates who want to check out the d.school. Graduates who want to practice with a diverse group. You are guaranteed to learn 10 useful things! (We do not guarantee everyone will learn the same 10 things!). Design Institute class; see <http://dschool.stanford.edu>.

2 units, Spr (Klein, D)

**DRAMA 107. Creating Theater for Children**

This class is for current members of the Flying Treehouse, a children's theater ensemble that leads creative writing workshops

for elementary school students, then performs sketches based on the young author's writings. Topics include theater education, lesson planning, performing for children and producing community-based theater.

4 units, Win (Klein, D)

**DRAMA 110. Poetics, Culture, and Geopolitics: Performing Power**

(Same as CSRE 99) Poet/performer Mark Gonzales of the Human Writes Project leads a course that examines the relationship between traditional forms of power and the power of performance. Students will analyze the text of body and bureaucracy that is performed on the stage of the globe. Through this analysis students will engage in critical reflection of how performance creates spaces to move beyond the dialectic of oppression and dominance. At culmination, students will create their own text, through body, visuals, or multi-media, to share the summary of their ideas at a campus wide symposium. GER:DB-Hum

4 units, Aut (Staff)

**DRAMA 120A. Fundamentals of Acting**

A substantive introduction to the basics of the craft of acting, this course gives all incoming students the foundation of a common vocabulary. Students will learn fundamental elements of dramatic analysis, and how to apply it in action. Topics include scene analysis, environment work, psychological and physical scoring, and development of a sound and serviceable rehearsal technique. Scene work will be chosen from accessible, contemporary, and realistic plays. Outside rehearsal time required.

1-3 units, Aut (Kostopoulos, K), Win (Freed, A)

**DRAMA 120B. Fundamentals of Acting**

Learn how to expand character work, beyond what is immediately familiar. Continuing basic practices from the first part of the sequence, in this quarter they will look beyond the strictly contemporary, and may begin to approach roles drawn from more challenging dramatic texts. This might include plays chosen from mid-century American classics, World Theater, or other works with specific historic or cultural requirements. Actors begin to learn how a performing artist researches and how that research can be used to enrich and deepen performance. Prerequisite: 120A or consent of instructor.

1-3 units, Spr (Kostopoulos, K)

**DRAMA 120D. Studio Performance**

Rehearsal and development of a studio performance project for an end of quarter presentation. Emphasis is on development of acting skills with minimal technical support. Material chosen from classic plays, American realism, world theater, or created group ensemble pieces.

1-5 units, not given this year

**DRAMA 120V. Vocal Production and Audition**

(Same as DRAMA 210V) An introductory study of the vocal mechanism and the development of voice and articulation for the stage. Students will be introduced to the actor's tools of phonetics, verbal action and text analysis. Vocal technique will then be applied to the actor's process in preparation for audition. Actors will fully participate in the audition process, from beginning to end. Emphasis will be on relaxation, selection of appropriate material, and versatility to show contrast and range.

1-3 units, Win (Kostopoulos, K)

**DRAMA 121P. Acting: Period and Style**

Expanding the acting range through heightened language. Scenes from non-contemporary dramatic literature including texts from Shakespeare, Shaw, Turgenev, Ibsen, and Strindberg.

3 units, Spr (Staff)

**DRAMA 121S. Acting Shakespeare Project**

Work on a shortened Shakespeare play leading to a studio performance project. Skills in understanding and performing Shakespeare, conducted as series of rehearsals, and culminating in group performance. Development of voice, movement, and speaking skills necessary for classical theater work. Prerequisites: DRAMA120A,B, or consent of instructor.

3 units, Aut (Bihl, J)

**DRAMA 124D. Acting for Non-Majors**

(Same as DRAMA 20) A class designed for all interested students. Creative play, ensemble work in a supportive environment. Designed for the student to experience a range of new creative

skills, from group improvisation to partner work. Introductory work on freeing the natural voice and physical relaxation. Emphasis on rediscovering imaginative and creative impulses. Movement improvisation, listening exercises, and theater games release the energy, playfulness and willingness to take risks that is the essence of free and powerful performance. Course culminates with work on dramatic text.

*1-3 units, Aut (Kostopoulos, K), Win (Kostopoulos, K), Spr (Kostopoulos, K), Sum (Staff)*

#### **DRAMA 132. Costume Design**

Process of designing costumes for the stage, covering script analysis, rendering techniques, character development and conceptual ideas. Project related work with smaller, pertinent exercises. Prerequisite: 30 or consent of instructor.

*4 units, Spr (Strayer, C)*

#### **DRAMA 133. Stage Scenery Design**

Craft and Theory of stage scenery design including visual research, spatial organization, basic drafting, sketching and model-building. Prerequisite: 30, or consent of instructor.

*3-4 units, Win (Gambatese, E)*

#### **DRAMA 134. Stage Management Project**

For students stage managing a Department of Drama production.

*2-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

#### **DRAMA 137. Hand Drafting for Designers**

Fundamentals of hand-drafting. Standard drawing conventions; the use of line weight, color, composition, and graphic style. Creation of construction documents for real-world applications. May be repeated for credit.

*3 units, Spr (Gambatese, E)*

#### **DRAMA 138. DIGITAL PROJECTION**

This course will cover the fundamentals of creating digital projections for a theatrical production starting with the basics of computer and projector setups and progressing through the creation of both static and moving projection using the software tools of Isadora, Photoshop, and Aftereffects.

*4 units, Spr (Staff)*

#### **DRAMA 140. Projects in Theatrical Production**

An independent study course for students performing significant production work on Drama Department or other Stanford University student theatre projects. Students serving as producers, directors or designers who wish mentorship and credit for their production work sign up for this course and contact the Michael Ramsaur, Director of Production, at [mrasm@stanford.edu](mailto:mrasm@stanford.edu) Prerequisite: consent of instructor.

*1-4 units, Aut (Staff), Win (Staff), Spr (Staff)*

#### **DRAMA 142P. ANIMALS AND PERFORMANCE**

(Same as DRAMA 342) Using the template of Ann Carlson's 1988 series, *Animals*, students will be exposed to working with live animals in performance, the perils and potential. Learning specific works from Carlson's performance series and building their own works with animals, this course interrogates the setting of live performance as a site for attention and new meaning between human and animal species. The course will address issues of interspecies communication, animals behavior, the use of language, and the history of human relationships with domesticated animals.

*4 units, Win (Carlson, A)*

#### **DRAMA 143P. Stillness In Action: The Body Out of Time**

(Same as DRAMA 343P) This course will investigate stillness as a performative event. We will look at the still body as its own method of inquiry, as a scholarly consideration and as a tool for understanding time, motion, activity and culture. Stillness in Action; the body out of time will begin with questions: What is the difference between no movement and stillness? What is the history of stillness with respect to artistic process? What is the impact of stillness on the performer and spectator? What other disciplines utilize ideas and practices of stillness and to what ends? The course will be a combination of laboratory and discussion, reading and workshop with the intent to practice and interrogate stillness in art and life.

*4 units, Aut (Carlson, A)*

#### **DRAMA 151T. Great Books: Dramatic Traditions**

(Same as DRAMA 351) The most influential and enduring texts in

the dramatic canon from Sophocles to Shakespeare, Chekhov to Soyinka. Their historical and geopolitical contexts. Questions about the power dynamics involved in the formation of canons.

*3-5 units, Spr (Menon, J)*

#### **DRAMA 152H. Markets, Movements and Macaroni**

(Same as DRAMA 352H) Come hungry to learn! This course looks at how food and performance converge in contemporary cultural studies. We will study the politics and poetics of food as it transforms us and the environments (indeed the worlds) in which we live. From feminist artists use of food (such as macaroni) in performance, to the circulation of food in economic markets to the ways in which food moves through us, we will learn to think about the myriad meanings of food in and through performance. The course features trips in the field and varied experiences as appropriate to the subject matter. Selected texts: Jonathan Foer's *Eating Animals*, Nao Bustamante's *Idig/urrito*, Yayoi Kusama's installations and Julie Dash's *Daughters of the Dust*.

*4 units, Spr (Staff)*

#### **DRAMA 155H. A study of Thornton Wilder's play Our Town**

(Same as DRAMA 355) This course will be mainly devoted to a close analysis of Thornton Wilder's major play, *Our Town*. The play will be considered in its literary, political, aesthetical and sociological dimension. The work on *Our Town* should be seen as a complement of the staging taking place during the same academic quarter. However, students do not need to be enrolled in the production to take this class.

*5 units, Aut (Apostolides, J)*

#### **DRAMA 156T. Africa in the African American Imaginary: Black Drama in the United States from 1950 to the Present**

(Same as AFRICAAM 156T) What role has imagining Africa played in the construction of an African American identity? How do playwrights stage Afrocentric politics? We shall interrogate the intellectual questions that come to bear at the juncture where Africa meets African America and discuss themes that include Christianity, exploitation, gender relations, and more. By the end of the quarter students will have a critical understanding of how playwrights interwove politics and ideologies that articulated African/African American relationships.

*4 units, Spr (Mbowe, A)*

#### **DRAMA 159H. Creating Comedy, Performing Identity**

(Same as CSRE 159H) This course examines how comedy has been utilized as a performance structure to negotiate issues of personal and group identity, including race, gender and sexuality. We will range from Shakespeare to Richard Pryor, covering stage comedy, solo performance, stand-up comedy, and sitcom. GER:DB-Hum

*4 units, Aut (Daube, M)*

#### **DRAMA 160. Dance and History: From Postwar to Postmodernism**

(Same as DANCE 160, DRAMA 260) The cultural and historical unfolding of the genre of contemporary performance known as postmodern dance over the past six decades. Dance history used to trace the effects of visual art and movement experimentalists as they have teamed up since the first decades of the 20th century, redrawing the boundaries of live art and dance performance. GER:DB-Hum, EC-Gender

*4 units, not given this year*

#### **DRAMA 162. Performance and the Text**

(Same as DRAMA 262) Formal elements in Greek, Elizabethan, Noh, Restoration, romantic, realistic, and contemporary world drama; how they intersect with the history of performance styles, character, and notions of action. Emphasis is on how performance and media intervene to reproduce, historicize, or criticize the history of drama. GER:DB-Hum

*5 units, not given this year*

#### **DRAMA 162H. Baroque Modernities: Dance, Theater, Film, Political Theory**

(Same as DANCE 162H) What do seventeenth-century choreography and dramaturgy contribute to (mean to) choreographic and theatrical modernity? How can we explain the recurrent baroque phenomenon across the twentieth century -- becoming particularly prominent in the 1980s -- beyond the historicist accounts of theatrical reconstruction? How does the baroque locate itself within cultural modernity? This seminar asks

this question of choreography at several junctures: The analysis of seventeenth century baroque spectacle that fashioned dance and theatre into political tools of monarchical sovereignty; Twentieth-century literature on the Baroque that destabilizes received notions of subjectivity and political sovereignty; Twentieth-century choreography and film that deploys baroque figures and techniques. Thus, our material shall range from seventeenth-century dance and theater to contemporary dance, film and literature.

*4 units, Win (Staff)*

**DRAMA 163S. Post Black Drama in the Age of Obama**

(Same as AFRICAAM 163S, AMSTUD 163S, CSRE 163S, DRAMA 363S) This course will examine works of the new millennium that confront questions of African American experience. These plays are written by African American and non-black writers. In analyzing these works, this course will investigate such questions as: In a time that has been called 'Post Race' or 'Post Soul' or even 'Post Black,' what can we discern about African American drama? How do these plays reflect or contradict such labeling? How do these works speak to our times? Who does the form relate to in matters of content in these works? What do these works tell us about the contemporary constructions and meanings of blackness? GER:DB-Hum

*5 units, Win (Elam, H)*

**DRAMA 164. Performance and Gender**

(Same as DRAMA 364H) The intersectionality of race, sex, gender, and class in the formation of gendered performance. Readings from the work of Judith Butler, Eve Sedgwick, David Savran, Judith Halberstam, and David Eng. Case studies include: M. Butterfly, The Crying Game, Paris is Burning, Angels in America, and American Idol.. GER:DB-Hum

*3-5 units, Spr (Menon, J)*

**DRAMA 165R. Theater and Memory**

(Same as CLASSGEN 165R) The course explores the extraordinary ways memory works in the theater and in film. Have you ever left a performance wondering, How did the actor learn all those lines? But that's only the beginning. When Hamlet promises that \* will As long as Memory holds a seat / In this distracted Globe, he refers not only to his own powers of memory, but also links his troubled psyche to Shakespeare's own theater (the Globe), suggesting the interplay between memory and the theater audience. Even in a film like The Social Network, memory plays an important role. At the end, the founder of Facebook logs onto his own invention to find the girl he insulted and lost as a freshman, a billionaire haunted by the memory of a human connection he yearns to recover.

*3-5 units, Sum (Staff)*

**DRAMA 166H. Historiography of Theater**

(Same as DRAMA 304) Goal is to design an undergraduate theater history class. Standard theater history textbooks, alternative models of theater history scholarship, and critical literature engaging historiography in general.

*3-5 units, Spr (Rayner, A)*

**DRAMA 167T. INTERPRETATION AND THEORY**

(Same as DRAMA 367, FRENGEN 268) This course will present majors French authors whose work have help to create Literary and Drama Theory in America. Among the authors we will devote a special interest to the work of Roland Barthes, Jacques Derrida, Jacques Lacan, Luce Irigaray, Gilles Deleuze, Julia Kristeva, Jacques Rancière and Alain Badiou. Paralellism between the interpretation of drama and the interpretation of painting will constitute the core of this course.

*5 units, Aut (Apostolides, J)*

**DRAMA 168H. Art and Life: The Second Avant Garde**

(Same as DRAMA 268H) Experiments in the second half of the 20th century that produced new genres such as happenings and performance art, and theoretical debates that attempted to reformulate relations between art forms and their changed role in society. How these fundamentals of performance were challenged and reshaped. WIM Course GER:DB-Hum

*3-5 units, Win (Jakovljevic, B)*

**DRAMA 168T. Biology and Biography in Performance and Art**

(Same as DRAMA 368) This course explores the connections

between biology and biography in performance and art through practice-based research and readings in contemporary art and science. The course combines seminar discussions of art practices and scientific research with devising techniques in the studio. Students will generate original material using the senses, automatic writing and body memory and can work in any format (live performance, visual art or film) toward their final creative piece. Assessment is equally weighted between critical and creative work.

*4 units, Aut (Hill, L; Paris, H)*

**DRAMA 169T. Performance, History, and Memory: The Jasper Ridge Project**

(Same as DRAMA 369T) The course will invite participants into the collision of history, preservation, memory and performance in the contemporary moment. Working in dialogue with Ann Carlson's proposed project for Jasper Ridge, we will utilize the strategy of re-staging archival photos in the tradition of tableau vivant to investigate an institution's history of itself as expressed in it's photographic archive. We will consider how that history choreographs the body, acts on student's, faculty and staff's daily performances of themselves, as well as how the archive functions in the present.

*4 units, Aut (Carlson, A)*

**DRAMA 170B. Directing Workshop: The Actor-Director Dialogue**

(Same as DRAMA 372) This course focuses on the actor-director dialogue. We will work with actors and directors developing approaches to collaboration that make the actor-director dialogue in theater.

*5 units, Aut (Rehm, R; Miller, D)*

**DRAMA 171. Performance Making: Process**

(Same as DRAMA 371) A studio course focused on creative processes and generating original material. Students will be encouraged to think critically about the relationship between form and content exploring the possibilities of site specific, gallery and theatre settings. Students will reflect throughout on the types of contact and communication uniquely possible in the live moment, such as interaction or the engagement of the senses. The emphasis is on weekly experimentation in the creation of short works rather than on a final production.

*5 units, Spr (Hill, L; Paris, H)*

**DRAMA 174A. PERFORMANCE MAKING: PRODUCTION**

(Same as DRAMA 374A) A structured, creative environment for students working toward the realization of Senior Projects and 2nd year graduate productions. Instructors will work with students to develop the relationships between the content and the form of their productions using critical and creative tools to develop and reflect on the work. There will be a staged class showing at the end of the quarter followed by critiques designed to help students as they begin preparing for their final public performances (beyond the class).

*5 units, Aut (Hill, L; Paris, H)*

**DRAMA 176H. Black Women Playwrights, 1900-the present**

(Same as AFRICAAM 176H, DRAMA 336, FEMST 140W) From the rave reviews garnered by Angelina Weld Grimke's lynching play, Rachel to recent work by Lynn Nottage on Rwanda, black women playwrights have addressed key issues in modern culture and politics. We will analyze and perform work written by black women in the U.S., Britain and the Caribbean in the 20th and 21st centuries. Topics include: sexuality, surrealism, colonialism, freedom, violence, colorism, love, history, community and more. Playwrights include: Angelina Grimke, Lorriane Hansberry, Winsome Pinnock, Adrienne Kennedy, Suzan- Lori Parks, Ntzoke Shange, Pearl Cleage, Sarah Jones, Anna DeVeare Smith, Alice Childress, Lydia Diamond and Zora Neale Hurston.

*4 units, Aut (Brody, J)*

**DRAMA 177. Writing for Performance: The Fundamentals**

(Same as CSRE 177, DRAMA 277) Course introduces students to the basic elements of playwriting and creative experimentation for the stage. Topics include: character development, conflict and plot construction, staging and setting, and play structure. Script analysis of works by contemporary playwrights may include: Marsha Norman, Patrick Shanley, August Wilson, Suzan-Lori Parks, Paula Vogel, Octavio Solis and others. Table readings of one-act length

work required by quarter's end. GER:DB-Hum  
5 units, Win (Moraga, C)

**DRAMA 178. Page to Stage: Playwriting and Solo Performance**

(Same as DRAMA 278) Dramatic writing: scripted and solo, and as performed by actors or by the playwright. Physical and psychological theatrical action. Development of skills in dialogue, story structure, style, and personal voice. Script readings and directed staging sessions.

3-5 units, Spr (Freed, A)

**DRAMA 178B. Intensive Playwriting Workshop**

(Same as DRAMA 278B) Intermediate level study of fundamentals of playwriting through an intensive play development process. Course emphasizes visual scripting for the stage and play revision. Script analysis of works by contemporary playwrights may include: Suzan-Lori Parks, Tony Kushner, Adrienne Kennedy, Edward Albee, Maria Irene Fornes and others. Table readings of full length work required by quarter's end.

5 units, Spr (Staff)

**DRAMA 179F. Flor y Canto: Poetry Workshop**

(Same as CSRE 179F, DRAMA 279F) Poetry reading and writing. The poet as philosopher and the poet as revolutionary. Texts: the philosophical meditations of pre-Columbian Aztec poetry known as flor y canto, and reflections on the poetry of resistance born out of the nationalist and feminist struggles of Latin America and Aztlán. Required 20-page poetry manuscript. GER:DB-Hum

3-5 units, Spr (Moraga, C)

**DRAMA 179G. Indigenous Identity in Diaspora: People of Color Art Practice in North America**

(Same as CSRE 179G, CSRE 279G, DRAMA 279G) This gateway core course to the IDA emphasis in CSRE offers a 21st century examination of people of color aesthetics and related politics, drawing from contemporary works (literature, music, visual and performing arts) in conversation with their native (especially American Indigenous and African) origins. Issues of gender and sexuality in relation to cultural identity are also integral to this study. Students will be required to produce a final work, integrating critical writing with a creative project.

3-5 units, not given this year

**DRAMA 180Q. Noam Chomsky: The Drama of Resistance**

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Chomsky's ideas and work which challenge the political and economic paradigms governing the U.S. Topics include his model for linguistics; cold war U.S. involvements in S.E. Asia, the Middle East, Central and S. America, the Caribbean, and Indonesia and E. Timor; the media, terrorism, ideology, and culture; student and popular movements; and the role of resistance. GER:DB-Hum

4 units, Aut (Rehm, R; Miller, D)

**DRAMA 190. Special Research**

Individual project on the work of a playwright, period, or genre. Prerequisite: consent of instructor.

1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**DRAMA 191. Independent Study**

Individual supervision of off-campus internship. Prerequisite: consent of instructor.

1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**DRAMA 200. Senior Project**

See Undergraduate Programs for description. (Staff)

2-9 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**DRAMA 201A. Honors Colloquium**

See Undergraduate Programs for description.

1 unit, Aut (Jakovljevic, B), Win (Jakovljevic, B), Spr (Jakovljevic, B), Sum (Staff)

**DRAMA 201B. Honors Colloquium**

See Undergraduate Programs for description.

1 unit, Aut (Jakovljevic, B), Win (Jakovljevic, B), Spr (Jakovljevic, B), Sum (Staff)

**DRAMA 201C. Honors Colloquium**

See Undergraduate Programs for description.

1 unit, Aut (Jakovljevic, B), Win (Jakovljevic, B), Spr (Jakovljevic, B), Sum (Staff)

**DRAMA 201D. Honors Colloquium**

See Undergraduate Programs for description.

1 unit, Aut (Jakovljevic, B), Win (Jakovljevic, B), Spr (Jakovljevic, B), Sum (Staff)

**DRAMA 202. Honors Thesis**

See Undergraduate Programs for description. May be repeated for credit. (Staff)

2-9 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**DRAMA 203. Advanced Improvisation**

Further development of improvisational skills.

3 units, Aut (Klein, D)

**DRAMA 210V. Vocal Production and Audition**

(Same as DRAMA 120V) An introductory study of the vocal mechanism and the development of voice and articulation for the stage. Students will be introduced to the actor's tools of phonetics, verbal action and text analysis. Vocal technique will then be applied to the actor's process in preparation for audition. Actors will fully participate in the audition process, from beginning to end. Emphasis will be on relaxation, selection of appropriate material, and versatility to show contrast and range.

1-3 units, Win (Kostopoulos, K)

**DRAMA 213. Stanford Improv Ensemble**

By audition only, for members of the improvisation troupe. Special project work. Prerequisite: 103.

1-2 units, Aut (Klein, D), Win (Klein, D), Spr (Klein, D)

**DRAMA 231. Advanced Stage Lighting Design**

Individually structured class in lighting mechanics and design through experimentation, discussions, and written reports. Prerequisite: 131 or consent of instructor.

1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**DRAMA 232. Advanced Costume Design**

Individually structured tutorial for costume designers. May be repeated for credit. Prerequisite: 132 or consent of instructor.

1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**DRAMA 233. Advanced Scene Design**

Individually structured workshop. May be repeated for credit. Prerequisite: 133 or consent of instructor.

1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**DRAMA 234. Advanced Stage Management Project**

For students stage managing a Department of Drama production. Prerequisite: 134.

2-9 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**GRADUATE COURSES IN DRAMA**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**DRAMA 260. Dance and History: From Postwar to Postmodernism**

(Same as DANCE 160, DRAMA 160) The cultural and historical unfolding of the genre of contemporary performance known as postmodern dance over the past six decades. Dance history used to trace the effects of visual art and movement experimentalists as they have teamed up since the first decades of the 20th century, redrawing the boundaries of live art and dance performance.

4 units, not given this year

**DRAMA 262. Performance and the Text**

(Same as DRAMA 162) Formal elements in Greek, Elizabethan, Noh, Restoration, romantic, realistic, and contemporary world drama; how they intersect with the history of performance styles, character, and notions of action. Emphasis is on how performance and media intervene to reproduce, historicize, or criticize the history of drama.

5 units, not given this year

**DRAMA 268H. Art and Life: The Second Avant Garde**

(Same as DRAMA 168H) Experiments in the second half of the 20th century that produced new genres such as happenings and performance art, and theoretical debates that attempted to reformulate relations between art forms and their changed role in society. How these fundamentals of performance were challenged and reshaped. WIM Course

3-5 units, Win (Jakovljevic, B)

**DRAMA 277. Writing for Performance: The Fundamentals**

(Same as CSRE 177, DRAMA 177) Course introduces students to the basic elements of playwriting and creative experimentation for the stage. Topics include: character development, conflict and plot construction, staging and setting, and play structure. Script analysis of works by contemporary playwrights may include: Marsha Norman, Patrick Shanley, August Wilson, Suzan-Lori Parks, Paula Vogel, Octavio Solis and others. Table readings of one-act length work required by quarter's end.

5 units, Win (Moraga, C)

**DRAMA 278. Page to Stage: Playwriting and Solo Performance**

(Same as DRAMA 178) Dramatic writing: scripted and solo, and as performed by actors or by the playwright. Physical and psychological theatrical action. Development of skills in dialogue, story structure, style, and personal voice. Script readings and directed staging sessions.

3-5 units, Spr (Freed, A)

**DRAMA 278B. Intensive Playwriting Workshop**

(Same as DRAMA 178B) Intermediate level study of fundamentals of playwriting through an intensive play development process. Course emphasizes visual scripting for the stage and play revision. Script analysis of works by contemporary playwrights may include: Suzan-Lori Parks, Tony Kushner, Adrienne Kennedy, Edward Albee, Maria Irene Fornes and others. Table readings of full length work required by quarter's end.

5 units, Spr (Staff)

**DRAMA 279F. Flor y Canto: Poetry Workshop**

(Same as CSRE 179F, DRAMA 179F) Poetry reading and writing. The poet as philosopher and the poet as revolutionary. Texts: the philosophical meditations of pre-Columbian Aztec poetry known as flor y canto, and reflections on the poetry of resistance born out of the nationalist and feminist struggles of Latin America and Aztlán. Required 20-page poetry manuscript.

3-5 units, Spr (Moraga, C)

**DRAMA 279G. Indigenous Identity in Diaspora: People of Color Art Practice in North America**

(Same as CSRE 179G, CSRE 279G, DRAMA 179G) This gateway core course to the IDA emphasis in CSRE offers a 21st century examination of people of color aesthetics and related politics, drawing from contemporary works (literature, music, visual and performing arts) in conversation with their native (especially American Indigenous and African) origins. Issues of gender and sexuality in relation to cultural identity are also integral to this study. Students will be required to produce a final work, integrating critical writing with a creative project.

3-5 units, not given this year

**DRAMA 290. Special Research**

Individual project on the work of a playwright, period, or genre.

1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**DRAMA 300A. Critical Styles I**

Literary criticism and theory, emphasizing style as evidence of historical, cultural, and ideological concerns. Assumptions about written texts by authors such as Coleridge, Bradley, and Burke. How style reveals context. Students write in the style of authors discussed.

5 units, Aut (Jakovljevic, B)

**DRAMA 300B. Critical Styles II**

This seminar follows on from Critical Styles I in which students were grounded in the rigors of critical writing. In this sequel seminar, the emphasis will be on the overtones and undertones of critical thought in performance making and performance analysis. Students will generate weekly critical and creative responses to readings from contemporary writers and artists such as Jacques Rancière, Amelia Jones, Guillermo Gómez-Peña and Marina Abramovic. Workshop activities and performances will take place alongside seminar discussions of readings.

5 units, Win (Paris, H; Hill, L; Preston, V)

**DRAMA 301. Performance and Performativity**

Performance theory through topics including: affect/trauma, embodiment, empathy, theatricality/performativity, specularity/visibility, liveness/disappearance, belonging/abjection, and utopias and dystopias. Readings from Schechner, Phelan, Austin, Butler, Conquergood, Roach, Schneider, Silverman,

Caruth, Fanon, Moten, Anzaldúa, Agamben, Freud, and Lacan. May be repeated for credit.

5 units, Win (Menon, J)

**DRAMA 304. Historiography of Theater**

(Same as DRAMA 166H) Goal is to design an undergraduate theater history class. Standard theater history textbooks, alternative models of theater history scholarship, and critical literature engaging historiography in general.

3-5 units, Spr (Rayner, A)

**DRAMA 316V. Metaphysics and the Mise-en-scene**

Theoretical paradigms of avant garde practices past and present.

5 units, Spr (Jakovljevic, B)

**DRAMA 335H. Methods in Interdisciplinary Studies**

This course introduces interdisciplinary methods in/for Performance Studies. Specifically, we will examine how the concept of performance interacts with dance, music, film, visual art, subjectivity and the everyday. We will investigate the ways in which performance can be understood as intermedial (to use Rebecca Schneider's term). Readings will range widely--from the classical to the contemporary. Texts may include works by Bill T. Jones, Susan Foster, Joseph Roach, J.L. Austin, Kobena Mercer, Kristine Stiles, Peggy Phelan, Stuart Hall, Adrian Piper, Split Britches, Paul Connor, Dwight Conquergood, Isaac Julien and more. This course is only open to Graduate Students.

4 units, Win (Brody, J)

**DRAMA 336. Black Women Playwrights, 1900-the present**

(Same as AFRICAAM 176H, DRAMA 176H, FEMST 140W) From the rave reviews garnered by Angelina Weld Grimke's lynching play, *Rachel* to recent work by Lynn Nottage on Rwanda, black women playwrights have addressed key issues in modern culture and politics. We will analyze and perform work written by black women in the U.S., Britain and the Caribbean in the 20th and 21st centuries. Topics include: sexuality, surrealism, colonialism, freedom, violence, colorism, love, history, community and more. Playwrights include: Angelina Grimke, Lorraine Hansberry, Winsome Pinnock, Adrienne Kennedy, Suzan-Lori Parks, Ntzoke Shange, Pearl Cleage, Sarah Jones, Anna DeVeare Smith, Alice Childress, Lydia Diamond and Zora Neale Hurston.

4 units, Aut (Brody, J)

**DRAMA 341. How Practice Practices**

(Same as DRAMA 101P) This course will investigate practice in the context of theater, dance, performance and interdisciplinary work. We will consider the totality of the human experience as it applies to building a practice. Participants will be challenged to engage more fully in their everyday activities as well as to design their activities to respond to their artistic aspirations. Through class exercises, discussions, readings and assignments, as well as learning about the activities of other practitioners, participants will be challenged to build practices that are personally rigorous, socially grounded and aesthetically daring.

4 units, Spr (Carlson, A)

**DRAMA 342. ANIMALS AND PERFORMANCE**

(Same as DRAMA 142P) Using the template of Ann Carlson's 1988 series, *Animals*, students will be exposed to working with live animals in performance, the perils and potential. Learning specific works from Carlson's performance series and building their own works with animals, this course interrogates the setting of live performance as a site for attention and new meaning between human and animal species. The course will address issues of interspecies communication, animals behavior, the use of language, and the history of human relationships with domesticated animals.

4 units, Win (Carlson, A)

**DRAMA 343P. Stillness In Action: The Body Out of Time**

(Same as DRAMA 143P) This course will investigate stillness as a performative event. We will look at the still body as its own method of inquiry, as a scholarly consideration and as a tool for understanding time, motion, activity and culture. Stillness in Action; the body out of time will begin with questions: What is the difference between no movement and stillness? What is the history of stillness with respect to artistic process? What is the impact of stillness on the performer and spectator? What other disciplines utilize ideas and practices of stillness and to what ends? The course will be a combination of laboratory and discussion, reading and



workshop with the intent to practice and interrogate stillness in art and life.

4 units, Aut (Carlson, A)

**DRAMA 351. Great Books: Dramatic Traditions**

(Same as DRAMA 151T) The most influential and enduring texts in the dramatic canon from Sophocles to Shakespeare, Chekhov to Soyinka. Their historical and geopolitical contexts. Questions about the power dynamics involved in the formation of canons.

3-5 units, Spr (Menon, J)

**DRAMA 352H. Markets, Movements and Macaroni**

(Same as DRAMA 152H) Come hungry to learn! This course looks at how food and performance converge in contemporary cultural studies. We will study the politics and poetics of food as it transforms us and the environments (indeed the worlds) in which we live. From feminist artists use of food (such as macaroni) in performance, to the circulation of food in economic markets to the ways in which food moves through us, we will learn to think about the myriad meanings of food in and through performance. The course features trips in the field and varied experiences as appropriate to the subject matter. Selected texts: Jonathan Foer's *Eating Animals*, Nao Bustamante's *Idig/urrito*, Yayoi Kusama's installations and Julie Dash's *Daughters of the Dust*.

4 units, Spr (Staff)

**DRAMA 355. A study of Thornton Wilder's play *Our Town***

(Same as DRAMA 155H) This course will be mainly devoted to a close analysis of Thornton Wilder's major play, *Our Town*. The play will be considered in its literary, political, aesthetic and sociological dimension. The work on *Our Town* should be seen as a complement of the staging taking place during the same academic quarter. However, students do not need to be enrolled in the production to take this class.

5 units, Aut (Apostolides, J)

**DRAMA 363S. Post Black Drama in the Age of Obama**

(Same as AFRICAAM 163S, AMSTUD 163S, CSRE 163S, DRAMA 163S) This course will examine works of the new millennium that confront questions of African American experience. These plays are written by African American and non-black writers. In analyzing these works, this course will investigate such questions as: In a time that has been called 'Post Race' or 'Post Soul' or even 'Post Black,' what can we discern about African American drama? How do these plays reflect or contradict such labeling? How do these works speak to our times? Who does the form relate to in matters of content in these works? What do these works tell us about the contemporary constructions and meanings of blackness?

5 units, Win (Elam, H)

**DRAMA 364H. Performance and Gender**

(Same as DRAMA 164) The intersectionality of race, sex, gender, and class in the formation of gendered performance. Readings from the work of Judith Butler, Eve Sedgwick, David Savran, Judith Halberstam, and David Eng. Case studies include: *M. Butterfly*, *The Crying Game*, *Paris is Burning*, *Angels in America*, and *American Idol*.

3-5 units, Spr (Menon, J)

**DRAMA 367. INTERPRETATION AND THEORY**

(Same as DRAMA 167T, FRENGEN 268) This course will present majors French authors whose work have help to create Literary and Drama Theory in America. Among the authors we will devote a special interest to the work of Roland Barthes, Jacques Derrida, Jacques Lacan, Luce Irigaray, Gilles Deleuze, Julia Kristeva, Jacques Rancière and Alain Badiou. Paralellism between the interpretation of drama and the interpretation of painting will constitute the core of this course.

5 units, Aut (Apostolides, J)

**DRAMA 368. Biology and Biography in Performance and Art**

(Same as DRAMA 168T) This course explores the connections between biology and biography in performance and art through practice-based research and readings in contemporary art and science. The course combines seminar discussions of art practices and scientific research with devising techniques in the studio. Students will generate original material using the senses, automatic writing and body memory and can work in any format (live performance, visual art or film) toward their final creative piece. Assessment is equally weighted between critical and creative

work.

4 units, Aut (Hill, L; Paris, H)

**DRAMA 369T. Performance, History, and Memory: The Jasper Ridge Project**

(Same as DRAMA 169T) The course will invite participants into the collision of history, preservation, memory and performance in the contemporary moment. Working in dialogue with Ann Carlson's proposed project for Jasper Ridge, we will utilize the strategy of re-staging archival photos in the tradition of *tableau vivant* to investigate an institution's history of itself as expressed in its photographic archive. We will consider how that history choreographs the body, acts on student's, faculty and staff's daily performances of themselves, as well as how the archive functions in the present.

4 units, Aut (Carlson, A)

**DRAMA 371. Performance Making: Process**

(Same as DRAMA 171) A studio course focused on creative processes and generating original material. Students will be encouraged to think critically about the relationship between form and content exploring the possibilities of site specific, gallery and theatre settings. Students will reflect throughout on the types of contact and communication uniquely possible in the live moment, such as interaction or the engagement of the senses. The emphasis is on weekly experimentation in the creation of short works rather than on a final production.

5 units, Spr (Hill, L; Paris, H)

**DRAMA 372. Directing Workshop: The Actor-Director Dialogue**

(Same as DRAMA 170B) This course focuses on the actor-director dialogue. We will work with actors and directors developing approaches to collaboration that make the actor-director dialogue in theater.

5 units, Aut (Rehm, R; Miller, D)

**DRAMA 374A. PERFORMANCE MAKING: PRODUCTION**

(Same as DRAMA 174A) A structured, creative environment for students working toward the realization of Senior Projects and 2nd year graduate productions. Instructors will work with students to develop the relationships between the content and the form of their productions using critical and creative tools to develop and reflect on the work. There will be a staged class showing at the end of the quarter followed by critiques designed to help students as they begin preparing for their final public performances (beyond the class).

5 units, Aut (Hill, L; Paris, H)

**DRAMA 374B. Projects in Directing**

Creative projects to be determined in consultation with Drama graduate faculty and production advisor

3-5 units, Aut (Staff), Win (Staff), Spr (Hill, L; Paris, H; Carlson, A), Sum (Staff)

**DRAMA 375. Main Stage Production**

Production of a full-length play as part of the Department of Drama season. Public performance.

3-5 units, Aut (Staff), Win (Hayes, A; Moraga, C), Spr (Hill, L; Ramsaur, M), Sum (Staff)

**DRAMA 377. Graduate Directors' Staged Reading Project**

Presentation of a new or newly adapted work for the stage, in a mode employed in professional theater for the development of new plays. Two to four rehearsals. Public performance.

2 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**DRAMA 390. Directed Reading**

(Staff) Students may take directing reading only with the permission of their dissertation advisor. Might be repeatable for credit twice for 6 units total.

1-6 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**DRAMA 399. Dissertation Research**

(Staff)

1-9 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**DRAMA 801. TGR Project**

(Staff)

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**DRAMA 802. TGR Dissertation**

(Staff)

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)



# EARTH SYSTEMS (EARTHSYS) COURSES

## UNDERGRADUATE COURSES IN EARTH SYSTEMS

Primarily for undergraduates; graduate students may enroll with consent of adviser.

### **EARTHSYS 2. Earth System History**

(Same as EESS 2) The evolution of Earth's systems from formation to the present. Couplings and relationships among biosphere, lithosphere, hydrosphere, and atmosphere. Topics include the evolution of life, origin of the oceans, atmosphere and continents, and changes in climate. Modern climate change and anthropogenic effects. GER: DB-NatSci

*3 units, Win (Chamberlain, P)*

### **EARTHSYS 4. Evolution and Extinction: Introduction to Historical Geology**

(Same as GES 4) Introduction to the basic tools and principles geologists and paleontologists use to reconstruct the history of the Earth. Principles of stratigraphy, correlation, the geological timescale, the history of biodiversity, and the interpretation of fossils. The use of data from sedimentary geology, geochemistry, and paleontology to test theories for critical events in Earth history such as mass extinctions. Two half-day field trips. GER: DB-NatSci

*4 units, Win (Payne, J)*

### **EARTHSYS 5. Ecology for Everyone**

(Same as BIO 5) Basics of ecology, from gut bacteria to global climate change. We will link processes at several scales to connect individual behavior, population growth, species interactions and ecosystem function. Combining classroom and field experience, we will see how basic hypothesis testing provides a way to learn about the world by considering the ecology of familiar organisms such as ants, squirrels, trees and some kinds of food. No prerequisites except arithmetic; open to everyone, including but not only those who may be headed for more advanced courses in ecology and environmental science. GER: DB-NatSci

*4 units, Spr (Gordon, D)*

### **EARTHSYS 8. The Oceans: An Introduction to the Marine Environment**

(Same as EESS 8) For non-majors and majors in earth science or environmental science. Students will learn about the major ocean ecosystems and how they function both naturally and under the influence of human activities. Emphasis will be placed on the dominant organisms of each ecosystem and how they interact with each other and their physical and chemical environment. The types of ecosystems discussed will include coral reefs, deep-sea hydrothermal vents, coastal upwelling systems, blue-water oceans, estuaries, near-shore dead zones, etc. The course will incorporate a mix of lectures, multi-media presentations, and group activities.

*3 units, Spr (Arrigo, K)*

### **EARTHSYS 10. Introduction to Earth Systems**

For non-majors and prospective Earth Systems majors. Multidisciplinary approach using the principles of geology, biology, engineering, and economics to describe how the Earth operates as an interconnected, integrated system. Goal is to understand global change on all time scales. Focus is on sciences, technological principles, and sociopolitical approaches applied to solid earth, oceans, water, energy, and food and population. Case studies: environmental degradation, loss of biodiversity, and resource sustainability. GER: DB-NatSci

*4 units, Aut (Ernst, G)*

### **EARTHSYS 18. Promoting Sustainability Behavior Change at Stanford**

Stanford Green Living Council training course. Effective strategies for enacting sustainable behavior change on campus. Community-based social marketing, psychology, sociology, and design. Behavior change intervention project targeting a specific sustainable behavior. Lectures online.

*2 units, Aut (Robinson, T)*

### **EARTHSYS 21. Peopling of the Globe: Changing Patterns of Land Use and Consumption Over the Last 50,000 Years**

(Same as ANTHRO 18, ARCHLGY 12, HUMBIO 182) Fossil, genetic and archaeological evidence suggest that modern humans began to disperse out of Africa about 50,000 years ago. Subsequently, humans have colonized every major landmass on earth. This class introduces students to the data and issues regarding human dispersal, migration and colonization of continents and islands around the world. We explore problems related to the timing and cause of colonizing events, and investigate questions about changing patterns of land use, demography and consumption. Students are introduced to critical relationships between prehistoric population changes and our contemporary environmental crisis. GER:DB-SocSci

*3-5 units, Aut (Bird, D)*

### **EARTHSYS 37N. Energy and the Environment on the Back of an Envelope**

(Same as EESS 37N) Preference to freshmen. How quantitative understanding of the Earth helps inform decisions about energy supply. How can enough energy be provided to support future growth and development throughout the world without damaging the natural environment? Focus is on simple quantitative observations and calculations that facilitate evaluation of potential solutions to this problem; algebra only, no calculus. GER: DB-NatSci

*3 units, not given this year*

### **EARTHSYS 38N. The Worst Journey in the World: The Science, Literature, and History of Polar Exploration**

(Same as EESS 38N, GES 38N) Preference to freshmen. The isolation of polar explorers under the harshest conditions on Earth, and the chronicles of their explorations and hardships dating to the 1500s for the Arctic and the 1700s for the Antarctic. Focus is on scientific and geographic achievements. Sources include *The Worst Journey in the World* by Apsley Cherry-Garrard who in 1911 participated in a midwinter Antarctic sledging trip to recover emperor penguin eggs. Class jointly authors essay on themes from such literature. Optional field trip into the high Sierra in December. (Dunbar) GER: DB-NatSci

*3 units, NEXTYEAR*

### **EARTHSYS 39N. The Carbon Cycle: Reducing Your Impact**

(Same as EESS 39N) Preference to freshmen. Changes in the long- and short-term carbon cycle and global climate through the burning of fossil fuels since the Industrial Revolution. How people can shrink their carbon footprints. Long-term sources and sinks of carbon and how they are controlled by tectonics and short-term sources and sinks and the interaction between the biosphere and ocean. How people can shrink their carbon footprints. Held at the Stanford Community Farm. GER: DB-NatSci

*3 units, not given this year*

### **EARTHSYS 41N. The Global Warming Paradox**

(F,Sem) (Same as EESS 41N) Stanford Introductory Seminar. Preference to freshman. Focus is on the complex climate challenges posed by the substantial benefits of energy consumption, including the critical tension between the enormous global demand for increased human well-being and the negative climate consequences of large-scale emissions of carbon dioxide. Topics include: Earth's energy balance; detection and attribution of climate change; the climate response to enhanced greenhouse forcing; impacts of climate change on natural and human systems; and proposed methods for curbing further climate change. Sources include peer-reviewed scientific papers, current research results, and portrayal of scientific findings by the mass media and social networks.

*3 units, Aut (Diffenbaugh, N)*

### **EARTHSYS 46N. Exploring the Critical Interface between the Land and Monterey Bay: Elkhorn Slough**

(Same as EESS 46N) Preference to freshmen. Field trips to sites in the Elkhorn Slough, a small agriculturally impacted estuary that opens into Monterey Bay, a model ecosystem for understanding the complexity of estuaries, and one of California's last remaining coastal wetlands. Readings include Jane Caffrey's *Changes in a California Estuary: A Profile of Elkhorn Slough*. Basics of biogeochemistry, microbiology, oceanography, ecology, pollution,

and environmental management.

*3 units, alternate years, not given this year*

**EARTHSYS 49N. Multi-Disciplinary Perspectives on a Large Urban Estuary: San Francisco Bay**

(F,Sem) (Same as EESS 49N) Stanford Introductory Seminar. This course will be focused around San Francisco Bay, the largest estuary on the Pacific coasts of both North and South America as a model ecosystem for understanding the critical importance and complexity of estuaries. Despite its uniquely urban and industrial character, the Bay is of immense ecological value and encompasses over 90% of California's remaining coastal wetlands. Students will be exposed to the basics of estuarine biogeochemistry, microbiology, ecology, hydrodynamics, pollution, and ecosystem management/restoration issues through lectures, interactive discussions, and field trips. Knowledge of introductory biology and chemistry is recommended.

*3 units, Spr (Francis, C)*

**EARTHSYS 56Q. Changes in the Coastal Ocean: The View From Monterey and San Francisco Bays**

(S,Sem) (Same as EESS 56Q) Stanford Introductory Seminar. Preference to sophomores. Recent changes in the California current, using Monterey Bay as an example. Current literature introduces principles of oceanography. Visits from researchers from MBARI, Hopkins, and UCSC. Optional field trip to MBARI and Monterey Bay. GER: DB-NatSci

*3 units, Spr (Dunbar, R)*

**EARTHSYS 57Q. Climate Change from the Past to the Future**

(S,Sem) (Same as EESS 57Q) Stanford Introductory Seminar. Preference to sophomores. Numeric models to predict how climate responds to increase of greenhouse gases. Paleoclimate during times in Earth's history when greenhouse gas concentrations were elevated with respect to current concentrations. Predicted scenarios of climate models and how these models compare to known hyperthermal events in Earth history. Interactions and feedbacks among biosphere, hydrosphere, atmosphere, and lithosphere. Topics include long- and short-term carbon cycle, coupled biogeochemical cycles affected by and controlling climate change, and how the biosphere responds to climate change. Possible remediation strategies.

*3 units, Win (Chamberlain, P)*

**EARTHSYS 61Q. Food and security**

(S,Sem) (Same as EESS 61Q, INTNLREL 61Q) Stanford Introductory Seminar. The course will provide a broad overview of key policy issues concerning agricultural development and food security, and will assess how global governance is addressing the problem of food security. At the same time the course will provide an overview of the field of international security, and examine how governments and international institutions are beginning to include food in discussions of security.

*5 units, Aut (Naylor, R; Stedman, S)*

**EARTHSYS 70. How the Earth Works: Physics for Earth and Environmental Scientists**

How do tsunamis form? What drives a hurricane? How are environmental pollutants transported? Introduction to the study of motion, forces, waves, and electromagnetism from the perspective of Earth and environmental scientists. Examination of the physics behind Earth processes that shape the environment we live in. Topics include groundwater flow, geothermal gradients, tidal and tsunami wave motion, seismic waves, earthquake propagation and hazard assessment, and the energy of photosynthesis. Lab/computer exercises incorporated into class time. Prerequisites: GES 1A, B or C or EARTHSYS 10 or GEOPHYS 113; and MATH 21 or 42; or instructor consent.

*3 units, Spr (Lawrence, K)*

**EARTHSYS 100. Environmental and Geological Field Studies in the Rocky Mountains**

(Same as EESS 101, GES 101) Three-week, field-based program in the Greater Yellowstone/Teton and Wind River Mountains of Wyoming. Field-based exercises covering topics including: basics of structural geology and petrology; glacial geology; western cordillera geology; paleoclimatology; chemical weathering; aqueous geochemistry; and environmental issues such as acid mine drainage and changing land-use patterns.

*3 units, Aut (Chamberlain, P)*

**EARTHSYS 101. Energy and the Environment**

(Same as ENERGY 101) Energy use in modern society and the consequences of current and future energy use patterns. Case studies illustrate resource estimation, engineering analysis of energy systems, and options for managing carbon emissions. Focus is on energy definitions, use patterns, resource estimation, pollution. Recommended: MATH 21 or 42. GER:DB-EngrAppSci

*3 units, Win (Durllofsky, L)*

**EARTHSYS 102. Renewable Energy Sources and Greener Energy Processes**

(Same as ENERGY 102) The energy sources that power society are rooted in fossil energy although energy from the core of the Earth and the sun is almost inexhaustible; but the rate at which energy can be drawn from them with today's technology is limited. The renewable energy resource base, its conversion to useful forms, and practical methods of energy storage. Geothermal, wind, solar, biomass, and tidal energies; resource extraction and its consequences. Recommended: MATH 21 or 42. GER:DB-EngrAppSci

*3 units, Spr (Gerritsen, M; Monroe, I)*

**EARTHSYS 103. Energy Resources**

(Same as CEE 173A, CEE 207A) Comprehensive overview of fossil and renewable energy resources and energy efficiency. Topics covered for each resource: resource abundance, location, recovery, conversion, consumption, end-uses, environmental impacts, economics, policy, and technology. Applied lectures in specific energy sectors: buildings, transportation, the electricity industry, and energy in the developing world. Required field trips to local energy facilities. Optional discussion section for extra unit. GER:DB-EngrAppSci

*3-5 units, Aut (Woodward, J; Knapp, K)*

**EARTHSYS 104. The Water Course**

(Same as GEOPHYS 104) The pathway that water takes from rainfall to the tap using student home towns as an example. How the geological environment controls the quantity and quality of water; taste tests of water from around the world. Current U.S. and world water supply issues. Offered occasionally. GER: DB-NatSci

*3 units, not given this year*

**EARTHSYS 105. Food and Community: New Visions for a Sustainable Future**

(Same as EESS 105) Service and research focused on providing healthy and environmentally friendly food for the under served in our community. Hands-on collaboration with the Stanford Glean student group, the Stanford Community Garden, and San Francisco nonprofits. Coverage of the broad spectrum from garden development to food dispersal to the needy. Design and implementation of projects that address an aspect of food and social justice, such as urban farming in low-income communities and sustainable food networks for the elderly. Service Learning Course (certified by Haas Center).

*3-5 units, Aut (Chamberlain, P), Spr (Chamberlain, P)*

**EARTHSYS 105A. Ecology and Natural History of Jasper Ridge Biological Preserve**

(Same as BIO 105A) Formerly 96A - Jasper Ridge Docent Training. First of two-quarter sequence training program to join the Jasper Ridge education/docent program. The scientific basis of ecological research in the context of a field station, hands-on field research, field ecology and the natural history of plants and animals, species interactions, archaeology, geology, hydrology, land management, multidisciplinary environmental education; and research projects, as well as management challenges of the preserve presented by faculty, local experts, and staff. Participants lead research-focused educational tours, assist with classes and research, and attend continuing education classes available to members of the JRB community after the course.

*4 units, Win (Dirzo, R; Wilber, C)*

**EARTHSYS 105B. Ecology and Natural History of Jasper Ridge Biological Preserve**

(Same as BIO 105B) Formerly 96B - Jasper Ridge Docent Training. First of two-quarter sequence training program to join the Jasper Ridge education/docent program. The scientific basis of ecological research in the context of a field station, hands-on field research, field ecology and the natural history of plants and animals, species interactions, archaeology, geology, hydrology,

land management, multidisciplinary environmental education; and research projects, as well as management challenges of the preserve presented by faculty, local experts, and staff. Participants lead research-focused educational tours, assist with classes and research, and attend continuing education classes available to members of the JRBP community after the course.

*4 units, Spr (Dirzo, R; Wilber, C)*

#### **EARTHSYS 106. World Food Economy**

(Same as ECON 106, EESS 106) The interrelationships among food, populations, resources, and economic development. The role of agricultural and rural development in achieving economic and social progress in low-income nations. Emphasis is on public sector decision making as it relates to food policy.

*5 units, Win (Naylor, R; Falcon, W)*

#### **EARTHSYS 108. Coastal Wetlands**

(Same as EARTHSYS 208) Ecological structure and function of wetlands emphasizing local, coastal wetlands. Topics include: wetland distribution, classification, and history; and interactions between biotic and abiotic components of wetland ecosystems. Labs and local field trips for exposure to landscape patterns, and common sampling equipment and methods. Recommended: 104 or CEE 166A. GER: DB-NatSci

*3 units, not given this year*

#### **EARTHSYS 109. Creating a Green Student Workforce to Help Implement Stanford's Sustainability Vision**

(Same as CEE 109) Examination of program-based local actions that promote resource conservation and an educational environment for sustainability. Examination of building-level actions that contribute to conservation, lower utility costs, and generate understanding of sustainability consistent with Stanford's commitment to sustainability as a core value. Overview of operational sustainability including energy, water, buildings, waste, and food systems. Practical training to enable students to become sustainability coordinators for their dorms or academic units.

*2 units, Win (Koseff, J; Ahmed, F)*

#### **EARTHSYS 111. Biology and Global Change**

(Same as BIO 117, EESS 111) The biological causes and consequences of anthropogenic and natural changes in the atmosphere, oceans, and terrestrial and freshwater ecosystems. Topics: glacial cycles and marine circulation, greenhouse gases and climate change, tropical deforestation and species extinctions, and human population growth and resource use. Prerequisite: Biology or Human Biology core or graduate standing. GER: DB-NatSci

*4 units, Win (Vitousek, P; Arrigo, K)*

#### **EARTHSYS 112. Human Society and Environmental Change**

(Same as EESS 112, HISTORY 103D) Interdisciplinary approaches to understanding human-environment interactions with a focus on economics, policy, culture, history, and the role of the state. Prerequisite: ECON 1A

*4 units, Aut (Naylor, R; Frank, Z; Pizarro Gariazzo, R)*

#### **EARTHSYS 113. Earthquakes and Volcanoes**

(Same as GEOPHYS 113) Earthquake location, magnitude and intensity scales, seismic waves, styles of eruptions and volcanic hazards, tsunami waves, types and global distribution of volcanoes, volcano forecasting. Plate tectonics as a framework for understanding earthquake and volcanic processes. Forecasting; earthquake resistant design; building codes; and probabilistic hazard assessment. For non-majors and potential earth scientists. Offered every year, spring quarter. GER:DB-EngrAppSci

*3 units, Spr (Beroza, G)*

#### **EARTHSYS 116. Ecology of the Hawaiian Islands**

(Same as BIO 116) Terrestrial and marine ecology and conservation biology of the Hawaiian Archipelago. Taught in the field in Hawaii as part of quarter-long sequence of courses including Earth Sciences and Anthropology. Topics include ecological succession, plant-soil interactions, conservation biology, biological invasions and ecosystem consequences, and coral reef ecology. Restricted to students accepted into the Earth Systems of Hawaii Program. GER: DB-NatSci

*4 units, alternate years, not given this year*

#### **EARTHSYS 117. Earth Sciences of the Hawaiian Islands**

(Same as EARTHSCI 117, EESS 117) Progression from volcanic

processes through rock weathering and soil-ecosystem development to landscape evolution. The course starts with an investigation of volcanic processes, including the volcano structure, origin of magmas, physical-chemical factors of eruptions. Factors controlling rock weathering and soil development, including depth and nutrient levels impacting plant ecosystems, are explored next. Geomorphic processes of landscape evolution including erosion rates, tectonic/volcanic activity, and hillslope stability conclude the course. Methods for monitoring and predicting eruptions, defining spatial changes in landform, landform stability, soil production rates, and measuring biogeochemical processes are covered throughout the course. This course is restricted to students accepted into the Earth Systems of Hawaii Program.

*4 units, alternate years, not given this year*

#### **EARTHSYS 118. Heritage, Environment, and Sovereignty in Hawaii**

(Same as ANTHRO 118) This course explores the cultural, political economic, and environmental status of contemporary Hawaiians. What sorts of sustainable economic and environmental systems did Hawaiians use in prehistory? How was colonization of the Hawaiian Islands informed and shaped by American economic interests and the nascent imperialism of the early 20th century? How was sovereignty and Native Hawaiian identity shaped by these forces? How has tourism and the leisure industry affected the natural environment? This course uses archaeological methods, ethnohistorical sources, and historical analysis in an exploration of contemporary Hawaiian social economic and political life.

*4 units, not given this year*

#### **EARTHSYS 122. Paleobiology**

(Same as GES 123) Introduction to the fossil record with emphasis on marine invertebrates. Major debates in paleontological research. The history of animal life in the oceans. Topics include the nature of the fossil record, evolutionary radiations, mass extinctions, and the relationship between biological evolution and environmental change. Fossil taxa through time. Exercises in phylogenetics, paleoecology, biostratigraphy, and statistical methods. GER: DB-NatSci

*4 units, alternate years, not given this year*

#### **EARTHSYS 123. From Local to Global: Collaborations for International Environmental Education**

(Same as EDUC 122X) A collaboration with three universities in Africa. Discourse and debate using Internet and mobile technology interactions. Topics include the global environment, climate change, sustainable development, and food security.

*2 units, not given this year*

#### **EARTHSYS 124. Environmental Justice: Local, National, and International Dimensions**

(Same as EARTHSYS 224) Focus is on whether minorities and low income citizens suffer disproportionate environmental and health impacts resulting from government and corporate decision making in contexts such as the siting of industrial facilities and waste dumps, toxic chemical use and distribution, and the enforcement of environmental mandates and policies. Implications of environmental justice issues at the international level, emphasizing climate change.

*4 units, not given this year*

#### **EARTHSYS 131. Communicating Environmental Research Using Narratives and Stories**

(Same as EESS 131, EESS 231, EARTHSYS 231) Creative strategies by which earth scientists can overcome impediments to scientific literacy. Construction of stories and narratives out of research. The role of imagination and cognitive perception in environmental issues. Barriers and problems that arise in risk and science awareness. Connections between environmentalism and environmental science. Environmental issues in fictional narratives. The responsible function for earth scientists in public debates. Reflections on the role of science in current and future issues likely to involve members outside of science. Priority given to students seeking degrees in the School of Earth Sciences.

*1 unit, not given this year*

#### **EARTHSYS 132. Energy and Climate Cooperation in the Western Hemisphere**

(Same as EARTHSYS 232, IPS 263, INTNLREL 146A) Current

political dynamics in major western hemisphere fossil fuel producers in N. America, the Andean region, the Southern Cone of S. America, and Trinidad and Tobago. The potential for developing sustainable alternative energy resources in the western hemisphere for export particularly biofuels, and its impact on agricultural policy, environmental protection, and food prices. The feasibility of creating regional energy security rings such as the proposed N. American Energy Security and Prosperity Partnership.

*4 units, not given this year*

**EARTHSYS 133. Climate Change Law and Policy: From California to the Federal Government**

(Same as EARTHSYS 233) California climate laws, including the California Global Warming Solutions Act of 2006 (AB32), the Clean Cars and Trucks Bill (SB 1493), and the Greenhouse Gas Emissions Performance Standard (SB 1368), and complementary and subsidiary regulations such as the Renewable Portfolio Standard, the Low Carbon Fuel Standard, land use law, and energy efficiency and decoupling. The draft scoping plan to outline California's policies for achieving its ambitious economy-wide reductions in greenhouse gas emissions. The Western Climate Initiative. The history, details, and current status of California's efforts as platforms to delve into larger legal issues.

*3 units, not given this year*

**EARTHSYS 134. Stable Isotopes in Biogeochemistry**

(Same as EARTHSYS 234, EESS 134, EESS 234) Light stable isotopes and their application to geological, ecological, and environmental problems. Isotopic systematics of hydrogen, carbon, nitrogen, oxygen, and sulfur; chemical and biogenic fractionation of light isotopes in the atmosphere, hydrosphere, and rocks and minerals. GER: DB-NatSci

*3 units, not given this year*

**EARTHSYS 135. Podcasting the Anthropocene**

(Same as EARTHSYS 235) Identification and interview of a Stanford researcher to be featured in an audio podcast. Exploration of interviewing techniques, audio manipulation, and podcasting as a newly emerging media platform. Individual and group projects. Group workshops focused on preparation, review, and critiques of podcasts.

*1 unit, Win (Staff)*

**EARTHSYS 141. Remote Sensing of the Oceans**

(Same as EARTHSYS 241, EESS 141, EESS 241) How to observe and interpret physical and biological changes in the oceans using satellite technologies. Topics: principles of satellite remote sensing, classes of satellite remote sensors, converting radiometric data into biological and physical quantities, sensor calibration and validation, interpreting large-scale oceanographic features. GER: DB-NatSci

*3-4 units, alternate years, not given this year*

**EARTHSYS 142. Remote Sensing of Land**

(Same as EARTHSYS 242, EESS 162, EESS 262) The use of satellite remote sensing to monitor land use and land cover, with emphasis on terrestrial changes. Topics include pre-processing data, biophysical properties of vegetation observable by satellite, accuracy assessment of maps derived from remote sensing, and methodologies to detect changes such as urbanization, deforestation, vegetation health, and wildfires.

*4 units, Win (Lambin, E)*

**EARTHSYS 142A. Negotiating Sustainable Development**

(Same as CEE 142A, CEE 242A, EARTHSYS 242A) How to be effective at achieving sustainability by learning the skills required to negotiate differences between stakeholders who advocate for their own interests. How ecological, social, and economic interests can be effectively balanced and managed. How to be effective actors in the sustainability movement, and use frameworks to solve complex, multiparty processes. Case study analysis of domestic and international issues. Students negotiate on behalf of different interest groups in a variety of arenas including energy, climate, land use, and the built environment. One Saturday all day field trip. No prerequisites.

*3 units, Win (Christensen, S)*

**EARTHSYS 143. Marine Biogeochemistry**

(Same as EARTHSYS 243, EESS 143, EESS 243) (Graduate students register for 243.) Processes that control the mean concentration and distribution of biologically utilized elements and

compounds in the ocean. Processes at the air-sea interface, production of organic matter in the upper ocean, remineralization of organic matter in the water column, and processing of organic matter in the sediments. Cycles of carbon, oxygen, and nutrients; the role of the ocean carbon cycle in interannual to decadal variability, paleoclimatology, and the anthropogenic carbon budget. GER: DB-NatSci

*3-4 units, Win (Arrigo, K)*

**EARTHSYS 143J. Climate Change in the West: A History of the Future**

(Same as HISTORY 243J) Global warming is changing the American West. But this region is no stranger to environmental change and human adaption to harsh environments. How can history create more clear thinking about the current crisis and choices for the future? The long history of climate change in the West, as well as current warming, through scientific research, historical sources, environmental histories, and visions for the future, including plans for mitigation and adaption, scientific predictions, and science fiction.

*5 units, not given this year*

**EARTHSYS 144. Fundamentals of Geographic Information Science (GIS)**

(Same as EESS 164) Survey of geographic information including maps, satellite imagery, and census data, approaches to spatial data, and tools for integrating and examining spatially-explicit data. Emphasis is on fundamental concepts of geographic information science and associated technologies. Topics include geographic data structure, cartography, remotely sensed data, statistical analysis of geographic data, spatial analysis, map design, and geographic information system software. Computer lab assignments. GER: DB-NatSci

*4 units, Aut (Thomas, N; Carbajales, P)*

**EARTHSYS 145. The Environmental History of North America**

(Same as HISTORY 169) Concentrates on anthropogenic environmental change and its consequences for both the natural environment and human society. Human alteration of the continent began well before the arrival of Europeans, and many developments usually considered as only human history are embedded in a wider environmental history. Begins with the Columbian Exchange and the demographic disaster that followed and ends with global climate change. GER:DB-SocSci

*4-5 units, Spr (White, R)*

**EARTHSYS 146A. Atmosphere, Ocean, and Climate Dynamics: The Atmospheric Circulation**

(Same as EARTHSYS 246A, EESS 146A, EESS 246A, GEOPHYS 146A, GEOPHYS 246A) Introduction to the physics governing the circulation of the atmosphere and ocean and their control on climate with emphasis on the atmospheric circulation. Topics include the global energy balance, the greenhouse effect, the vertical and meridional structure of the atmosphere, dry and moist convection, the equations of motion for the atmosphere and ocean, including the effects of rotation, and the poleward transport of heat by the large-scale atmospheric circulation and storm systems. Prerequisites: MATH 51 or CME100 and PHYSICS 41.

*3 units, Win (Thomas, L; Diffenbaugh, N; Skinner, C), alternate years, not given next year*

**EARTHSYS 146B. Atmosphere, Ocean, and Climate Dynamics: the Ocean Circulation**

(Same as EARTHSYS 246B, EESS 146B, EESS 246B, GEOPHYS 146B, GEOPHYS 246B) Introduction to the physics governing the circulation of the atmosphere and ocean and their control on climate with emphasis on the large-scale ocean circulation. This course will give an overview of the structure and dynamics of the major ocean current systems that contribute to the meridional overturning circulation, the transport of heat, salt, and biogeochemical tracers, and the regulation of climate. Topics include the tropical ocean circulation, the wind-driven gyres and western boundary currents, the thermohaline circulation, the Antarctic Circumpolar Current, water mass formation, atmosphere-ocean coupling, and climate variability. Prerequisites: EESS 146A/246A or CEE 164/262D or consent of instructor.

*3 units, Spr (Thomas, L; Diffenbaugh, N), alternate years, not given next year*

**EARTHSYS 147. Controlling Climate Change in the 21st Century**

(Same as EARTHSYS 247, HUMBIO 116) Global climate change science, impacts, and response strategies. Topics: scientific understanding of the climate system; modeling future climate change; global and regional climate impacts and vulnerability; mitigation and adaptation approaches; the international climate policy challenge; and decarbonization of energy and transportation systems. GER: DB-NatSci

*3 units, not given this year*

**EARTHSYS 153. Soils and Nutrient Cycling in the Amazon Rainforest**

(Same as EARTHSYS 253, EESS 153, EESS 253) Focus is on Amazon soils as dynamic but also as a non-renewable natural resource, especially in the impoverished soils. Course will cover the importance of the soils in the Amazon region rain forest ecosystem sustainability and the geographic distribution of the main soils classes in the Amazon region. Additional topics include the chemical and mineralogical characteristics of these soils classes and the factors influencing elemental cycling within the terrestrial Amazon rain forest ecosystem.

*3 units, Win (Staff)*

**EARTHSYS 155. Science of Soils**

(Same as EESS 155) Physical, chemical, and biological processes within soil systems. Emphasis is on factors governing nutrient availability, plant growth and production, land-resource management, and pollution within soils. How to classify soils and assess nutrient cycling and contaminant fate. Recommended: introductory chemistry and biology. GER: DB-NatSci

*4 units, Spr (Fendorf, S)*

**EARTHSYS 156. Soil and Water Chemistry**

(Same as EARTHSYS 256, EESS 156, EESS 256) (Graduate students register for 256.) Practical and quantitative treatment of soil processes affecting chemical reactivity, transformation, retention, and bioavailability. Principles of primary areas of soil chemistry: inorganic and organic soil components, complex equilibria in soil solutions, and adsorption phenomena at the solid-water interface. Processes and remediation of acid, saline, and wetland soils. Recommended: soil science and introductory chemistry and microbiology. GER: DB-NatSci

*1-4 units, Win (Fendorf, S)*

**EARTHSYS 156M. Marine Resource Economics and Policy**

(Same as ECON 156) Economic, political, and institutional frameworks for understanding the causes and potential solutions to marine resource problems. Marine policy formation, implementation and evaluation. Applications include: offshore energy production, managing fisheries, marine spatial planning, protecting biodiversity, and ocean recreation. Prerequisite: Econ 1A

*5 units, not given this year*

**EARTHSYS 158. Geomicrobiology**

(Same as EESS 158, EESS 258, EARTHSYS 258) How microorganisms shape the geochemistry of the Earth's crust including oceans, lakes, estuaries, subsurface environments, sediments, soils, mineral deposits, and rocks. Topics include mineral formation and dissolution; biogeochemical cycling of elements (carbon, nitrogen, sulfur, and metals); geochemical and mineralogical controls on microbial activity, diversity, and evolution; life in extreme environments; and the application of new techniques to geomicrobial systems. Recommended: introductory chemistry and microbiology such as CEE 274A.

*3 units, Win (Francis, C)*

**EARTHSYS 160. Statistical Methods for Earth and Environmental Sciences: General Introduction**

(Same as EESS 160) Extracting information from data using statistical summaries and graphical visualization, statistical measures of association and correlation, distribution models, sampling, error estimation and confidence intervals, linear models and regression analysis, introduction to time-series and spatial data with geostatistics, applications including environmental monitoring, natural hazards, and experimental design. GER:DB-Math

*3 units, not given this year*

**EARTHSYS 161. Statistical Methods for the Earth and****Environmental Sciences: Geostatistics**

(Same as EESS 161, ENERGY 161) Statistical analysis and graphical display of data, common distribution models, sampling, and regression. The variogram as a tool for modeling spatial correlation; variogram estimation and modeling; introduction to spatial mapping and prediction with kriging; integration of remote sensing and other ancillary information using co-kriging models; spatial uncertainty; introduction to geostatistical software applied to large environmental, climatological, and reservoir engineering databases; emphasis is on practical use of geostatistical tools. GER: DB-NatSci

*3-4 units, not given this year*

**EARTHSYS 170. Environmental Geochemistry**

(Same as GES 170) Solid, aqueous, and gaseous phases comprising the environment, their natural compositional variations, and chemical interactions. Contrast between natural sources of hazardous elements and compounds and types and sources of anthropogenic contaminants and pollutants. Chemical and physical processes of weathering and soil formation. Chemical factors that affect the stability of solids and aqueous species under earth surface conditions. The release, mobility, and fate of contaminants in natural waters and the roles that water and dissolved substances play in the physical behavior of rocks and soils. The impact of contaminants and design of remediation strategies. Case studies. Prerequisite: 90 or consent of instructor. GER: DB-NatSci

*4 units, Win (Brown, G)*

**EARTHSYS 173. Aquaculture and the Environment: Science, History, and Policy**

(Same as EARTHSYS 273, EESS 173, EESS 273) Can aquaculture feed billions of people without degrading aquatic ecosystems or adversely impacting local communities? Interdisciplinary focus on aquaculture science and management, international seafood markets, historical case studies (salmon farming in Chile, tuna ranching in the Mediterranean, shrimp farming in Vietnam), current federal/state legislation. Field trip to aquaculture farm and guest lectures.

*3 units, Spr (Staff), alternate years, not given next year*

**EARTHSYS 175. California Coast: Science, Policy, and Law**

(Same as CEE 175A, CEE 275A, EARTHSYS 275) Same as LAW 514. Interdisciplinary. The legal, science, and policy dimensions of managing California's coastal resources. Coastal land use and marine resource decision making. The physics, chemistry, and biology of the coastal zone, tools for exploring data from the coastal ocean, and the institutional framework that shapes public and private decision making. Field work: how experts from different disciplines work to resolve coastal policy questions. Primarily for graduate students; upper-level undergraduates may enroll with permission of instructor. Students will be expected to participate in at least three mandatory field trips.

*3-4 units, alternate years, not given this year*

**EARTHSYS 177. Interdisciplinary Research Survival Skills**

(Same as EARTHSYS 277) Learning in interdisciplinary situations. Framing research questions. Developing research methods that benefit from interdisciplinary understanding. Writing for multiple audiences and effectively making interdisciplinary presentations. Discussions with interdisciplinary experts from across campus regarding interdisciplinary research projects.

*2 units, Spr (Root, T)*

**EARTHSYS 178. The Ethics of Environmental Choices**

(Same as EARTHSYS 278, PHIL 178A, PHIL 278A) (Formerly PHIL 278/378.) The institutional and individual dimensions of environmental choices. On the institutional side, examine externalities, the tragedy of the commons, sustainable development and environmental policy. On the individual side, discuss individual responsibility, intrinsic value, and moral pluralism. Focus is on decision making including the role of risk analysis, the rate of discount for effects on future generations, cost-benefit analysis, and scientific epistemology. GER:DB-Hum

*4 units, not given this year*

**EARTHSYS 180B. Principles and Practices of Sustainable Agriculture**

(Same as EESS 180B) Field-based training in ecologically sound agricultural practices at the Stanford Community Farm. Weekly

lessons, field work, and group projects. Field trips to educational farms in the area. Topics include: soils, composting, irrigation techniques, IPM, basic plant anatomy and physiology, weeds, greenhouse management, and marketing.

3-4 units, Aut (Archie, J), Spr (Archie, J)

#### **EARTHSYS 181. Concepts of Urban Agriculture**

(Same as EARTHSYS 281, EESS 181, EESS 281) For advanced undergraduates and graduate students from all fields. Seminar. Current status of and potential for global urban agriculture. Topics include: environmental and economic dimensions of urban food production and sourcing; city policy and land-use planning; and an ecosystem services approach to urban agriculture. Developed and developing world contexts. Two field trips to nearby cities; guest lectures; case studies; group projects. Attendance at first class is mandatory. Enrollment is limited. Enrollment permissions will be determined after first class meeting.

3 units, Win (Matson, P)

#### **EARTHSYS 182. Current Issues in Sustainable Agriculture**

(Same as EARTHSYS 282, EESS 182, EESS 282) Sustainability and ethics of animal production in the U.S. Demystification of the marketing of agricultural products. The past, present, and future of small family farms. Farm labor issues. Students lead discussions and write response papers.

2 units, not given this year

#### **EARTHSYS 183. Food Matters: Agriculture in Film**

(Same as EARTHSYS 283, EESS 183, EESS 283) Film series presenting historical and contemporary issues dealing with food and agriculture across the globe. Students discuss reactions and thoughts in a round table format. May be repeated for credit.

1 unit, Win (Staff)

#### **EARTHSYS 184. Climate and Agriculture**

(Same as EARTHSYS 284, EESS 184, EESS 284) The effects of climate change on global food and agricultural systems. Climate assessment and socioeconomic modeling approaches to quantify the impacts of climate on agro-ecosystems and society. Enrollment limited to 25; priority to graduate students, seniors, and juniors. Prerequisites: ECON 106/206.

3-4 units, Spr (Lobell, D)

#### **EARTHSYS 188. Social and Environmental Tradeoffs in Climate Decision-Making**

(Same as EARTHSYS 288) How can we ensure that measures taken to mitigate global climate change don't create larger social and environmental problems? What metrics should be used to compare potential climate solutions beyond cost and technical feasibility, and how should these metrics be weighed against each other? How can modeling efforts and stakeholder engagement be best integrated into climate decision making? What information are we still missing to make fully informed decisions between technologies and policies? Exploration of these questions, alongside other issues related to potential negative externalities of emerging climate solutions. Evaluation of energy, land use, and geoengineering approaches in an integrated context, culminating in a climate stabilization group project.

1-2 units, Win (Monroe, I; Matson, P)

#### **EARTHSYS 199. Honors Program in Earth Systems**

1-9 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

#### **EARTHSYS 210B. Senior Seminar**

Interdisciplinary problem analysis and oral communication. Students present results of their Earth Systems internship or research project. Students participate in a research or service learning group project focused on a local environmental issue. Service Learning Course (certified by Haas Center). Prerequisite: EARTHSYS 260.

3 units, Win (Kennedy, J)

#### **EARTHSYS 210C. Senior Seminar**

Interdisciplinary problem analysis and oral communication. Students present results of their Earth Systems internship or research project. Students participate in a research or service learning group project focused on a local environmental issue. Service Learning Course (certified by Haas Center). Prerequisite: EARTHSYS 260.

3 units, Win (Kennedy, J)

#### **EARTHSYS 210D. Senior Seminar**

Interdisciplinary problem analysis and oral communication. Students present results of their Earth Systems internship or research project. Students participate in a research or service learning group project focused on a local environmental issue. Service Learning Course (certified by Haas Center). Prerequisite: EARTHSYS 260.

3 units, Win (Dunbar, R)

## **GRADUATE COURSES IN EARTH SYSTEMS**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

#### **EARTHSYS 200. Sustaining Action: Research, Analysis and Writing for the Public**

(Same as ENVRES 200) Preference to graduate students and senior undergraduates in environmental, natural and social sciences, engineering, journalism. Students help produce and publish SAGE, an eco advice column, by choosing, researching, and answering questions about sustainable living submitted by Stanford alumni and the general public. Prerequisite: admission by application, available from instructor, thayden@stanford.edu, and due 9/21/11 (Aut) or 3/28/12 (Spr). (Meets Earth Systems WIM requirement).

3 units, Aut (Hayden, T), Spr (Hayden, T)

#### **EARTHSYS 201. Climate Change and the IPCC**

(Same as EESS 201) The Intergovernmental Panel on Climate Change has begun work on its 5th Assessment Report, due in 2014. The Working Group II (WGII) contribution to the AR5 will have an increased focus on assessing vulnerability, impacts, and adaptation in the context of multiple stresses, assessing a broader range of impacts, including impacts on oceans systems, approaches for effectively managing the risks of climate change in the context of multiple stresses, and providing more information on the costs of climate change for different sectors and regions. Examination of the IPCC assessment process, as well as the current research on the range of issues that will be covered in the WGII report presented by Stanford faculty and Bay Area scientists involved in WGII.

1-2 units, Aut (Matson, P)

#### **EARTHSYS 208. Coastal Wetlands**

(Same as EARTHSYS 108) Ecological structure and function of wetlands emphasizing local, coastal wetlands. Topics include: wetland distribution, classification, and history; and interactions between biotic and abiotic components of wetland ecosystems. Labs and local field trips for exposure to landscape patterns, and common sampling equipment and methods. Recommended: 104 or CEE 166A.

3 units, not given this year

#### **EARTHSYS 210A. Senior Seminar**

Interdisciplinary problem analysis and oral communication. Students present results of their Earth Systems internship or research project. Students participate in a research or service learning group project focused on a local environmental issue. Service Learning Course (certified by Haas Center). Prerequisite: EARTHSYS 260.

3 units, Aut (Kennedy, J)

#### **EARTHSYS 211. Fundamentals of Modeling**

(Same as EESS 211) Simulation models are a powerful tool for environmental research, if used properly. The major concepts and techniques for building and evaluating models. Topics include model calibration, model selection, uncertainty and sensitivity analysis, and Monte Carlo and bootstrap methods. Emphasis is on gaining hands-on experience using the R programming language. Prerequisite: basic knowledge of statistics.

3 units, Aut (Lobell, D)

#### **EARTHSYS 224. Environmental Justice: Local, National, and International Dimensions**

(Same as EARTHSYS 124) Focus is on whether minorities and low income citizens suffer disproportionate environmental and health impacts resulting from government and corporate decision making in contexts such as the siting of industrial facilities and waste dumps, toxic chemical use and distribution, and the enforcement of environmental mandates and policies. Implications

of environmental justice issues at the international level, emphasizing climate change.

*4 units, not given this year*

**EARTHSYS 231. Communicating Environmental Research Using Narratives and Stories**

(Same as EESS 131, EESS 231, EARTHSYS 131) Creative strategies by which earth scientists can overcome impediments to scientific literacy. Construction of stories and narratives out of research. The role of imagination and cognitive perception in environmental issues. Barriers and problems that arise in risk and science awareness. Connections between environmentalism and environmental science. Environmental issues in fictional narratives. The responsible function for earth scientists in public debates. Reflections on the role of science in current and future issues likely to involve members outside of science. Priority given to students seeking degrees in the School of Earth Sciences.

*1 unit, not given this year*

**EARTHSYS 232. Energy and Climate Cooperation in the Western Hemisphere**

(Same as EARTHSYS 132, IPS 263, INTNLREL 146A) Current political dynamics in major western hemisphere fossil fuel producers in N. America, the Andean region, the Southern Cone of S. America, and Trinidad and Tobago. The potential for developing sustainable alternative energy resources in the western hemisphere for export particularly biofuels, and its impact on agricultural policy, environmental protection, and food prices. The feasibility of creating regional energy security rings such as the proposed N. American Energy Security and Prosperity Partnership.

*4 units, not given this year*

**EARTHSYS 233. Climate Change Law and Policy: From California to the Federal Government**

(Same as EARTHSYS 133) California climate laws, including the California Global Warming Solutions Act of 2006 (AB32), the Clean Cars and Trucks Bill (SB 1493), and the Greenhouse Gas Emissions Performance Standard (SB 1368), and complementary and subsidiary regulations such as the Renewable Portfolio Standard, the Low Carbon Fuel Standard, land use law, and energy efficiency and decoupling. The draft scoping plan to outline California's policies for achieving its ambitious economy-wide reductions in greenhouse gas emissions. The Western Climate Initiative. The history, details, and current status of California's efforts as platforms to delve into larger legal issues.

*3 units, not given this year*

**EARTHSYS 234. Stable Isotopes in Biogeochemistry**

(Same as EARTHSYS 134, EESS 134, EESS 234) Light stable isotopes and their application to geological, ecological, and environmental problems. Isotopic systematics of hydrogen, carbon, nitrogen, oxygen, and sulfur; chemical and biogenic fractionation of light isotopes in the atmosphere, hydrosphere, and rocks and minerals.

*3 units, not given this year*

**EARTHSYS 235. Podcasting the Anthropocene**

(Same as EARTHSYS 135) Identification and interview of a Stanford researcher to be featured in an audio podcast. Exploration of interviewing techniques, audio manipulation, and podcasting as a newly emerging media platform. Individual and group projects. Group workshops focused on preparation, review, and critiques of podcasts.

*1 unit, Win (Staff)*

**EARTHSYS 241. Remote Sensing of the Oceans**

(Same as EARTHSYS 141, EESS 141, EESS 241) How to observe and interpret physical and biological changes in the oceans using satellite technologies. Topics: principles of satellite remote sensing, classes of satellite remote sensors, converting radiometric data into biological and physical quantities, sensor calibration and validation, interpreting large-scale oceanographic features.

*3-4 units, alternate years, not given this year*

**EARTHSYS 242. Remote Sensing of Land**

(Same as EARTHSYS 142, EESS 162, EESS 262) The use of satellite remote sensing to monitor land use and land cover, with emphasis on terrestrial changes. Topics include pre-processing data, biophysical properties of vegetation observable by satellite, accuracy assessment of maps derived from remote sensing, and methodologies to detect changes such as urbanization,

deforestation, vegetation health, and wildfires.

*4 units, Win (Lambin, E)*

**EARTHSYS 242A. Negotiating Sustainable Development**

(Same as CEE 142A, CEE 242A, EARTHSYS 142A) How to be effective at achieving sustainability by learning the skills required to negotiate differences between stakeholders who advocate for their own interests. How ecological, social, and economic interests can be effectively balanced and managed. How to be effective actors in the sustainability movement, and use frameworks to solve complex, multiparty processes. Case study analysis of domestic and international issues. Students negotiate on behalf of different interest groups in a variety of arenas including energy, climate, land use, and the built environment. One Saturday all day field trip. No prerequisites.

*3 units, Win (Christensen, S)*

**EARTHSYS 243. Marine Biogeochemistry**

(Same as EARTHSYS 143, EESS 143, EESS 243) (Graduate students register for 243.) Processes that control the mean concentration and distribution of biologically utilized elements and compounds in the ocean. Processes at the air-sea interface, production of organic matter in the upper ocean, remineralization of organic matter in the water column, and processing of organic matter in the sediments. Cycles of carbon, oxygen, and nutrients; the role of the ocean carbon cycle in interannual to decadal variability, paleoclimatology, and the anthropogenic carbon budget.

*3-4 units, Win (Arrigo, K)*

**EARTHSYS 246A. Atmosphere, Ocean, and Climate Dynamics: The Atmospheric Circulation**

(Same as EARTHSYS 146A, EESS 146A, EESS 246A, GEOPHYS 146A, GEOPHYS 246A) Introduction to the physics governing the circulation of the atmosphere and ocean and their control on climate with emphasis on the atmospheric circulation. Topics include the global energy balance, the greenhouse effect, the vertical and meridional structure of the atmosphere, dry and moist convection, the equations of motion for the atmosphere and ocean, including the effects of rotation, and the poleward transport of heat by the large-scale atmospheric circulation and storm systems. Prerequisites: MATH 51 or CME100 and PHYSICS 41.

*3 units, Win (Thomas, L; Diffenbaugh, N; Skinner, C), alternate years, not given next year*

**EARTHSYS 246B. Atmosphere, Ocean, and Climate Dynamics: the Ocean Circulation**

(Same as EARTHSYS 146B, EESS 146B, EESS 246B, GEOPHYS 146B, GEOPHYS 246B) Introduction to the physics governing the circulation of the atmosphere and ocean and their control on climate with emphasis on the large-scale ocean circulation. This course will give an overview of the structure and dynamics of the major ocean current systems that contribute to the meridional overturning circulation, the transport of heat, salt, and biogeochemical tracers, and the regulation of climate. Topics include the tropical ocean circulation, the wind-driven gyres and western boundary currents, the thermohaline circulation, the Antarctic Circumpolar Current, water mass formation, atmosphere-ocean coupling, and climate variability. Prerequisites: EESS 146A/246A or CEE 164/262D or consent of instructor.

*3 units, Spr (Thomas, L; Diffenbaugh, N), alternate years, not given next year*

**EARTHSYS 247. Controlling Climate Change in the 21st Century**

(Same as EARTHSYS 147, HUMBIO 116) Global climate change science, impacts, and response strategies. Topics: scientific understanding of the climate system; modeling future climate change; global and regional climate impacts and vulnerability; mitigation and adaptation approaches; the international climate policy challenge; and decarbonization of energy and transportation systems.

*3 units, not given this year*

**EARTHSYS 250. Directed Research**

Independent research related to student's primary track, carried out after the junior year, during the summer, and/or during the senior year. Student develops own project with faculty supervision. 10-15 page thesis. May be repeated for credit.

*1-9 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*



**EARTHSYS 253. Soils and Nutrient Cycling in the Amazon Rainforest**

(Same as EARTHSYS 153, EESS 153, EESS 253) Focus is on Amazon soils as dynamic but also as a non-renewable natural resource, especially in the impoverished soils. Course will cover the importance of the soils in the Amazon region rain forest ecosystem sustainability and the geographic distribution of the main soils classes soils in the Amazon region. Additional topics include the chemical and mineralogical characteristics of these soils classes and the factors influencing elemental cycling within the terrestrial Amazon rain forest ecosystem.

3 units, Win (Staff)

**EARTHSYS 256. Soil and Water Chemistry**

(Same as EARTHSYS 156, EESS 156, EESS 256) (Graduate students register for 256.) Practical and quantitative treatment of soil processes affecting chemical reactivity, transformation, retention, and bioavailability. Principles of primary areas of soil chemistry: inorganic and organic soil components, complex equilibria in soil solutions, and adsorption phenomena at the solid-water interface. Processes and remediation of acid, saline, and wetland soils. Recommended: soil science and introductory chemistry and microbiology.

1-4 units, Win (Fendorf, S)

**EARTHSYS 258. Geomicrobiology**

(Same as EESS 158, EESS 258, EARTHSYS 158) How microorganisms shape the geochemistry of the Earth's crust including oceans, lakes, estuaries, subsurface environments, sediments, soils, mineral deposits, and rocks. Topics include mineral formation and dissolution; biogeochemical cycling of elements (carbon, nitrogen, sulfur, and metals); geochemical and mineralogical controls on microbial activity, diversity, and evolution; life in extreme environments; and the application of new techniques to geomicrobial systems. Recommended: introductory chemistry and microbiology such as CEE 274A.

3 units, Win (Francis, C)

**EARTHSYS 260. Internship**

Supervised field, lab, or private sector project. May consist of directed research under the supervision of a Stanford faculty member, participation in one of several off campus Stanford programs, or an approved non-Stanford program relevant to the student's Earth Systems studies. Required of and restricted to declared Earth Systems majors. Includes 15-page technical summary research paper that is subject to iterative revision. (WIM)

1-9 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**EARTHSYS 272. Antarctic Marine Geology**

(Same as EESS 242) For upper-division undergraduates and graduate students. Intermediate and advanced topics in marine geology and geophysics, focusing on examples from the Antarctic continental margin and adjacent Southern Ocean. Topics: glaciers, icebergs, and sea ice as geologic agents (glacial and glacial marine sedimentology), Southern Ocean current systems and deep ocean sedimentation), Antarctic biostratigraphy and chronostratigraphy (continental margin evolution). Students interpret seismic lines and sediment core/well log data. Examples from a recent scientific drilling expedition to Prydz Bay, Antarctica. Up to two students may have an opportunity to study at sea in Antarctica during Winter Quarter.

3 units, NEXTYEAR

**EARTHSYS 273. Aquaculture and the Environment: Science, History, and Policy**

(Same as EARTHSYS 173, EESS 173, EESS 273) Can aquaculture feed billions of people without degrading aquatic ecosystems or adversely impacting local communities? Interdisciplinary focus on aquaculture science and management, international seafood markets, historical case studies (salmon farming in Chile, tuna ranching in the Mediterranean, shrimp farming in Vietnam), current federal/state legislation. Field trip to aquaculture farm and guest lectures.

3 units, Spr (Staff), alternate years, not given next year

**EARTHSYS 275. California Coast: Science, Policy, and Law**

(Same as CEE 175A, CEE 275A, EARTHSYS 175) Same as LAW 514. Interdisciplinary. The legal, science, and policy dimensions of managing California's coastal resources. Coastal land use and marine resource decision making. The physics, chemistry, and

biology of the coastal zone, tools for exploring data from the coastal ocean, and the institutional framework that shapes public and private decision making. Field work: how experts from different disciplines work to resolve coastal policy questions. Primarily for graduate students; upper-level undergraduates may enroll with permission of instructor. Students will be expected to participate in at least three mandatory field trips.

3-4 units, alternate years, not given this year

**EARTHSYS 277. Interdisciplinary Research Survival Skills**

(Same as EARTHSYS 177) Learning in interdisciplinary situations. Framing research questions. Developing research methods that benefit from interdisciplinary understanding. Writing for multiple audiences and effectively making interdisciplinary presentations. Discussions with interdisciplinary experts from across campus regarding interdisciplinary research projects.

2 units, Spr (Root, T)

**EARTHSYS 278. The Ethics of Environmental Choices**

(Same as EARTHSYS 178, PHIL 178A, PHIL 278A) (Formerly PHIL 278/378.) The institutional and individual dimensions of environmental choices. On the institutional side, examine externalities, the tragedy of the commons, sustainable development and environmental policy. On the individual side, discuss individual responsibility, intrinsic value, and moral pluralism. Focus is on decision making including the role of risk analysis, the rate of discount for effects on future generations, cost-benefit analysis, and scientific epistemology.

4 units, not given this year

**EARTHSYS 281. Concepts of Urban Agriculture**

(Same as EARTHSYS 181, EESS 181, EESS 281) For advanced undergraduates and graduate students from all fields. Seminar. Current status of and potential for global urban agriculture. Topics include: environmental and economic dimensions of urban food production and sourcing; city policy and land-use planning; and an ecosystem services approach to urban agriculture. Developed and developing world contexts. Two field trips to nearby cities; guest lectures; case studies; group projects. Attendance at first class is mandatory. Enrollment is limited. Enrollment permissions will be determined after first class meeting.

3 units, Win (Matson, P)

**EARTHSYS 282. Current Issues in Sustainable Agriculture**

(Same as EARTHSYS 182, EESS 182, EESS 282) Sustainability and ethics of animal production in the U.S. Demystification of the marketing of agricultural products. The past, present, and future of small family farms. Farm labor issues. Students lead discussions and write response papers.

2 units, not given this year

**EARTHSYS 283. Food Matters: Agriculture in Film**

(Same as EARTHSYS 183, EESS 183, EESS 283) Film series presenting historical and contemporary issues dealing with food and agriculture across the globe. Students discuss reactions and thoughts in a round table format. May be repeated for credit.

1 unit, Win (Staff)

**EARTHSYS 284. Climate and Agriculture**

(Same as EARTHSYS 184, EESS 184, EESS 284) The effects of climate change on global food and agricultural systems. Climate assessment and socioeconomic modeling approaches to quantify the impacts of climate on agro-ecosystems and society. Enrollment limited to 25; priority to graduate students, seniors, and juniors. Prerequisites: ECON 106/206.

3-4 units, Spr (Lobell, D)

**EARTHSYS 288. Social and Environmental Tradeoffs in Climate Decision-Making**

(Same as EARTHSYS 188) How can we ensure that measures taken to mitigate global climate change don't create larger social and environmental problems? What metrics should be used to compare potential climate solutions beyond cost and technical feasibility, and how should these metrics be weighed against each other? How can modeling efforts and stakeholder engagement be best integrated into climate decision making? What information are we still missing to make fully informed decisions between technologies and policies? Exploration of these questions, alongside other issues related to potential negative externalities of emerging climate solutions. Evaluation of energy, land use, and geoeengineering approaches in an integrated context, culminating in



a climate stabilization group project.

1-2 units, Win (Monroe, I; Matson, P)

#### **EARTHSYS 290. Master's Seminar**

Required of and open to Earth Systems master's students only. Discussion of topical published literature relevant to Earth systems.

2 units, Spr (Phillips, K)

#### **EARTHSYS 297. Directed Individual Study in Earth Systems**

Under supervision of an Earth Systems faculty member on a subject of mutual interest.

1-9 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

#### **EARTHSYS 298. Earth Systems Book Review**

For Earth Systems master's students and advanced undergraduates only. Analysis and discussion of selected literary nonfiction books relevant to Earth systems topics. Examples of previous topics include political presentations of environmental change in the popular press, review of the collected works of Aldo Leopold, disaster literature, and global warming.

2 units, Spr (Kennedy, J)

#### **EARTHSYS 299. M.S. Thesis**

1-9 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

#### **EARTHSYS 323. Stanford at Sea**

(Same as BIOHOPK 182H, BIOHOPK 323H, EESS 323) (Graduate students register for 323H.) Five weeks of marine science including oceanography, marine physiology, policy, maritime studies, conservation, and nautical science at Hopkins Marine Station, followed by five weeks at sea aboard a sailing research vessel in the Pacific Ocean. Shore component comprised of three multidisciplinary courses meeting daily and continuing aboard ship. Students develop an independent research project plan while ashore, and carry out the research at sea. In collaboration with the Sea Education Association of Woods Hole, MA. Only 6 units may count towards the Biology major.

16 units, alternate years, not given this year

## EARTH, ENERGY, AND ENVIRONMENTAL SCIENCES (EEES) COURSES

### GRADUATE COURSES IN EARTH, ENERGY, AND ENVIRONMENTAL SCIENCES

Primarily for graduate students; undergraduates may enroll with consent of instructor.

#### **EEES 302. Challenges and Practices in Crossdisciplinary Research and Teaching**

Required EEES core course. Presentations by Earth Sciences faculty. Pedagogical tools to present interdisciplinary concepts to a non-specialist audience.

1 unit, not given this year

#### **EEES 400. Research in Earth, Energy, and Environmental Sciences**

May be repeated for credit.

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

#### **EEES 802. TGR Dissertation**

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

## EAST ASIAN STUDIES (EASTASN) COURSES

### UNDERGRADUATE COURSES IN EAST ASIAN STUDIES

Primarily for undergraduates; graduate students may enroll with consent of adviser.

#### **EASTASN 70SI. Critical Issues in U.S.-China Relations Today**

Multidisciplinary approach to historical factors, current events, and key issues that drive relations between the United States and China today, including: economic reform and the current financial crisis; security concerns over Taiwan, North Korea and Tibet; energy and the environment; role of NGOs and media in society; and human rights and prospects for political liberalization. Guest lectures from faculty and personal experiences from individuals who have lived or worked in China.

2 units, Spr (Staff)

#### **EASTASN 117. Health and Healthcare Systems in East Asia**

(Same as EASTASN 217) China, Japan, and both Koreas. Healthcare economics as applied to East Asian health policy, including economic development, population aging, infectious disease outbreaks (SARS, avian flu), social health insurance, health service delivery, payment incentives, competition, workforce policy, pharmaceutical industry, and regulation. No prior knowledge of economics or healthcare required.

3-5 units, Win (Eggleston, K)

#### **EASTASN 189K. Korea's Relations with Major Neighboring Countries and Its Growing Role on a Global Stage**

(Same as EASTASN 289K) Topics on Korea vary each year. Topics this year include South Korea's relations with the U.S., Japan, China, ASEAN and the EU. Focus is on South Korea's diplomatic practices during early 1990's to 2010 in dealing with pending issues with these countries and communities. In addition to required readings in English, supplemental basic readings in Korean, Japanese, and Chinese will be recommended.

3 units, Win (Staff)

#### **EASTASN 191. Journal of East Asian Studies**

(Staff)

1 unit, Aut (Wigen, K), Win (Wigen, K), Spr (Wigen, K)

### GRADUATE COURSES IN EAST ASIAN STUDIES

Primarily for graduate students; undergraduates may enroll with consent of instructor.

#### **EASTASN 217. Health and Healthcare Systems in East Asia**

(Same as EASTASN 117) China, Japan, and both Koreas. Healthcare economics as applied to East Asian health policy, including economic development, population aging, infectious disease outbreaks (SARS, avian flu), social health insurance, health service delivery, payment incentives, competition, workforce policy, pharmaceutical industry, and regulation. No prior knowledge of economics or healthcare required.

3-5 units, Win (Eggleston, K)

#### **EASTASN 289K. Korea's Relations with Major Neighboring Countries and Its Growing Role on a Global Stage**

(Same as EASTASN 189K) Topics on Korea vary each year. Topics this year include South Korea's relations with the U.S., Japan, China, ASEAN and the EU. Focus is on South Korea's diplomatic practices during early 1990's to 2010 in dealing with pending issues with these countries and communities. In addition to required readings in English, supplemental basic readings in Korean, Japanese, and Chinese will be recommended.

3 units, Win (Staff)

#### **EASTASN 300. Graduate Directed Reading**

Independent studies under the direction of a faculty member for which academic credit may properly be allowed. For East Asian Studies M.A. students only.

1-7 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

#### **EASTASN 330. Core Seminar: Issues and Approaches in East Asian Studies**

For East Asian Studies M.A. students only.

1 unit, Aut (Chang, G)

#### **EASTASN 390. Practicum Internship**

On-the-job training under the guidance of experienced, on-site supervisors. Meets the requirements for curricular practical training for students on F-1 visas. Students submit a concise report detailing work activities, problems worked on, and key results. May be repeated for credit. Prerequisite: qualified offer of employment and consent of adviser.

1 unit, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### **EASTASN 801. TGR Project**

0 units, Aut (Wigen, K), Win (Wigen, K), Spr (Wigen, K), Sum (Staff)

## **ECONOMICS (ECON) COURSES**

### **UNDERGRADUATE COURSES IN ECONOMICS**

Primarily for undergraduates; graduate students may enroll with consent of adviser.

#### **ECON 1A. Introductory Economics A**

The economic way of thinking and the functioning of a market economy. The behavior of consumers and firms, markets for goods and inputs, and principles of international exchange. Applications and policy issues in economics. GER:DB-SocSci

5 units, Aut (Taylor, J), Win (Wright, G), Sum (Staff)

#### **ECON 1B. Introductory Economics B**

Aggregate economic relationships, including output, employment, inflation, interest rates, and exchange rates. Short-run fluctuations and long-run growth. Issues in monetary and fiscal policy. Prerequisite: 1A. GER:DB-SocSci

5 units, Win (Amador Lopez, M), Spr (Clerici-Arias, M), Sum (Staff)

#### **ECON 10. Silicon Valley Meets Wall Street**

Seminar in applied economics with focus on the microcosm of Silicon Valley, how growth companies are originated, managed and financed from start-up to IPO. Round-table discussion format. Applicable to those students with an interest in technical innovation and business development. Enrollment limited to 10 students; selection based on short application. Priority given to juniors and seniors majoring in in Economics or Engineering.

1 unit, Aut (Shanahan, T)

#### **ECON 11N. Understanding the Welfare System**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Welfare reform legislation and the devolution revolution. The transfer of responsibility for antipoverty programs to the states. How recent reforms change the welfare system and who is likely to be affected. Food stamps, AFDC, TANF, SSI, and Medicaid. Income transfer programs such as earned income tax credit and income taxes, and labor market regulations such as minimum wages and overtime rules. Economic principles to understand the effectiveness of these programs and their consequences on the behavior of families. Pre- or corequisite: ECON 1. Recommended: basic understanding of labor markets, taxes, and transfers.

2 units, Aut (MacCurdy, T)

#### **ECON 13SC. Economic Policies of the Presidential Candidates**

Modern finance theory. Financial instruments including stocks, bonds, options, mutual funds, and exchange-traded funds. Historical returns on asset classes. Equity analysis. Capital pricing model. Efficient market hypotheses. Index funds. Meetings with financial managers and venture capitalists.

2 units, not given this year

#### **ECON 17N. Energy, the Environment, and the Economy**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. The relationship between environmental quality and production and consumption of energy. Can environmentally-friendly energy production and consumption compete with conventional sources? How to estimate and compare environmental impact costs of nonrenewable sources such as fossil fuels and nuclear power versus renewable sources such as solar and wind power. Implicit subsidies in conventional energy sources and the environmental costs of these subsidies. Regulatory and legal barriers to more environmentally friendly energy sources.

2 units, Spr (Wolak, F)

#### **ECON 19N. The Economics of Cities**

In most countries of the world, urban areas tend to have the highest per-worker productivity and generate most of the economic output and economic innovation. In this class, we will explore what economics has to say about the costs and benefits of urbanization. We will discuss a number of classic topics in urban economics,

including agglomeration advantages, human capital externalities, the economics of congestion, and efficient economic development policies. Prerequisite: Econ 1A

2 units, not given this year

#### **ECON 20N. Economy and Economics of Ancient Greece**

Cultural background for Athens of the 5th and 4th century BC. Strengths and weaknesses of Athenian democracy. Athenian economy of the 4th century BC. Economic ideas of Plato, Aristotle, and Xenophon. Pros and cons of utilitarianism in light of the ethical theories of Plato and Aristotle. GER:EC-GlobalCom

3 units, not given this year

#### **ECON 20SI. Sustainability from the Economic Perspective**

In spite of its apparent universal popularity, environmental sustainability is a concept that is impossible to define objectively. Nevertheless, many aspects of economic activity reduce the quality of environmental services available to consumers. The local and global pollutants that result from the production and consumption of fossil fuels is perhaps the most highly publicized example of this phenomenon. However, virtually all aspects of modern economic activity degrade some aspect of available environmental services. Consequently, a major challenge to increasing the share of the world's population with a modern standard of living is the need to balance the adverse impacts of modern economic activity on all of the dimensions of environmental services. This course will analyze the full range of mechanisms available to manage these tradeoffs. The course will focus on solutions from business, government, and the non-profit sectors. Guest speakers will include venture capitalists, consul

1-2 units, not given this year

#### **ECON 50. Economic Analysis I**

Individual consumer and firm behavior under perfect competition. The role of markets and prices in a decentralized economy. Monopoly in partial equilibrium. Economic tools developed from multivariable calculus using partial differentiation and techniques for constrained and unconstrained optimization. Prerequisites: 1A and MATH 51(must be taken for a letter grade). GER:DB-Math

5 units, Aut (Tendall, M), Spr (Tendall, M), Sum (Staff)

#### **ECON 51. Economic Analysis II**

Neoclassical analysis of general equilibrium, welfare economics, imperfect competition, externalities and public goods, intertemporal choice and asset markets, risk and uncertainty, game theory, adverse selection, and moral hazard. Multivariate calculus is used. Prerequisite: 50.

5 units, Aut (Clerici-Arias, M), Win (Scheuer, F), Sum (Staff)

#### **ECON 52. Economic Analysis III**

Long-run economic growth and short-run economic fluctuations. Focus on the macroeconomic tools of government: fiscal policy (spending and taxes) and monetary policy, and their effects on growth, employment, and inflation. Prerequisites: 1B, 50.

5 units, Win (Kurlat, P), Spr (Staff), Sum (Staff)

#### **ECON 90. Introduction to Financial Accounting**

(Same as ECON 190) How to read, understand, and use corporate financial statements. Oriented towards the use of financial accounting information (rather than the preparer), and emphasizes the reconstruction of economic events from published accounting reports.

5 units, Aut (Stanton, F), Win (Stanton, F)

#### **ECON 91. Introduction to Cost Accounting**

(Same as ECON 191) The use of internal financial data for managerial decision making.

5 units, Spr (Staff)

#### **ECON 101. Economic Policy Analysis**

Economic policy analysis, writing, and oral presentation. Topics vary with instructor. Limited enrollment. Prerequisites: 51 and 52, 102B, and two field courses. Some sections require additional prerequisites. WIM

5 units, Aut (Steiner, F), Win (Steiner, F), Spr (Steiner, F)

#### **ECON 102A. Introduction to Statistical Methods (Postcalculus) for Social Scientists**

Description and examples of the use of statistical techniques relevant to economics. Basic rules of probability, conditional probability, discrete and continuous probability distributions. Point estimation, tests of hypotheses, confidence intervals, and linear

regression model. Prerequisite: MATH 41 or equivalent. GER:DB-Math

5 units, *Aut (McKeon, S), Win (McKeon, S), Spr (McKeon, S)*

### **ECON 102B. Introduction to Econometrics**

Descriptive statistics. Regression analysis. Hypothesis testing. Confidence regions. Simultaneous equation models. Instrumental variables. Panel data. Limited dependent variables. Time series. Prerequisites: 50, 102A or equivalent. Recommended: computer experience.

5 units, *Win (Harding, M), Spr (Mahajan, A)*

### **ECON 102C. Advanced Topics in Econometrics**

Identification and estimation of the effect of human capital variables on earnings (such as the return to education, tenure). The evaluation problem. Identification and estimation of social interactions. Topics: instrumental variable estimation, limited dependent variable models (probit, logit, and Tobit models), panel data techniques (fixed effect and random effect models, dynamic panel data models), introduction to non-parametric methods.

5 units, *Spr (DeGiorgi, G)*

### **ECON 103. Applied Econometrics**

The construction and use of econometric models for analyzing economic phenomena. Students complete individual projects and core material. Topics vary with the instructor. Enrollment restricted to Juniors and Seniors. Limited enrollment. Prerequisites: 52, 102B.

5 units, *not given this year*

### **ECON 104. Econometrics Applied to Macroeconomics and Finance**

Seminar in quantitative analysis of issues relating to the overall performance of the American and global economies. Emphasis on the recent economic crisis. Requires the execution and presentation of an original research paper using econometric techniques. Prerequisites: Econ 51, 52, 102B. Recommended: Econ 140. Limited enrollment.

5 units, *not given this year*

### **ECON 106. World Food Economy**

(Same as EARTHSYS 106, EESS 106) The interrelationships among food, populations, resources, and economic development. The role of agricultural and rural development in achieving economic and social progress in low-income nations. Emphasis is on public sector decision making as it relates to food policy.

5 units, *Win (Naylor, R; Falcon, W)*

### **ECON 111. Money and Banking**

Money, interest rates, banks and other financial institutions at both micro and macro levels. Micro: alternative financial instruments, the determination of interest rates, the yield curve, and the role of banks and other capital market institutions in the intermediation process. Supply of money, regulation, and supervision. Macro: the choice of monetary policy by the central bank, the impact of monetary policy making institutions on this choice and the various channels through which monetary policy affects inflation and real variables in the economy. Emphasis is on the institutional structure of Federal Reserve System and the conduct of monetary policy in the U.S. Prerequisites: 50, 52.

5 units, *Win (Schneider, K), Sum (Staff)*

### **ECON 113. Economics of Innovation**

(Same as PUBLPOL 354) The modern, knowledge-based economy characterized by: rapid innovation; a dramatic increase in the rate of production of information and decline in the cost of producing it; and pervasive network externalities or increasing returns to scale. Emphasis is on the role of patents and alternative mechanisms for creating incentives for firms to innovate. Topics include: why there may be too much innovative activity; how patent laws may slow rather than help innovation; and the interaction between public and private sector innovation. Prerequisites: 51, 102B.

5 units, *Spr (Moser, P)*

### **ECON 114. Economy and Economics of Ancient Greece**

Cultural and political background for Athens of the 5th and 4th century BC. Athenian economy of the 4th century BC. Economic ideas of Plato, Aristotle, and Xenophon. Pros and Cons of utilitarianism in light of the ethical theories of Plato and Aristotle. Economy and economics of ancient Greece will be compared to the same of ancient China. There is an interesting parallel.

GER:EC-GlobalCom

5 units, *Win (Amemiya, T)*

### **ECON 115. European Economic History**

Economic changes and growth in W. Europe from antiquity to the present. The transformation of Europe from an economically and culturally backward part of the world to the center of the pre-WW I world economy. Topics: the role of techniques and sciences, variations of the extent of market activities, institutional changes, international politics, demography. Prerequisites: 51, 52. GER:DB-SocSci

5 units, *not given this year*

### **ECON 116. American Economic History**

(Same as AMSTUD 116) The American economy from colonial times to the present, illustrating the role of history in economic life. Topics: U.S. economic development in global and comparative context; slavery as an economic system; origins and consequences of the American technology and business organization; economics of the Great Depression and New Deal; post-World War II economic performance and social change; recent U.S. economic record in historical perspective. Prerequisite: 1A. GER:DB-SocSci, EC-AmerCul

5 units, *Spr (Wright, G)*

### **ECON 117. Economic History and Modernization of the Islamic Middle East**

From the rise of Islam to the present. Transformation of region from economically advanced to underdeveloped. Role of religion in economic successes and failures. Current obstacles to development. Topics: Islamic economic institutions; innovation and change; political economy of modernization; interactions with other regions; and economic consequences of Islamism. Prerequisites: ECON 51, 52, 102B.

5 units, *not given this year*

### **ECON 118. Development Economics**

The economic problems and policy concerns of developing countries. Theories of growth and development; inequality and poverty; credit and labor markets; health and education; politics and corruption. Emphasis is on economic models and econometric evidence rather than case studies. Prerequisites: 52, 102B. GER:EC-GlobalCom

5 units, *Aut (Blimpo, M)*

### **ECON 119. The Russian Economy**

(Same as REES 119, REES 219) Brief introduction to the economic history of Russia, general overview of the modern Russian economy with analysis of its macroeconomic features and dynamics, industrial structure, and the major institutional features that are important for understanding Russian economic development. The period of transition from Soviet-type planned economy to a market economy and market reforms (1991-1998), the period of economic growth (1999-2007), and the economic development of Russia during the current global crisis of 2008-2010. Analysis of Russia's social structure and social policy, labor markets, the regional structure of the economy, the role of the state, and major Russian industries (oil, metals, machinery). Emphasis on the specific institutional aspects that have shaped Russia's economic development.

4-5 units, *not given this year*

### **ECON 120. Socialist Economies in Transition**

Privatization, restructuring, and institutional change in E. Europe and the former Soviet Union. Analysis of property rights, corporate governance, incentives, and resource allocation in socialist and transitional economies. Emphasis is on liberalization and privatization policies (including mass and voucher programs) as the primary instruments to induce changes in behavior. Prerequisite: 50. Recommended: 51.

5 units, *not given this year*

### **ECON 123. Regulation and Competition in Less Developed Countries**

The economics and workings of public intervention, control and liberalization of markets in less developed countries. Topics: natural monopoly regulation; institutions and regulatory commitment; infrastructure concessions; regulation and competition in network industries such as telecoms and electricity; liberalization of markets and competition policy; competition and efficiency; antitrust with a weak judiciary. Prerequisite: 51.

5 units, not given this year

#### **ECON 124. Contemporary Japanese Economy**

Comparative and historical perspective. Micro and institutional aspects, such as firms, the employment system, corporate governance and financial institutions, and the macro economy. Elementary applications of macro- and microeconomics. Prerequisite: 50. GER:EC-GlobalCom

5 units, not given this year

#### **ECON 126. Economics of Health and Medical Care**

(Same as BIOMEDIN 156, BIOMEDIN 256, HRP 256) Institutional, theoretical, and empirical analysis of the problems of health and medical care. Topics: demand for medical care and medical insurance; institutions in the health sector; economics of information applied to the market for health insurance and for health care; measurement and valuation of health; socioeconomic status and epidemiology; economics of obesity. Graduate students with research interests should take ECON 248. Prerequisites: ECON 50 and ECON 102A or Stats 116 or the equivalent. Recommended: ECON 51.

5 units, Aut (Bhattacharya, J)

#### **ECON 127. Economics of Health Improvement in Developing Countries**

(Same as MED 262) Application of economic paradigms and empirical methods to health improvement in developing countries. Emphasis is on unifying analytic frameworks and evaluation of empirical evidence. How economic views differ from public health, medicine, and epidemiology; analytic paradigms for health and population change; the demand for health; the role of health in international development. Prerequisites: ECON 50 and 102B.

5 units, Win (Miller, N)

#### **ECON 135. Finance for Non-MBAs**

(Same as MS&E 245G) For graduate students and advanced undergraduates. The foundations of finance; applications in corporate finance and investment management. Financial decisions made by corporate managers and investors with focus on process valuation. Topics include criteria for investment decisions, valuation of financial assets and liabilities, relationships between risk and return, market efficiency, and the valuation of derivative securities. Corporate financial instruments including debt, equity, and convertible securities. Equivalent to core MBA finance course, FINANCE 220. Prerequisites: ECON 51, or ENGR 60, or equivalent; ability to use spreadsheets, and basic probability and statistics concepts including random variables, expected value, variance, covariance, and simple estimation and regression.

3-5 units, Aut (Perez-Gonzalez, F), Win (Admati, A)

#### **ECON 136. Market Design**

Use of economic theory and analysis to design allocation mechanisms and market institutions. Course focuses on three areas: the design of matching algorithms to solve assignment problems, with applications to school choice, entry-level labor markets, and kidney exchanges; the design of auctions to solve general resource allocation problems, with applications to the sale of natural resources, financial assets, and advertising; and the design of platforms and exchanges, with applications to internet markets. Emphasis on connecting economic theory to practical applications. Students must write term paper. Prerequisites: recommended: 51.

5 units, Aut (Levin, J)

#### **ECON 137. Information and Incentives**

Effective decision models consider a decision maker's alternatives, information and preferences. The construction of such models in single-party situations with emphasis on the role of information. The course then evolves to two-party situations where one party has more information than the other. The general structure of such problems and the design of contracts to create compatible incentives between the parties. Situations involving moral hazard, adverse selection and signaling with a variety of applications. Prerequisite: 51

5 units, Spr (McKeon, S)

#### **ECON 138. Risk and Insurance**

The nature of economic risk, its effect on allocation of resources and how public policy should be conducted in markets for risk. Preferences among risky prospects: expected utility theory and the theory of risk aversion. Allocation of risk using markets for

contingent claims vs. insurance pools in economies with complete information. The functioning of insurance markets when information is asymmetric, under moral hazard and adverse selection. Can insurance markets function well in a competitive equilibrium and what should be public policy in markets such as medical insurance? Role of asset markets in allocating risk. Hedging strategies using futures markets, options and other derivative assets. The role of risk taking in the 2007-2008 financial crises. Prerequisite: 50.

5 units, Win (Kurz, M)

#### **ECON 139D. Directed Reading**

May be repeated for credit.

1-10 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

#### **ECON 140. Introduction to Financial Economics**

Modern portfolio theory and corporate finance. Topics: present value and discounting, interest rates and yield to maturity, various financial instruments including financial futures, mutual funds, the efficient market theory, basic asset pricing theory, the capital asset pricing model, and models for pricing options and other contingent claims. Use of derivatives for hedging. Prerequisites: 51, 102A.

5 units, Spr (Shoven, J)

#### **ECON 141. Public Finance and Fiscal Policy**

(Same as PUBLPOL 107) What role should and does government play in the economy? What are the effects of government spending, borrowing, and taxation on efficiency, equity and economic growth? The course covers economic analysis, statistical evidence and historical and current fiscal policy debates in the U.S. and around the world. Policy topics: budget surpluses/deficits; tax reform; social security, public goods, and externalities; fiscal federalism; public investment; and cost-benefit analysis. Prerequisites: 51, 52 (can be taken concurrently).

5 units, Spr (Boskin, M)

#### **ECON 144. Family Economics**

Topics at the intersection of economics and demography. Causes and consequences of historical trends such as the demographic transition, the increase in female labor force participation and its macroeconomic implications, the connection between economic development and family laws (child labor laws, women's rights), and policies affecting families and children (such as parental leave policies, social security policy, education subsidies). Economic models of household bargaining, fertility choice, and intergenerational transfers. Prerequisites: 51.

5 units, not given this year

#### **ECON 145. Labor Economics**

Analysis and description of labor markets. Determination of employment, unemployment, hours of work, wages. Welfare programs and work effort. Wage differentials by schooling, experience, gender, and race. Economics of discrimination. Earnings inequality and changes in inequality. Employment contracts, labor unions, and bargaining. International comparisons. Prerequisites: 51, 102B. GER:EC-Gender

5 units, Aut (Pencavel, J)

#### **ECON 146. Economics of Education**

How a decision to invest in education is affected by factors including ability and family background. Markets for elementary and secondary schooling; topics such as vouchers and charter schools, accountability, expenditure equalization among schools, and the teacher labor market. The market for college education emphasizing how college tuition is determined, and whether students are matched efficiently with colleges. How education affects economic growth, focusing on developing countries. Theory and empirical results. Application of economics from fields such as public economics, labor economics, macroeconomics, and industrial organization. Prerequisites: 50, 102B.

5 units, Win (Hoxby, C)

#### **ECON 147. Economics of Human Resources**

Issues in the economics of human beings including the organization of work inside firms, the link between family background and adult outcomes, the operation of some cooperative organizations, the economic analysis of inequality, and the association between health and income. Prerequisite: 51.

5 units, Win (Pencavel, J)

#### **ECON 149. The Modern Firm in Theory and Practice**

Combines the latest theory and empirics on the modern firm.

Theoretical topics will include transactions cost theory, contract theory and incentives. Applied topics include the organization of firms in US and internationally. Management practices around information systems, target setting and human resources. Focus on management practices in manufacturing, but also analyze retail, hospitals and schools, plus some recent field-experiments in developing countries. Prerequisites: Econ 51, 102B

*5 units, Win (Bloom, N; Milgrom, P)*

#### **ECON 150. Economic Policy Analysis**

(Same as PUBLPOL 104, PUBLPOL 204) The relationship between microeconomic analysis and public policy making. How economic policy analysis is done and why political leaders regard it as useful but not definitive in making policy decisions. Economic rationales for policy interventions, methods of policy evaluation and the role of benefit-cost analysis, economic models of politics and their application to policy making, and the relationship of income distribution to policy choice. Theoretical foundations of policy making and analysis, and applications to program adoption and implementation. Prerequisites: ECON 50, and 102B.

*5 units, Win (Rosston, G; Clemens, J)*

#### **ECON 153. Economics of the Internet**

Economic models and tools used to understand online market phenomena, including standards, network and platform economics, online transactions, advertising, auctions, information, communications, and networking. The contemporary economics literature on internet markets and mobile communications markets. Public policy issues in competition policy, communication policy, and support for innovation. Prerequisites: 51 and 102B.

*5 units, Win (Bresnahan, T)*

#### **ECON 154. Economics of Legal Rules and Institutions**

(Same as PUBLPOL 106, PUBLPOL 206) Design and consequences of laws, given alternative policy objectives. Welfare approach to legal policy; deontological perspectives including Kant, Locke, Mill, and Rawls. Economic efficiency and agent rationality, law as mitigation of market and cognitive failures, effects of law on expectations and incentives, balancing costs of type I and type II legal errors. Empirical studies of law's effects. Applications: property, tort, contract, antitrust, discrimination, crime, legal procedure. Examples chiefly from U.S. law, but analytical tools of general applicability. Prerequisite: ECON 50.

*4-5 units, Aut (Owen, B)*

#### **ECON 155. Environmental Economics and Policy**

Economic sources of environmental problems and alternative policies for dealing with them (technology standards, emissions taxes, and marketable pollution permits). Evaluation of policies addressing regional air pollution, global climate change, water allocation in the western U.S., and the use of renewable resources. Connections between population growth, economic output, environmental quality, and human welfare. Prerequisite: ECON 50. GER: DB-NatSci

*5 units, Win (Goulder, L)*

#### **ECON 156. Marine Resource Economics and Policy**

(Same as EARTHSYS 156M) Economic, political, and institutional frameworks for understanding the causes and potential solutions to marine resource problems. Marine policy formation, implementation and evaluation. Applications include: offshore energy production, managing fisheries, marine spatial planning, protecting biodiversity, and ocean recreation. Prerequisite: Econ 1A

*5 units, not given this year*

#### **ECON 157. Imperfect Competition**

The interaction between firms and consumers in markets that fall outside the benchmark competitive model. How firms acquire and exploit market power. Game theory and information economics to analyze how firms interact strategically. Topics include monopoly, price discrimination, oligopoly, collusion and cartel behavior, anti-competitive practices, the role of information in markets, anti-trust policy, and e-commerce. Sources include theoretical models, real-world examples, and empirical papers. Prerequisite: 51.

*5 units, not given this year*

#### **ECON 158. Regulatory Economics**

The history, economics, and legal background of the institutions

under which U.S. industry is subject to government control. Topics: economics and practice of public utility regulation in the communications, television, transportation, energy, and postal delivery sectors and health and safety regulation. Emphasis on the application of economic concepts in evaluating the performance and policies of government agencies. Antitrust law will be introduced and discussed where necessary. Prerequisite: 51 or equivalent intermediate microeconomics course.

*5 units, not given this year*

#### **ECON 160. Game Theory and Economic Applications**

Introduction to game theory and its applications to economics. Topics: strategic and extensive form games, dominant strategies, Nash equilibrium, subgame-perfect equilibrium, Bayesian equilibrium, and behavioral game theory. The theory is applied to repeated games, voting, auctions, and bargaining with examples from economics and political science. Prerequisites: 51 and course in calculus.

*5 units, Spr (Jackson, M)*

#### **ECON 162. Monetary Economics**

Dynamic analysis of the role of money and monetary policy in the macro economy, using calculus. Topics: the exchange process and the role of money; inflation, the inflation tax, and hyperinflation; costs of inflation; monetary policy: rules vs discretion; inflation targeting; international monetary unions; the indeterminacy of floating exchange rates; money and interest-bearing government debt; the government's budget constraint and the coordination of monetary and fiscal policies; the effect of the national debt on consumption, savings, investment and output; time consistency of government policies; the financial crisis and unconventional monetary policy.. Prerequisite: 52.

*5 units, Aut (Hafstead, M)*

#### **ECON 165. International Finance**

Introduction to international macroeconomics. Topics: intertemporal approach to the current account, international investment patterns, sovereign debt, crises in international financial markets, real and nominal exchange rate determination and exchange rate policy. Prerequisite: ECON 52.

*5 units, Aut (Fitzgerald, D), Sum (Staff)*

#### **ECON 166. International Trade**

Different sources of comparative advantage in production and trade among nations. Aggregate gains from trade, winners and losers from globalization. International migration, outsourcing and multinational companies. Trade policy and international trade agreements. Theory, empirical evidence, and real-life anecdotes. Lectures supplemented by in-class debates on current topics from the popular press. Prerequisite: 51.

*5 units, Spr (Manova, K)*

#### **ECON 167. European Monetary and Economic Integration**

The economics of the European Community and the internal market. Analysis of current competition, transportation, and factor market policies, including the problems of agriculture and unemployment. Fiscal harmonization and mercantilist rivalry. European Monetary Union (EMU): genesis, implementation, and consequences of a common currency and central bank. Foreign exchange and foreign trade. Prerequisites: 51, 52, or equivalents.

*5 units, not given this year*

#### **ECON 168. International Finance and Exchange Rates**

(Same as ECON 268) (Graduate students register for 268.) Monetary foundations of international exchange; the rules of the game since Bretton Woods. Foreign exchange risk under the world dollar standard. Hedging, forward covering, and interest parity relationships. International capital flows and the current account. Global trade imbalances; China and Japan versus the U.S. Inflation versus exchange rate targeting in developing countries. Prerequisite for undergraduates: 50; recommended: 165.

*5 units, Win (McKinnon, R)*

#### **ECON 179. Experimental Economics**

Methods and major subject areas that have been addressed by laboratory experiments. Focus is on a series of experiments that build on one another. Topics include decision making, two player games, auctions, and market institutions. How experiments are used to learn about preferences and behavior, trust, fairness, and learning. Final presentation of group projects. Prerequisites: 50, 51, 102A.

5 units, Win (Niederle, M)

**ECON 190. Introduction to Financial Accounting**

(Same as ECON 90) How to read, understand, and use corporate financial statements. Oriented towards the use of financial accounting information (rather than the preparer), and emphasizes the reconstruction of economic events from published accounting reports.

5 units, Aut (Stanton, F), Win (Stanton, F)

**ECON 191. Introduction to Cost Accounting**

(Same as ECON 91) The use of internal financial data for managerial decision making.

5 units, Spr (Staff)

**ECON 198. Junior Honors Seminar**

(Same as PUBLPOL 197) Primarily for students who expect to write an honors thesis. Weekly sessions discuss writing an honors thesis proposal (prospectus), submitting grant applications, and completing the honors thesis. Readings focus on writing skills and research design. Students select an adviser, outline a program of study for their senior year, and complete a prospectus by the end of the quarter. Enrollment limited to 25.

5 units, Spr (Rothwell, G)

**ECON 199D. Honors Thesis Research**

In-depth study of an appropriate question and completion of a thesis of very high quality. Normally written under the direction of a member of the Department of Economics (or some closely related department). See description of honors program. Register for at least 1 unit for at least one quarter. Meets first week of Autumn Quarter.

1-10 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**GRADUATE COURSES IN ECONOMICS**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**ECON 202. Core Economics: Modules 1 and 2**

(Non-Economics graduate students register for 202N.) Open to advanced undergraduates with consent of instructors. Theory of the consumer and the implications of constrained maximization; uses of indirect utility and expenditure functions; theory of the producer, profit maximization, and cost minimization; behavior under uncertainty; partial equilibrium analysis and introduction to models of general equilibrium. Limited enrollment. Prerequisite: thorough understanding of the elements of multivariate calculus and linear algebra.

2-5 units, Aut (Segal, I)

**ECON 202N. 202 For Non-Economics Ph.D. Students**

Core Economics modules 1 and 2 for non-Economics Ph.D. students.

2-5 units, Aut (Handley, K)

**ECON 203. Core Economics: Modules 5 and 6**

(Non-Economics graduate students register for 203N.) Non-cooperative game theory including normal and extensive forms, solution concepts, games with incomplete information, and repeated games. Externalities and public goods. The theory of imperfect competition: static Bertrand and Cournot competition, dynamic oligopoly, entry decisions, entry deterrence, strategic behavior to alter market conditions. Limited enrollment. Prerequisite: 202.

2-5 units, Win (Bernheim, D)

**ECON 203N. 203 For Non-Economics Ph.D. Students**

Non-cooperative game theory including normal and extensive forms, solution concepts, games with incomplete information, and repeated games. Externalities, public goods, and asymmetric information. The theory of imperfect competition and other applications. Limited enrollment. Prerequisite: 202N or consent of instructor.

2-5 units, Win (Staff)

**ECON 204. Core Economics: Modules 9 and 10**

The theory of contracts, emphasizing contractual incompleteness and the problem of moral hazard. Incentive regulation. Competition with imperfect information, including signaling and adverse selection. The theory of resource allocation over time, competitive equilibrium, and intertemporal efficiency. Limited enrollment. Prerequisite: 203.

2-5 units, Spr (Jackson, M)

**ECON 210. Core Economics: Modules 3 and 7**

Dynamic economics applied to aggregate economic fluctuations and economic growth. Solving dynamic, stochastic rational expectation models using discrete time dynamic programming. Growth theory (neoclassical models, growth accounting, technical change, endogenous growth) using optimal control theory. Limited enrollment.

2-5 units, Aut (Amador Lopez, M; Klenow, P)

**ECON 211. Core Economics: Modules 11 and 12**

Investment theory and empirics, including adjustment costs and the q theory; consumption theory and empirics, focusing on the life-cycle model; and the labor market. Macro economics of financial markets. Limited enrollment. Prerequisite: 210.

2-5 units, Win (Piazzesi, M; Schneider, K)

**ECON 212. Core Economics: Modules 4 and 8**

General equilibrium with incomplete markets: precautionary savings; income, wealth, and consumption distribution; constrained efficiency. Endogenous market incompleteness: limited commitment, moral hazard, hidden income and hidden savings; recursive contracts. Optimal income taxation: the primal approach; taxation of capital income; optional taxation with heterogeneity; commitment and time inconsistency. Monetary theory and policy: time series techniques to characterize and evaluate policy; models with rational expectations and rigidities; the Lucas critique; time inconsistency; staggered price and wage setting; optimal policy rules; the term structure of interest rates. Limited enrollment. Prerequisites: 203, 211.

2-5 units, Spr (Taylor, J; Kurlat, P)

**ECON 214. Development Economics I**

Consumption smoothing and insurance. Lack of enforceability and imperfect (partial) insurance. Social networks and informal institutions. Evaluation of policy interventions in developing countries. Joint liability and micro-credit. Institutions and the process of development. Climate change. Prerequisites: 202 or 202N, 270.

2-5 units, Win (DeGiorgi, G)

**ECON 215. Economic Development**

Microeconomic analysis of markets and institutions in developing countries. Topics: agriculture; insurance, credit and saving; health and nutrition; education; public service delivery. Emphasis is on empirical tests of and evidence for theoretical models. Prerequisites: 202 or 202N.

2-5 units, Spr (Staff)

**ECON 216. Development Economics III**

Use of quantitative theory to understand various aspects of the growth and development process. Emphasis on family and demographic issues and their importance for development. Theoretical models of fertility and marriage decisions, and their empirical relevance. Unified growth theories: demographic transition and industrial revolution. Family institutions such as marriage payments and polygamy. The political economy of family-related institutions, e.g. the evolution of women's and children's rights. Female labor supply and development. Theories of disease and development. Prerequisite: 202, 203, 204, 210, 211, 212, 270, 271, 272.

2-5 units, not given this year

**ECON 217. Topics in Latin American Macroeconomics and Development**

Banking systems, interest rates, regulatory policies, and the productivity of capital in developing countries. Controlling inflation: fiscal and monetary policies for macroeconomic stability. Currency crises, exchange rates, and the liberalization of foreign trade. Further applications to transitional socialist economies in Asia and E. Europe.

2-5 units, Win (Neumeyer, P)

**ECON 220. Political Economy I**

Positive and normative theories of political economy. Positive topics include direct democracy, electoral competition, legislative policy making, agenda setting, lobbying, comparative constitutions, and intergenerational politics, with applications to income taxation, redistribution, and the size of government. Normative topics include social choice theory with and without interpersonal comparisons, Pareto efficiency with public goods,

potential Pareto improvements, welfare measurement, cost benefit analysis, and analysis of economic policy reform.

2-5 units, not given this year

### **ECON 221. Political Economy II**

Continuation of 220. Preparation for advanced research in applied political economy. Focus is on econometric methods (panel data, IV, treatment estimation, nonlinear models, random coefficients, duration models, factor analysis) with applications to economic and political development, economic voting, war and economic interdependence, corruption, legislative behavior, and social networks.

2-5 units, not given this year

### **ECON 224. Science, Technology, and Economic Growth**

Upper-division undergraduates may enroll with consent of instructor. The roles played by the growth of scientific knowledge and technical progress in the development of industrial societies. Emphasis is on the interactions between science and technology, and the organizational factors which have influenced their effectiveness in contributing to productivity growth.

2-5 units, not given this year

### **ECON 225. Economics of Technology and Innovation**

Theoretical and empirical analysis of innovation. Topics include optimal design of patents laws and alternative mechanisms to create incentives for innovation, such as technology transfer to developing countries, (compulsory) licensing, and patent pools. Emphasis on empirical analyses of both historical and contemporary data.

2-5 units, Spr (Moser, P)

### **ECON 226. U.S. Economic History**

The role of economic history as a distinctive approach to the study of economics, using illustrations from U.S. history. Topics: historical and institutional foundations of the U.S. rise to world economic preeminence; economic causes and consequences of slavery; the origins and character of national systems of technology; the Great Depression of the 30s.

2-5 units, not given this year

### **ECON 227. European Economic History**

European economic history from middle ages to the twentieth century. Topics: competing hypotheses in explaining long term trends in economic growth and cross-country differences in long-term economic growth; formation, function, and persistence of institutions and organizations; the role of institutions and organizations (e.g. apprenticeship, servitude, partnerships, cooperatives, social networks, share cropping, and communes) as solutions to contractual problems; the economics of migration; the changing economic role of the family. Use of economic theory in guiding hypothesis testing, as well as construction of new datasets and the execution of empirical analysis.

2-5 units, Aut (Abramitzky, R)

### **ECON 228. Institutions and Organizations in Historical Perspective**

Emphasis is on the formative period from the 11th to 18th centuries. Formation, function, and evolution of institutions; alternative conceptual frameworks such as neoclassical, transaction cost economics, institutionalism, and Marxism and neo-Marxism; game theory, mechanism design, and contract theory. Institutions related to trade organization, the organization of production, feudalism, mercantilism, and the state.

2-5 units, Win (Greif, A)

### **ECON 229. Topics in Economic History**

Emphasis is on institutions and organizations, such as risk-sharing organizations, and property rights, such as patent laws and their effects on technological change and economic growth. Topics include: competing hypotheses for cross-country differences in long-term growth; the importance of institutions to economic growth; formation, function, and persistence of institutions and organizations; role of patent laws in creating incentives for innovation; informal networks as a mechanism to trade property rights; causes and effects of institutional change; tests of contract theory in history; and long-term migration and its effect on economic development.

2-5 units, not given this year

### **ECON 233. Advanced Macroeconomics I**

Topics in the theory and empirics of economic growth.

2-5 units, Aut (Klenow, P)

### **ECON 234. Advanced Macroeconomics II**

Modern macroeconomics of aggregate fluctuations in advanced economies, concentrating mainly on the U.S. Current research on sovereign debt, fiscal policy and financial flows, with emphasis on current events. The bulk of the entire course will involve the study of recent research papers.

2-5 units, Win (Hall, R; Amador Lopez, M)

### **ECON 235. Advanced Macroeconomics III**

Current topics to prepare student for research in the field. Recent research in labor-market friction, reallocation, fluctuations, wage and price determination, innovation, and productivity growth. Research methods, presentations skills, and writing in advanced economics.

2-5 units, Spr (Kurlat, P)

### **ECON 236. Financial Economics I**

Tools: solving choice problems and equilibrium models with multiple risky assets, many agents, and frictions. Applications: household finance (including housing and mortgage choice); risk sharing and financial innovation; economies; trading volume; international capital flows and financial market integration. Prerequisites: 210, 211, 212.

2-5 units, Win (Schneider, K; Piazzesi, M)

### **ECON 237. Financial Economics II**

Topics in financial Economics. Discussion of recent academic papers on asset pricing. Student presentations and course paper requirement. Designed for second year PhD students in economics or finance.

2-5 units, Spr (Staff)

### **ECON 239D. Directed Reading**

May be repeated for credit.

1-10 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### **ECON 241. Public Finance and Taxation I**

Optimal taxation and design of tax/income transfer systems, including incidence and efficiency. Social welfare. Externalities and public goods. Local public economics, fiscal federalism, and education finance. Prerequisites: 202-204, 210, 270, 271, or equivalent with consent of instructor.

2-5 units, Win (Hoxby, C; Scheuer, F)

### **ECON 242. Public Finance and Taxation II**

Topics concerning dynamic taxation, including capital income taxation, taxation and saving, and corporate income taxation. Public expenditures, including government interventions in private insurance markets, adverse selection, optimal unemployment insurance design, and health economics. Prerequisites: 202, 203, 204, 210, 270, 271, or equivalent with consent of instructor. Recommended: 241.

2-5 units, Spr (Scheuer, F; Bernheim, D)

### **ECON 246. Labor Economics I**

The demand for workers and hours of work, substitution among different types of labor in production, technological change, adjustment costs, restrictions on layoffs. The supply of labor, hours of work, participation, life-cycle models of behavior, welfare programs. Wage differentials by schooling, age, cohort, gender, and race. Changes in these wage differentials and differences across countries. Economics of discrimination. Income inequality. Employment contracts and turnover. Models of labor union behavior. Bargaining. Worker-owned enterprises.

2-5 units, Aut (Pencavel, J)

### **ECON 247. Labor Economics II**

Recent topics in applied micro, focusing on top papers from the last five years. Skill-biased technical change, discrimination, media bias, management, pollution, culture, development and peer effects. Combination of student and faculty presentations. Additional sessions on general presentations, paper writing and research skills, as well as practical Stata sessions on estimation procedures and tricks. Short presentation of research idea required.

2-5 units, Win (Bloom, N)

### **ECON 248. Labor Economics III**

Topics in current applied microeconomic research including skill-biased technical change, income distribution, program evaluation, job search, migration, consumption behavior. Student and faculty presentations



2-5 units, not given this year

### **ECON 250. Environmental Economics**

Theoretical and empirical analysis of sources of and solutions to environmental problems, with application to local pollution challenges and global environmental issues such as climate change. Topics include: analysis of market failure, choice of environmental policy instruments, integrating environmental and distortionary taxes, environmental policy making under uncertainty, valuing environmental amenities, and measuring/promoting sustainable development.

2-5 units, Spr (Goulder, L; Sanders, N)

### **ECON 251. Natural Resource and Energy Economics**

Management and provision non-renewable and renewable natural resources, with considerable attention to energy provision and use. Topics include: fisheries problems and policy; energy industry market structure, pricing, and performance; and policies to facilitate transitions from non-renewable to renewable energy. Prerequisites: 202, 203, 204, 271, and 272, or equivalents with consent of instructor.

2-5 units, Win (Goulder, L)

### **ECON 257. Industrial Organization 1**

Theoretical and empirical analyses of the determinants of market structure; firm behavior and market efficiency in oligopolies; price discrimination; price dispersion and consumer search; differentiated products; the role of information in markets, including insurance and adverse selection; auctions; collusion and cartel behavior; advertising; entry and market structure; market dynamics; strategic behavior.

2-5 units, Aut (Einav, L; Bresnahan, T)

### **ECON 258. Industrial Organization 2A**

Theoretical and empirical analyses of the determinants of market structure; firm behavior and market efficiency in oligopolies; collusion and cartel behavior; advertising; signaling; auctions; financial markets.

2-5 units, Win (Kastl, J; Bagwell, K)

### **ECON 259. Industrial Organization II B**

Theoretical and empirical analyses of the determinants of market structure; firm behavior and market efficiency in oligopolies; economics of antitrust and regulation, with focus on energy and environmental economics; the role of information asymmetries in markets; adverse selection and moral hazard, with focus on insurance and credit markets.

2-5 units, not given this year

### **ECON 260. Industrial Organization III**

Current research and policy questions in industrial organization. Course combines lectures by the instructors with student presentations, with an emphasis on initiating dissertation research in industrial organization. Prerequisites: 257, 258.

2-5 units, Spr (Einav, L; Bresnahan, T)

### **ECON 265. International Economics I**

International macroeconomics and finance, emphasizing current research. The course is organized around the role of different types of frictions (in asset and goods markets) in explaining features of the international macroeconomy. Prerequisites: 202, 203, 204, 210, 211, 212.

2-5 units, Aut (Fitzgerald, D)

### **ECON 266. International Economics II**

Commercial policies, unilateral trade policies, political economy of trade policy and the economics of trade agreements. Trade with perfectly and imperfectly competitive markets.

2-5 units, Win (Bagwell, K)

### **ECON 267. Topics in International Trade**

Topics from the frontier of current international trade research, presented through recent theoretical and empirical papers. Firm heterogeneity in trade and firms' export decisions. Different types of foreign direct investment. Multinational firms and the interaction between international trade and the theory of the firm. Institutional frictions and their effects on trade and FDI activity. Course goal is to prepare students for doing research in international trade and related fields.

2-5 units, Spr (Manova, K)

### **ECON 268. International Finance and Exchange Rates**

(Same as ECON 168) (Graduate students register for 268.)

Monetary foundations of international exchange; the rules of the game since Bretton Woods. Foreign exchange risk under the world dollar standard. Hedging, forward covering, and interest parity relationships. International capital flows and the current account. Global trade imbalances; China and Japan versus the U.S. Inflation versus exchange rate targeting in developing countries. Prerequisite for undergraduates: 50; recommended: 165.

5 units, Win (McKinnon, R)

### **ECON 270. Intermediate Econometrics I**

Probability, random variables, and distributions; large sample theory; theory of estimation and hypothesis testing. Limited enrollment. Prerequisites: math and probability at the level of Chapter 2, Paul G. Hoel, Introduction to Mathematical Statistics, 5th ed.

2-5 units, Aut (Hong, H)

### **ECON 271. Intermediate Econometrics II**

Linear regression model, relaxation of classical-regression assumptions, simultaneous equation models, linear time series analysis. Limited enrollment. Prerequisite: 270.

2-5 units, Win (Wolak, F)

### **ECON 272. Intermediate Econometrics III**

Continuation of 271. Nonlinear estimation, qualitative response models, limited dependent variable (Tobit) models. Limited enrollment. Prerequisite: 271.

2-5 units, Spr (MaCurdy, T)

### **ECON 273. Advanced Econometrics I**

Possible topics: parametric asymptotic theory. M and Z estimators. General large sample results for maximum likelihood; nonlinear least squares; and nonlinear instrumental variables estimators including the generalized method of moments estimator under general conditions. Model selection test. Consistent model selection criteria. Nonnested hypothesis testing. Markov chain Monte Carlo methods. Nonparametric and semiparametric methods. Quantile Regression methods.

2-5 units, Aut (Hong, H)

### **ECON 274. Advanced Econometrics II**

(Formerly 273B); Possible topics: nonparametric density estimation and regression analysis; sieve approximation; local polynomial regression; spline regression; cross validation; indirect inference; resampling methods: bootstrap and subsampling; quantile regression; nonstandard asymptotic distribution theory; empirical processes; set identification and inference, large sample efficiency and optimality.

2-5 units, Win (Romano, J)

### **ECON 275. Time Series Econometrics**

Stochastic processes and concepts such as stationarity, ergodicity, and mixing. Inference with heteroskedastic and autocorrelated time series; autoregressive and moving average models; unit root processes and asymptotic analysis of such; tests for structural change; vector autoregressive models; cointegration; impulse response analysis; forecasting; ARCH and GARCH volatility models. Prerequisites: 270, 271.

2-5 units, not given this year

### **ECON 276. Limited Dependent Variables**

(Formerly 274.) Parametric and semi-parametric approaches to the estimation of econometric models with discrete or limited dependent variables. Maximum likelihood, nonlinear panel data, duration models, rank estimation and index models, Bayesian approaches and MCMC. Estimation of discrete choice models with endogeneity, simulation methods and computationally intensive approaches. Estimation of social network models. Random matrix theory. Prerequisite: 273 or consent of instructor.

2-5 units, not given this year

### **ECON 278. Behavioral and Experimental Economics I**

This is the first half of a two course sequence (along with Econ 279) on behavioral and experimental economics. The sequence has two main objectives: 1) examines theories and evidence related to the psychology of economic decision making, 2) Introduces methods of experimental economics, and explores major subject areas (including those not falling within behavioral economics) that have been addressed through laboratory experiments. Focuses on series of experiments that build on one another in an effort to test between competing theoretical frameworks, with the objects of improving the explanatory and predictive performance of standard



models, and of providing a foundation for more reliable normative analyses of policy issues. Prerequisites: 204 and 271, or consent of instructor.

2-5 units, Aut (Bernheim, D; Niederle, M)

### **ECON 279. Behavioral and Experimental Economics II**

This is the second half of a two course sequence (along with Econ 278) on behavioral and experimental economics. The sequence has two main objectives: 1) examines theories and evidence related to the psychology of economic decision making, 2) Introduces methods of experimental economics, and explores major subject areas (including those not falling within behavioral economics) that have been addressed through laboratory experiments. Focuses on series of experiments that build on one another in an effort to test between competing theoretical frameworks, with the objects of improving the explanatory and predictive performance of standard models, and of providing a foundation for more reliable normative analyses of policy issues. Prerequisites: 204 and 271, or consent of instructor.

2-5 units, Win (Staff)

### **ECON 281. Normative Decision Theory and Social Choice**

Normative principles of behavior, especially in single-person decision trees. Objective and subjective expected utility. Savage, Anscombe-Aumann, and consequentialist axioms. State dependence. Multi-person extensions: social choice, ethics, opinion pooling, and rationalizability in non-cooperative games. Prerequisite: 202 or equivalent. (Hammond)

2-5 units, not given this year

### **ECON 282. Contracts, Information, and Incentives**

Basic theories and recent developments in mechanism design and the theory of contracts. Topics include: hidden characteristics and hidden action models with one and many agents, design of mechanisms and markets with limited communication, long-term relationships under commitment and under renegotiation, property rights and theories of the firm.

2-5 units, Win (Segal, I)

### **ECON 283. Theory and Practice of Auction Market Design**

Basics of auction theory. Combinatorial auctions. Auction message spaces. Robust auction design. Connections to matching theory. Applied auction design with practical applications. Applied topics may include auctions for Internet advertising, radio spectrum auctions, securities markets, commodities, and complex procurements. US incentive auctions and procurement for the Connect America Fund are likely applications for 2012. Prerequisite: 282 or consent of instructors.

2-5 units, Win (Milgrom, P)

### **ECON 285. Auctions, Bargaining, and Pricing**

(Same as MGTECON 602.) Theory of auctions and related literature in bargaining and pricing. Key papers include Myerson and Satterthwaite on bargaining, Myerson on optimal auctions, and Milgrom and Weber's classic work. How markets with complicated preferences and constraints, limitations on the use of cash, or variations in contract details among bidders decisively impair the performance of simple market rules. Emphasis on matching markets such as the National Resident Matching Program, asset auctions such as the spectrum auctions. Literature on dynamic bargaining.

2-5 units, Aut (Niederle, M)

### **ECON 286. Game Theory and Economic Application**

Solution concepts for non-cooperative games, repeated games, games of incomplete information, reputation, and experiments. Standard results and current research topics. Prerequisite: 203 or consent of instructor.

2-5 units, not given this year

### **ECON 287. General Equilibrium Theory**

Existence, efficiency, and Walrasian equilibrium in exchange economies. Production, financial markets, incomplete markets, sequence economies with infinitely-lived agents. Prerequisites: 204 or consent of instructor.

2-5 units, not given this year

### **ECON 289. Advanced Topics in Game Theory and Information Economics**

Topics course covering a variety of game theory topics with emphasis on market design, such as matching theory and auction theory. Prerequisites: Econ 285 or equivalent.

2-5 units, not given this year

### **ECON 290. Multiperson Decision Theory**

dents and faculty review and present recent research papers on basic theories and economic applications of decision theory, game theory and mechanism design. Applications include market design and analyses of incentives and strategic behavior in markets, and selected topics such as auctions, bargaining, contracting, and computation.

4 units, not given this year

### **ECON 291. Social and Economic Networks**

Synthesis of research on social and economic networks by sociologists, economists, computer scientists, physicists, and mathematicians, with an emphasis on modeling. Includes methods for describing and measuring networks, empirical observations about network structure, models of random and strategic network formation, as well as analyses of contagion, diffusion, learning, peer influence, games played on networks, and networked markets.

2-5 units, Spr (Jackson, M)

### **ECON 299. Practical Training**

Students obtain employment in a relevant research or industrial activity to enhance their professional experience consistent with their degree programs. At the start of the quarter, students must submit a one page statement showing the relevance of the employment to the degree program along with an offer letter. At the end of the quarter, a three page final report must be supplied documenting work done and relevance to degree program. May be repeated for credit.

1-10 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### **ECON 300. Third-Year Seminar**

Restricted to Economics Ph.D. students. Students present current research. May be repeated for credit.

1-10 units, Aut (Bresnahan, T; Mahajan, A), Spr (Bresnahan, T; Mahajan, A)

### **ECON 301. Microeconomic Workshop**

1-10 units, not given this year

### **ECON 310. Macroeconomic Workshop**

1-10 units, Aut (Hall, R; Klenow, P; Taylor, J; Amador Lopez, M; Tertilt, M; Piazzesi, M; Schneider, K; Bloom, N; Kurlat, P), Win (Hall, R; Klenow, P; Taylor, J; Amador Lopez, M; Piazzesi, M; Schneider, K; Bloom, N; Kurlat, P), Spr (Hall, R; Klenow, P;

### **ECON 315. Development Workshop**

1-10 units, Aut (DeGiorgi, G; Mahajan, A; Bloom, N), Win (Mahajan, A; DeGiorgi, G), Spr (DeGiorgi, G; Mahajan, A)

### **ECON 325. Economic History Workshop**

May be repeated for credit.

1-10 units, Aut (Greif, A; Wright, G; Abramitzky, R; Moser, P), Win (Greif, A; Wright, G; Moser, P; Abramitzky, R), Spr (Wright, G; Greif, A; Moser, P; Abramitzky, R)

### **ECON 341. Public Economics and Environmental Economics Seminar**

Issues in measuring and evaluating the economic performance of government tax, expenditure, debt, and regulatory policies; their effects on levels and distribution of income, wealth, and environmental quality; alternative policies and methods of evaluation. Workshop format combines student research, faculty presentations, and guest speakers. Prerequisite: 241 or consent of instructor.

1-10 units, Aut (Boskin, M; Shoven, J; Hoxby, C; Bloom, N), Win (Boskin, M; Shoven, J; Bloom, N; Hoxby, C), Spr (Boskin, M; Shoven, J; Bloom, N; Hoxby, C)

### **ECON 345. Applications Workshop**

1-10 units, Aut (MaCurdy, T; Pencavel, J; Pistaferri, L; Wolak, F; Mahajan, A; Dupas, P; Bloom, N), Win (MaCurdy, T; Pencavel, J; Pistaferri, L; Wolak, F; Mahajan, A; Hong, H; Dupas, P), Spr (MaCurdy, T; Pencavel, J; Pistaferri, L; Wolak, F; Mahajan, A)

### **ECON 354. Workshop in Law and Economics**

2-6 units, Aut (Polinsky, M), Win (Polinsky, M)

### **ECON 355. Industrial Organization Workshop**

Current research in the field by visitors, presentations by students, and discussion of recent papers. Students write an original research

paper, make a formal presentation, and lead a structured discussion.

*1-10 units, Aut (Bresnahan, T; Einav, L; Kastl, J; Levin, J; Wolak, F), Win (Bresnahan, T; Einav, L; Kastl, J; Levin, J; Wolak, F), Spr (Bresnahan, T; Einav, L; Kastl, J; Levin, J; Wolak, F)*

#### **ECON 365. International Trade Workshop**

*1-10 units, Aut (Fitzgerald, D; Manova, K; Staiger, R; Bagwell, K), Win (Staiger, R; Fitzgerald, D; Manova, K; Bagwell, K), Spr (Fitzgerald, D; Staiger, R; Bagwell, K; Manova, K)*

#### **ECON 370. Econometrics Workshop**

*1-10 units, Aut (Hong, H; Hansen, P; Mahajan, A; Harding, M; MaCurdy, T; Wolak, F), Win (Hansen, P; Mahajan, A; Hong, H; Harding, M; MaCurdy, T; Wolak, F), Spr (Hansen, P; Mahajan, A; Hong, H; Harding, M; MaCurdy, T; Wolak, F)*

#### **ECON 391. Microeconomic Theory Seminar**

*1-10 units, Aut (Segal, I; Milgrom, P; Niederle, M; Bernheim, D; Jackson, M; Kojima, F; Fong, K), Win (Bernheim, D; Milgrom, P; Niederle, M; Segal, I; Jackson, M; Kojima, F; Fong, K), Spr (Bernheim, D; Fong, K)*

#### **ECON 801. TGR Project**

*0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

#### **ECON 802. TGR Dissertation**

*0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

## EDUCATION (EDUC) COURSES

### UNDERGRADUATE COURSES IN EDUCATION

Primarily for undergraduates; graduate students may enroll with consent of adviser.

#### **EDUC 11SC. Work and Family**

Examination into the forces behind the rise in women's paid work and subsequent changes in the workplace and in families. Topics include gendered division of labor, decisions about marriage and childrearing, economic issues, employers' role in structuring work and family, and public policy issues such as anti-discrimination laws, divorce laws, and subsidized child care.

*2 units, not given this year*

#### **EDUC 95SI. Learning with Improvisation: Enhancing Creativity, Confidence, and Empathy through Theatrical Play**

Can you imagine going on stage without memorizing any lines, knowing that absolutely anything could happen, and you're going to have to deal with it? Teachers do this every day! In this class, we will play theatrical games as an applied introduction to active learning in the classroom, effective leadership, and the psychology of creativity, effective group work, and emotional intelligence. Challenge and expand yourself; learn how to use improv to challenge and develop others when you are the leader or educator. Preference to students without significant theater or drama experience.

*1-2 units, Aut (Oishi, L; Oppizzo, M)*

#### **EDUC 97X. Science Education through Community Service**

This one-unit directed reading, service-learning course will focus on educational inequity in the sciences for k-8 children in the communities of the Ravenswood School District. It is intended for students who are participating in the Haas Center's Science in Service program. Students will attend a 2-hr/week seminar. Through the readings students will familiarize themselves with the communities, gain an understanding of the root causes of educational inequity in the sciences, and acquire skills in teaching science and mentoring children.

*1 unit, Aut (Beck, K)*

#### **EDUC 98X. Service Learning Practicum**

For Alternative Spring Break program leaders. The skills and philosophical framework to develop and lead an ASB experience.

*1 unit, Aut (McConnell, J)*

#### **EDUC 100A. EAST House Seminar: Current Issues and Debates in Education**

Education and Society Theme (EAST) House seminar. In fall

quarter, faculty from around the University discuss the latest issues and research related to education. In winter quarter, current issues in international and comparative education, particularly in developing countries, are explored. In the spring, the seminar revolves around race and ethnicity, political activism, and higher education. Through an examination of these topics, students are able to share and develop their varied interests in educational research, policy, and practice.

*1 unit, Aut (Wotipka, C)*

#### **EDUC 100B. EAST House Seminar: Current Issues and Debates in Education**

Education and Society Theme (EAST) House seminar. In fall quarter, faculty from around the University discuss the latest issues and research related to education. In winter quarter, current issues in international and comparative education, particularly in developing countries, are explored. In the spring, the seminar revolves around race and ethnicity, political activism, and higher education. Through an examination of these topics, students are able to share and develop their varied interests in educational research, policy, and practice.

*1 unit, Win (Wotipka, C)*

#### **EDUC 100C. EAST House Seminar: Current Issues and Debates in Education**

(Same as ASNAMST 100C) Education and Society Theme (EAST) House seminar. In fall quarter, faculty from around the University discuss the latest issues and research related to education. In winter quarter, current issues in international and comparative education, particularly in developing countries, are explored. In the spring, the seminar revolves around race and ethnicity, political activism, and higher education. Through an examination of these topics, students are able to share and develop their varied interests in educational research, policy, and practice.

*1 unit, Spr (Wotipka, C)*

#### **EDUC 101. Introduction to Teaching and Learning**

This course is designed to help undergraduates explore career interests in education; it is the core course for the Undergraduate Minor in Education, and fulfills requirements for Honors in Education. The course considers the philosophy, history, politics, professional practice and social structures of teaching in the United States. Students will read and discuss teaching theory and research, participate in learning activities and visit school teaching sites, as well as examine and analyze artifacts and models of teaching.

*3-5 units, Aut (Wolf, J)*

#### **EDUC 102. Examining Social Structures, Power, and Educational Access**

Goal is to prepare Education and Youth Development fellows for their work with adolescents in the Haas Center's pre-college summer programs and to define their role in addressing educational inequities in the summer programs and beyond.

*2-3 units, Spr (Metz, M)*

#### **EDUC 103A. Tutoring: Seeing a Child through Literacy**

(Same as EDUC 203A) Experience tutoring grade school readers in a low income community near Stanford under supervision. Training in tutoring; the role of instruction in developing literacy; challenges facing low income students and those whose first language is not English. How to see school and print through the eyes of a child. Ravenswood Reads tutors encouraged to enroll. Service Learning Course (certified by Haas Center). GER:DB-SocSci

*4 units, Aut (Juel, C)*

#### **EDUC 103B. Race, Ethnicity, and Linguistic Diversity in Classrooms: Sociocultural Theory and Practices**

(Same as AFRICAAM 106, CSRE 103B, EDUC 337) Focus is on classrooms with students from diverse racial, ethnic and linguistic backgrounds. Studies, writing, and media representation of urban and diverse school settings; implications for transforming teaching and learning. Issues related to developing teachers with attitudes, dispositions, and skills necessary to teach diverse students.

*3-5 units, Spr (Ball, A)*

#### **EDUC 103C. Educational Policy, Diversity, and English Learners**

Undergraduates engage in the real world of teaching. Historical and legal foundations, and materials, methods, and strategies for English and primary language development. Students tutor an

English learner.

*3-4 units, not given this year*

**EDUC 104X. Conduct of Research with and in Communities**

For undergraduates interested in service learning and research in community settings. The historical and theoretical underpinnings of community-based participatory research (CBPR), action research, community-embedded research, participant observation, and qualitative research.

*3-4 units, not given this year*

**EDUC 105X. Introduction to Education Research for Undergraduates**

EDUC 105X explores types and purposes and products of education research. Broadly, this seminar course is designed to support Stanford undergraduates in exploring academic and career interests in education; specifically, this course satisfies requirements for the Education Minor, and supports students considering application to the Education Honors Program. In this course we consider what defines education research, and what factors make for quality research. Each week we will read current research by School of Education scholars and welcome the researcher-authors as guest speakers to the class. Students will identify an education topic of interest and write an educational literature review to that topic.

*3 units, Spr (Wolf, J)*

**EDUC 106. Interactive Media in Education**

Workshop. (CTE)

*3-5 units, not given this year*

**EDUC 109X. Educational Issues in Contemporary China**

(Same as EDUC 309X) Reforms such as the decentralization of school finance, emergence of private schools, expansion of higher education, and reframing of educational policy to focus on issues of quality. Have these reforms exacerbated educational inequality.

*3-4 units, not given this year*

**EDUC 110. Sociology of Education: The Social Organization of Schools**

(Same as EDUC 310, SOC 132, SOC 332) Seminar. Key sociological theories and empirical studies of the links between education and its role in modern society, focusing on frameworks that deal with sources of educational change, the organizational context of schooling, the impact of schooling on social stratification, and the relationships between the educational system and other social institutions such as families, neighborhoods, and the economy. GER:DB-SocSci

*4 units, Spr (Carter, P)*

**EDUC 111. The Young Adult Novel: A Literature For and About Adolescents**

For undergraduates considering teaching or working with adolescents, and for those planning to apply to the coterminal program in the Stanford Teacher Education program (STEP). Students work together to define the genre of young adult novels. What they reveal about adolescence in America. How to read and teach young adult literature.

*4 units, not given this year*

**EDUC 112X. Urban Education**

(Same as AFRICAAM 112, EDUC 212X, SOC 129X, SOC 229X) (Graduate students register for EDUC 212X or SOC 229X). Combination of social science and historical perspectives trace the major developments, contexts, tensions, challenges, and policy issues of urban education. GER:DB-SocSci

*3-4 units, Spr (Ball, A)*

**EDUC 113X. Gender and Sexuality in Schools**

Issues at the intersection of queer theory and educational practice. Experiences, rights, and responsibilities of lesbian, gay, bisexual, transgender, intersex, queer, and questioning students and teachers as members of marginalized or majority cultures. GER:EC-Gender

*1-3 units, not given this year*

**EDUC 114N. Growing Up Bilingual**

(F,Sem) (Same as CHICANST 14N, CSRE 14N) Stanford Introductory Seminar. This course is a Freshman Introductory Seminar that has as its purpose introducing students to the sociolinguistic study of bilingualism by focusing on bilingual communities in this country and on bilingual individuals who use two languages in their everyday lives. Much attention is given to

the history, significance, and consequences of language contact in the United States. The course focuses on the experiences of long-term US minority populations as well as that of recent immigrants.

*3 units, Win (Valdes, G)*

**EDUC 115Q. Identities, Race, and Culture in Urban Schools**

Preference to sophomores. How urban youth come to a sense of themselves as students, members of cultural and racial groups, and young people in urban America. The nature and interaction of racial and academic identities: how identity takes shape; how it has been conceptualized. The relation between identities and learning. Urban schools as contexts for identity development. Theoretical perspectives include psychology, sociolinguistics, sociology, anthropology, and education. Students shadow a high-school student in a public school and write a case study.

*3 units, not given this year*

**EDUC 116X. Service Learning as an Approach to Teaching**

History, theory, and practice. Topics include: responsive community partnerships, cultural awareness, the role of reflection, and best practices in service learning.

*3 units, Spr (Mitchell, T)*

**EDUC 117. Research and Policy on Postsecondary Access**

(Same as EDUC 417) The transition from high school to college. K-16 course focusing on high school preparation, college choice, remediation, pathways to college, and first-year adjustment. The role of educational policy in postsecondary access. Service Learning Course (certified by Haas Center).

*3 units, not given this year*

**EDUC 120C. Education and Society**

(Same as EDUC 220C, SOC 130, SOC 230) The effects of schools and schooling on individuals, the stratification system, and society. Education as socializing individuals and as legitimizing social institutions. The social and individual factors affecting the expansion of schooling, individual educational attainment, and the organizational structure of schooling. GER:DB-SocSci

*4-5 units, NEXTYEAR*

**EDUC 120X. Sociology of Knowledge Creation**

(Same as EDUC 320X, SOC 330) The sociology of knowledge creation explores systematic relationships between thought and social structure in order to examine how human beings construct, interpret, and view reality. How knowledge is socially constructed, patterned, and used, and how everyday and tacit forms of knowledge are achieved. Emphasis is on the creation and patterning of scientific paradigms, social science disciplines, and the field of education.

*3-4 units, Aut (McFarland, D)*

**EDUC 121X. Hip Hop, Youth Identities, and the Politics of Language**

(Same as AFRICAAM 121X, AMSTUD 121X, ANTHRO 121A, CSRE 121X, LINGUIST 155) Focus is on issues of language, identity, and globalization, with a focus on Hip Hop cultures and the verbal virtuosity within the Hip Hop nation. Beginning with the U.S., a broad, comparative perspective in exploring youth identities and the politics of language in what is now a global Hip Hop movement. Readings draw from the interdisciplinary literature on Hip Hop cultures with a focus on sociolinguistics and youth culture.

*3-4 units, Spr (Alim, H)*

**EDUC 122X. From Local to Global: Collaborations for International Environmental Education**

(Same as EARTHSYS 123) A collaboration with three universities in Africa. Discourse and debate using Internet and mobile technology interactions. Topics include the global environment, climate change, sustainable development, and food security.

*2 units, not given this year*

**EDUC 123X. Contexts that Promote Youth Development: Understandings of Effective Interventions**

How psychology, medicine, public health, sociology, education, and public policy define and promote youth development. How to build the resilience and competencies of youth through safe, supportive environments for building social, emotional, and intellectual skills. How to design settings that best promote youth development.

*2-4 units, not given this year*

**EDUC 124. Collaborative Design and Research of Technology-integrated Curriculum**

Design models for the development of educational materials through a studio-based, curriculum development project. Teams work with a teacher or non-school educator to design and test technology-integrated curricula. Focus is on the role that technologies can play in teaching and learning in school and out-of-school contexts. Open to all.

*3-4 units, not given this year*

**EDUC 126A. Introduction to Public Service Leadership**

Offered through the Haas Center for Public Service. A foundation and vision for a future of public service leadership. Students identify personal values and assess strengths as leaders. The ethics of public service and leadership theory.

*1-2 units, Win (Lobo, K)*

**EDUC 126B. Public Service Leadership Program Practicum**

This course is for students in the Public Service Leadership Program offered through the Haas Center for Public Service. Designed as a follow-up course to EDUC 126A: Introduction to Public Service Leadership, the PSLP Practicum provides an opportunity for PSLP students to reflect on their own leadership experiences and to learn from each other's leadership experiences while continuing to build a community of peer service leaders. The PSLP Practicum will meet every other week throughout the quarter.

*1 unit, Aut (Lobo, K), Win (Lobo, K), Spr (Lobo, K)*

**EDUC 130. Introduction to Counseling**

(Same as PSYCH 148) The goal of counseling is to help others to create more satisfying lives for themselves. Clients learn to create and capitalize on unexpected events to open up new opportunities. The success of counseling is judged, not by the words and actions of the counselor, but by the progress that the client makes in the real world after counseling itself is ended. Students are encouraged to exert their full efforts within reasonable time limits to improve their competence. (PSE)

*3 units, Win (Krumboltz, J)*

**EDUC 131. Mediation for Dispute Resolution**

(Same as PSYCH 152) Mediation as more effective and less expensive than other forms of settling disputes such as violence, lawsuits, or arbitration. How mediation can be structured to maximize the chances for success. Simulated mediation sessions.

*3 units, Aut (Krumboltz, J)*

**EDUC 131Q. Is Nationalism Dying?**

(F,Dial) Stanford Introductory Dialogue. The 19th century has been depicted as the age of nationalism. The nation-state as a blueprint and mass schooling as a nation-state project emerged and diffused. The transformation of transnational masses into national citizens is a core dynamic of this seminar, with special attention to how schools functioned as laboratories for nationalism. Readings will include Benedict Anderson's *Imagined Communities*, and selected chapters from Eugene Weber's *Peasants to Frenchmen* and from Michael Schudson's *The Good Citizen*. In recent decades, questions have been raised about nationalism and the role of schools in promoting nationalism. Some of these questions emphasize a cosmopolitan narrative that valorizes humanity, while others have stressed multiculturalism and the valorization of diversity. These questions are anchored in a human rights discourse that leads to the second core dynamic of this seminar: the rise of a human rights regime, in particular its education

*3 units, Win (Ramirez, F)*

**EDUC 134. Career and Personal Counseling**

(Same as EDUC 234, PSYCH 192) Theories and methods for helping people create more satisfying lives for themselves. Simulated counseling experiences.

*3 units, Spr (Krumboltz, J)*

**EDUC 136. World, Societal, and Educational Change: Comparative Perspectives**

(Same as EDUC 306D, SOC 231) Theoretical perspectives and empirical studies on the structural and cultural sources of educational expansion and differentiation, and on the cultural and structural consequences of educational institutionalization. Research topics: education and nation building; education, mobility, and equality; education, international organizations, and world culture. GER:DB-SocSci

*4-5 units, Win (Ramirez, F)*

**EDUC 140. Honors Research**

Provides opportunity for research in pursuit of senior honors theses.

*1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**EDUC 143. Boys' Psychosocial Development**

(Same as HUMBIO 144) From early childhood through adolescence. Emphasis is on how boys' lives and experiences are embedded within their interpersonal relationships and social and cultural contexts. Interdisciplinary approach including perspectives from fields such as psychology, sociology, anthropology, family studies, and education. Prerequisite: Human Biology core, or Developmental Psychology, or consent of instructor. GER:EC-Gender

*4 units, Spr (Chu, J)*

**EDUC 146X. Perspectives on the Education of Linguistic Minorities**

Social, political, linguistic, and pedagogical issues associated with educating students who do not speak the language or language variety of the majority society. Focus is on the U.S.; attention to minorities elsewhere. American attitudes toward linguistic and racial minorities. Educational problems of linguistically different children and non-English- or limited-English-speaking children. Approaches to solving problems.

*3-4 units, not given this year*

**EDUC 148X. Critical Perspectives on Teaching and Tutoring English Language Learners**

Theoretical foundation for volunteer tutors of English language learners in urban environments working with children in school-based programs or adults in community-based settings.

*3 units, Aut (Valdes, G), Win (Valdes, G), Spr (Valdes, G)*

**EDUC 149. Theory and Issues in the Study of Bilingualism**

(Same as EDUC 249) Sociolinguistic perspective. Emphasis is on typologies of bilingualism, the acquisition of bilingual ability, description and measurement, and the nature of societal bilingualism. Prepares students to work with bilingual students and their families and to carry out research in bilingual settings. (SSPEP)

*3-5 units, Aut (Valdes, G)*

**EDUC 165. History of Higher Education in the U.S.**

(Same as AMSTUD 165, EDUC 265, HISTORY 158C) Major periods of evolution, particularly since the mid-19th century. Premise: insights into contemporary higher education can be obtained through its antecedents, particularly regarding issues of governance, mission, access, curriculum, and the changing organization of colleges and universities. (SSPEP-APA)

*3-5 units, Win (Labaree, D)*

**EDUC 170X. Preparation for Independent Public Service Projects**

Open only to recipients of the Haas Summer Fellowship, which offers students the opportunity to initiate and carry out an innovative service project in collaboration with a community partner. Goal is to expand upon the work fellows did during the application process with respect to the feasibility and sustainability of their field projects.

*2 units, Spr (Hawthorne, J)*

**EDUC 171. Early Childhood Education Practicum**

Year-long seminar; restricted to students who participate in JumpStart, a service learning program. Training for activities in preschool classrooms. Background on issues related to: young children's cognitive, language, and social development; classroom management; literacy; math; science teaching; cultural diversity; and early childhood education programs. May be repeated for credit.

*2-4 units, not given this year*

**EDUC 178X. Latino Families, Languages, and Schools**

The challenges facing schools to establish school-family partnerships with newly arrived Latino immigrant parents. How language acts as a barrier to home-school communication and parent participation. Current models of parent-school collaboration and the ideology of parental involvement in schooling. (SSPEP) (Valdés)

*3-5 units, Spr (Valdes, G)*

**EDUC 179. Urban Youth and Their Institutions: Research and Practice**

(Same as EDUC 279) The determinants and consequences of urban life for youth, emphasizing disciplinary and methodological approaches, and the gap between the perspectives of state and local organizations and those of youth and their communities. The diversity of urban youth experiences with respect to ethnicity, gender, and immigration histories. Case studies illustrate civic-level and grassroots institutions, their structures, networks, and philosophies; historical and contemporary realities of urban youth for policy makers, educators, and researchers. Limited enrollment. Prerequisite: consent of instructor. (SSPEP/APA)

*4-5 units, not given this year*

**EDUC 179B. Youth Empowerment and Civic Engagement**

(Same as EDUC 279B) Focus is on youth development policies and practices: what makes them effective, and how they operate in broader institutional contexts. Research-based information; conceptual underpinnings; best learning from experience; and the perspective of expert youth workers, policymakers, and youth about what works.

*2-4 units, not given this year*

**EDUC 180. Directed Reading in Education**

For undergraduates and master's degree students. (All Areas)

*1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**EDUC 180S. Pre-field Course for Alternative Spring Break**

Limited to students participating in the Alternative Spring Break program. See <http://asb.stanford.edu> for more information.

*1 unit, Win (Staff)*

**EDUC 181. Multicultural Issues in Higher Education**

(Same as EDUC 381) The primary social, educational, and political issues that have surfaced in American higher education due to the rapid demographic changes occurring since the early 80s. Research efforts and the policy debates include multicultural communities, the campus racial climate, and student development; affirmative action in college admissions; multiculturalism and the curriculum; and multiculturalism and scholarship.

*4 units, not given this year*

**EDUC 187X. Math Mentoring: Working in the Zone with Learners**

(Same as EDUC 397X) The course focuses on how the tutorial relationship can help students learn mathematics. The course will provide background theory and knowledge as well as provide practical approaches to tutoring, supports for targeting activities to students, needs, selection of materials and activities, and ways to assess the progress of the students and reflect on your own experience. Topics will include social theories of learning, teaching for understanding, and challenges of students who are English language learners. In addition to attending 4, two-hour workshop classes, 1 hour of tutoring is required each week. The course will meet 4 times during the quarter for workshops and discussions following Friday tutoring sessions. Students will submit assignments on the Coursework site on weeks that the course does not meet. A 1 unit section of the course will run in Winter and Spring quarters.

*1-2 units, Win (Goldman, S; O'Connor, K)*

**EDUC 189X. Language and Minority Rights**

(Same as CHICANST 189W, CSRE 189W) Language as it is implicated in migration and globalization. The effects of globalization processes on languages, the complexity of language use in migrant and indigenous minority contexts, the connectedness of today's societies brought about by the development of communication technologies. Individual and societal multilingualism; preservation and revival of endangered languages. GER:EC-GlobalCom

*3 units, not given this year*

**EDUC 190. Directed Research in Education**

For undergraduates and master's students. May be repeated for credit. (all areas)

*1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**EDUC 191X. Introduction to Survey Research**

(Same as EDUC 291X) Planning tasks, including problem formulation, study design, questionnaire and interview design, pretesting, sampling, interviewer training, and field management. Epistemological and ethical perspectives. Issues of design,

refinement, and ethics in research that crosses boundaries of nationality, class, gender, language, and ethnicity.

*3-4 units, Win (Rodriguez, E)*

**EDUC 193A. Listen Up! Core Peer Counseling Skills**

Topics: verbal and non-verbal skills, open and closed questions, paraphrasing, working with feelings, summarization, and integration. Individual training, group exercises, role play practice with optional video feedback. Sections on relevance to crisis counseling and student life. Guest speakers from University and community agencies. Students develop and apply skills in University settings.

*2 units, Aut (Martinez, A), Win (Martinez, A), Spr (Martinez, A)*

**EDUC 193B. Peer Counseling in the Chicano/Latino Community**

Topics: verbal and non-verbal attending and communication skills, open and closed questions, working with feelings, summarization, and integration. Salient counseling issues including Spanish-English code switching in communication, the role of ethnic identity in self-understanding, the relationship of culture to personal development, and Chicana/o student experience in University settings. Individual training, group exercises, role play, and videotape practice.

*1 unit, Aut (Martinez, A)*

**EDUC 193C. Peer Counseling in the African American Community**

Topics: the concept of culture, Black cultural attributes and their effect on reactions to counseling, verbal and non-verbal attending, open and closed questions, working with feelings, summarization, and integration. Reading assignments, guest speakers, role play, and videotaped practice. Students develop and apply skills in the Black community on campus or in other settings that the student chooses.

*1 unit, Aut (Adams, C; Michael, L)*

**EDUC 193F. Psychological Well-Being on Campus: Asian American Perspectives**

Topics: the Asian family structure, and concepts of identity, ethnicity, culture, and racism in terms of their impact on individual development and the counseling process. Emphasis is on empathic understanding of Asians in America. Group exercises.

*1 unit, Spr (Lin, O; Lee-Anderson, K; Brown, N)*

**EDUC 193N. Peer Counseling in the Native American Community**

Verbal and non-verbal communication, strategic use of questions, methods of dealing with strong feelings, and conflict resolution. How elements of counseling apply to Native Americans including client, counselor, and situational variables in counseling, non-verbal communication, the role of ethnic identity in self-understanding, the relationship of culture to personal development, the impact of family on personal development, gender roles, and the experience of Native American students in university settings. Individual skill development, group exercises, and role practice.

*1 unit, not given this year*

**EDUC 193P. Peer Counseling at the Bridge**

Mental health issues such as relationships, substance abuse, sexual assault, depression, eating disorders, academic stressors, suicide, and grief and bereavement. Guest speakers.

*1 unit, Aut (Martinez, A), Win (Martinez, A), Spr (Martinez, A)*

**EDUC 193S. Peer Counseling on Comprehensive Sexual Health**

Information on sexually transmitted infections and diseases, and birth control methods. Topics related to sexual health such as communication, societal attitudes and pressures, pregnancy, abortion, and the range of sexual expression. Role-play and peer-education outreach projects. Required for those wishing to counsel at the Sexual Health Peer Resource Center (SHPRC).

*1 unit, Aut (Yisrael, D), Win (Yisrael, D), Spr (Yisrael, D)*

**EDUC 196X. The Design of Technologies for Casual Learning**

(Same as EDUC 396X) Studio-based, participatory, and user-centered development of casual learning technologies is explored, using the Apple iPhone as a prototype platform. The term casual is borrowed from casual gaming to denote that the learning technologies are meant for learners to use in extreme informal learning circumstances (while on the go, any time and any place).

The class builds on learning about and synthesizing knowledge, theory and development activity in four areas including learning theories, mobile technologies, games and participatory design processes.

*3 units, not given this year*

**EDUC 197. Education, Gender, and Development**

(Same as SOC 134) Theories and perspectives from the social sciences relevant to the role of education in changing, modifying, or reproducing structures of gender differentiation and hierarchy. Cross-national research on the status of girls and women and the role of development organizations and processes. (SSPEP) GER:EC-Gender

*4 units, Spr (Wotipka, C)*

**EDUC 199A. Undergraduate Honors Seminar**

Required of juniors and seniors in the honors program in the School of Education. Student involvement and apprenticeships in educational research. Participants share ongoing work on their honors thesis. Prerequisite: consent of instructor. May be repeated for credit once.

*3 units, Aut (Stevens, M)*

**EDUC 199B. Undergraduate Honors Seminar**

Required of juniors and seniors in the honors program in the School of Education. Student involvement and apprenticeships in educational research. Participants share ongoing work on their honors thesis. Prerequisite: consent of instructor. May be repeated for credit once.

*1 unit, Win (Stevens, M)*

**EDUC 199C. Undergraduate Honors Seminar**

Required of juniors and seniors in the honors program in the School of Education. Student involvement and apprenticeships in educational research. Participants share ongoing work on their honors thesis. Prerequisite: consent of instructor. May be repeated for credit once.

*1 unit, Spr (Stevens, M)*

**EDUC 245. Understanding Racial and Ethnic Identity Development**

(Same as AFRICAAM 245, CSRE 245) African American, Native American, Mexican American, and Asian American racial and ethnic identity development; the influence of social, political and psychological forces in shaping the experience of people of color in the U.S. The importance of race in relationship to social identity variables including gender, class, and occupational, generational, and regional identifications. Bi- and multiracial identity status, and types of white racial consciousness.

*3-5 units, not given this year*

**EDUC 289. The Centrality of Literacies in Teaching and Learning**

(Formerly EDUC 166.) Focus is on principles in understanding, assessing, and supporting the reading and writing processes, and the acquisition of content area literacies in secondary schools. Literacy demands within particular disciplines and how to use oral language, reading, and writing to teach content area materials more effectively to all students. (STEP)

*3 units, Sum (Staff)*

**GRADUATE COURSES IN EDUCATION**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**EDUC 147X. Human-Computer Interaction in Education**

Required for students in the Learning Design and Technology Master's Program. Concepts underlying the design of human-computer interaction including usability and affordances, direct manipulation, systematic design methods, user conceptual models and interface metaphors, design languages and genres, human cognitive and physical ergonomics, information and interactivity structures, design tools, and environments. Studio/discussion component applies these principles to the design of interactive technology for teaching and learning.

*3 units, not given this year*

**EDUC 176X. The Design of Technologies for Casual Learning - Lab**

Lab. Studio-based, participatory, and user-centered development of casual learning technologies is explored, using the Apple iPhone as

a prototype platform. The term casual is borrowed from casual gaming to denote that the learning technologies are meant for learners to use in extreme informal learning circumstances (while on the go, any time and any place). The class builds on learning about and synthesizing knowledge, theory and development activity in four areas including learning theories, mobile technologies, games and participatory design processes.

*1 unit, not given this year*

**EDUC 185. Master's Thesis**

(all areas)

*1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**EDUC 200A. Introduction to Data Analysis and Interpretation**

(Formerly EDUC 150.) Primarily for master's students in the School of Education. Focus is on reading literature and interpreting descriptive and inferential statistics, especially those commonly found in education. Topics: basic research design, instrument reliability and validity, description statistics, correlation, t-tests, one-way analysis of variance, and simple and multiple regression.

*4 units, Aut (Porteus, A), Win (Porteus, A)*

**EDUC 200B. Introduction to Qualitative Research Methods**

(Formerly EDUC 151.) Primarily for master's students: An introduction to the core concepts and methods of qualitative research. Through a variety of hands-on learning activities, readings, field experiences, class lectures, and discussions, students will explore the processes and products of qualitative inquiry.

*4 units, Aut (Pope, D), Win (Wolf, J)*

**EDUC 200C. Introduction to Statistical Methods in Education**

(Formerly EDUC 160.) Basic techniques in descriptive and inferential statistics for educational research will be covered with an emphasis on rigorous preparation for intermediate and advanced courses. Topics include central tendency, variance, probability, distributions, confidence interval, t-test, F-test, correlation, regression, and analysis of variance. Non-parametric statistics and graphical principles for data representation will also be addressed. Students will also be introduced to STATA in preparation for subsequent higher level courses.

*3-4 units, Aut (Hakuta, K)*

**EDUC 201. History of Education in the United States**

(Same as AMSTUD 201, HISTORY 158B) How education came to its current forms and functions, from the colonial experience to the present. Focus is on the 19th-century invention of the common school system, 20th-century emergence of progressive education reform, and the developments since WW II. The role of gender and race, the development of the high school and university, and school organization, curriculum, and teaching. (SSPEP)

*3-5 units, not given this year*

**EDUC 202. Introduction to Comparative and International Education**

Contemporary theoretical debates about educational change and development, and the international dimension of issues in education. Emphasis is on the development of students' abilities to make cross-national and historical comparisons of educational phenomena. (SSPEP/ICE)

*4-5 units, Aut (Davidson, S; Buckner, E)*

**EDUC 202I. Education Policy Workshop in International and Comparative Education**

For students in International and Comparative Education. Practical introduction to issues in educational policy making, educational planning, implementation, and the role of foreign expertise/consultants in developing country contexts. (SSPEP/ICE)

*3-4 units, not given this year*

**EDUC 203. The Anthropology of Education**

Learning across situations, organizations, institutions, and cultures. How and when people learn and where, with whom and for what and how answers to these questions change across the lifespan. Schools in relation to other settings in which learning takes place for children, adolescents, and adults. Apprenticeship, mentorship, and learning through observation and imitation.

*3-5 units, not given this year*

**EDUC 203A. Tutoring: Seeing a Child through Literacy**

(Same as EDUC 103A) Experience tutoring grade school readers in a low income community near Stanford under supervision.

Training in tutoring; the role of instruction in developing literacy; challenges facing low income students and those whose first language is not English. How to see school and print through the eyes of a child. Ravenswood Reads tutors encouraged to enroll. Service Learning Course (certified by Haas Center).

4 units, Aut (Juel, C)

#### **EDUC 204. Introduction to Philosophy of Education**

How to think philosophically about educational problems. Recent influential scholarship in philosophy of education. No previous study in philosophy required. (SSPEP)

3 units, Aut (Callan, E)

#### **EDUC 204A. Introduction to the Philosophical and Educational Thought of John Dewey**

This course, which will have a seminar format, will entail close analytical reading (and intense and hopefully lively discussion) of primary sources - namely, some of the writings of John Dewey. These sources have been selected to give a fair overview of his work, but no one course can do Dewey full justice (he published more than 40 books and 800 journal articles). Dewey can be a difficult author to follow, but on the other hand there are passages of great force and beauty; and undoubtedly he has been of significant influence both in education and in philosophy. (It is important to note that Dewey himself regarded his work in philosophy and in education as being inextricably related.) No special intellectual preparation is required, except a willingness to read carefully and appreciatively, but critically.

3 units, Aut (Phillips, D)

#### **EDUC 204B. Philosophical Issues in Educational Research**

Several decades ago epistemological issues (that is, philosophical issues pertaining to the nature of knowledge, and how knowledge-claims are established as likely to be true) were not the focus of much serious attention in the educational research literature. Most how to do research textbooks had a short and bland chapter on philosophy of science issues in educational research, and occasionally a president of AERA would take advantage of the presidential address to make some relevant remarks. In general, a positivistic orientation pervaded these contributions. Over the past two decades or so the situation has changed remarkably - for example, over this period the house journal of the AERA, Educational Researcher, has published scores of papers that raise epistemological issues; many of these papers have been written by researchers themselves (instead of philosophers), and a wide range of positions are represented in these sources. Epistemological/philosophy of science

3 units, Spr (Phillips, D)

#### **EDUC 205X. The Impact of Social and Behavioral Science Research on Educational Issues**

Ways in which research intersects with educational policy and practice. Emphasis is on behavioral, social, and cognitive traditions. Topics include early childhood education, early reading, science education, bilingual education, school desegregation, class size reduction, classroom organization, violence and juvenile crime, and affirmative action in higher education. Policy debates and how research informs or fails to inform deliberations and decisions in these areas.

3 units, not given this year

#### **EDUC 206A. Applied Research Methods in International and Comparative Education I: Introduction**

Required for M.A. students in ICE and IEAPA. Orientation to the M.A. program and research project; exploration of resources for study and research. (SSPEP/ICE)

1 unit, Aut (Wotipka, C)

#### **EDUC 206B. Applied Research Methods in International and Comparative Education II: Master's Paper Proposal**

Required for M.A. students in ICE and IEAPA. Development of research skills through theoretical and methodological issues in comparative and international education. Preparation of a research proposal for the M.A. monograph. (SSPEP/ICE)

1-3 units, Win (Wotipka, C)

#### **EDUC 206C. Applied Research Methods in ICE III: Data Collection and Analysis**

Required for M.A. students in ICE and IEAPA. Practice in data collection and analysis. Preparation of the first draft of the M.A. monograph. (SSPEP/ICE)

1 unit, Spr (Wotipka, C)

#### **EDUC 206D. Applied Research Methods in International and Comparative Education IV: Master's Paper Workshop**

Conclusion of the M.A. program in ICE and IEAPA; required of M.A. students. Reviews of students' research in preparation for their master's monograph. (SSPEP/ICE)

3 units, Sum (Staff)

#### **EDUC 207X. School: What Is It Good For?**

(Same as HISTORY 258D) Focus is on authors who establish claims that the purposes, functions, impacts, and social roles of schooling promote human capital, citizenship, social reproduction, values transmission, social mobility, class equality, racial equality, social stratification, disciplinary power, and the pursuit of individual interests. Historical and sociological approaches.

3-4 units, Win (Labaree, D)

#### **EDUC 208B. Curriculum Construction**

The theories and methods of curriculum development and improvement. Topics: curriculum ideologies, perspectives on design, strategies for diverse learners, and the politics of curriculum construction and implementation. Students develop curriculum plans for use in real settings. Service Learning Course (certified by Haas Center). (CTE)

3-4 units, Win (Pope, D)

#### **EDUC 208C. Curriculum: In Theory and Policy**

Focus is on key works on the organization and structuring of learning in formal and informal educational settings in light of contemporary issues in curriculum theory, relation of theory and practice, and strategies of curriculum policy development and implementation.

4 units, Spr (Willinsky, J)

#### **EDUC 209X. Policy, Organization, and Leadership Studies Seminar**

Focus is on orienting students to a variety of educational topics pertaining to elementary, secondary, and higher education including program management, financial literacy, and effective communication.

1 unit, Spr (Salinas, N)

#### **EDUC 210X. Policy, Organization, and Leadership Studies Internship Workshop**

Forum for POLS students to link their academic learning to real world experience through in-class discussions, presentations, and reflective writing. Fall Quarter is focused on understanding the intern's role within the larger organization. Winter Quarter is outward looking with a focus on understanding the broader fields the students' organizations reside within. Spring Quarter focus is on students learning from and being prepared to teach others.

1-3 units, Aut (Salinas, N), Win (Salinas, N), Spr (Salinas, N)

#### **EDUC 211X. Beyond Bits and Atoms - Lab**

(Same as CS 402L) This course is a hands-on lab in the prototyping and fabrication of tangible technologies, with a special focus in learning and education. We will learn how to use state-of-the-art fabrication machines (3D printers, 3D scanners, laser cutters, routers) to design educational toolkits, educational toys, science kits, and tangible user interfaces. A special focus of the course will be to design low-cost technologies, particularly for urban school in the US and abroad.

1-3 units, Win (Blikstein, P), Spr (Blikstein, P)

#### **EDUC 212X. Urban Education**

(Same as AFRICAAM 112, EDUC 112X, SOC 129X, SOC 229X) (Graduate students register for EDUC 212X or SOC 229X). Combination of social science and historical perspectives trace the major developments, contexts, tensions, challenges, and policy issues of urban education.

3-4 units, Spr (Ball, A)

#### **EDUC 213X. Introduction to Teaching**

Key concepts in teaching and learning. Student prior knowledge and preconceptions; facts, concepts, and the organization of knowledge; active learning; behavior and cognition; constructing knowledge; metacognition; motivation and affect; transfer; goals and objectives; zone of proximal development; input; organizing learning; modeling; feedback; practice; individual and group differences among students; and pedagogical content knowledge.

3-4 units, Aut (Borko, H)



**EDUC 214X. Social Entrepreneurship**

(Same as STRAMGT 369.) The efforts of private citizens to create effective responses to social needs and innovative solutions to social problems. New opportunities for applying business skills in the social sector. Concepts, practices, and challenges of social entrepreneurship in the U.S. and around the world. Frameworks and tools to be more effective in socially entrepreneurial.

*4 units, not given this year*

**EDUC 215X. International Human Rights and Education**

Theory and practice. Focus is on how education may be seen as a human rights issue and a tool to educate citizens about their human rights. The history of human rights and the spread of the international human rights regime in terms of organizations and treaties. Issues include street and working children, language rights, and women's right to education.

*4-5 units, not given this year*

**EDUC 216X. Education, Race, and Inequality in African American History, 1880-1990**

(Same as CSRE 216X, HISTORY 255E) Seminar. The relationship among race, power, inequality, and education from the 1880s to the 1990s. How schools have constructed race, the politics of school desegregation, and ties between education and the late 20th-century urban crisis.

*3-5 units, not given this year*

**EDUC 217. Philosophical and Methodological Issues in Educational Research**

The role causation in educational phenomena, and how to determine causal factors. Is educational research based on a positivistic paradigm? Randomized controlled experimental designs. Criteria for judging the rigor of qualitative modes of inquiry. Do Popperian or Deweyan approaches hold the key to resolving contentious issues? Does a postpositivist perspective hold promise?

*3 units, not given this year*

**EDUC 218. Topics in Cognition and Learning: Visualization**

Topical seminar with changing topics on the psychological and social processes of learning. This year's course is on the use of visualizations for learning (e.g., maps, diagrams, art, sketches, videogames). Topics also include the psychological basis for why visualizations can be so effective. May be repeated for credit.

*3 units, Aut (Schwartz, D)*

**EDUC 219E. The Creative Arts in Elementary Classrooms**

For STEP Elementary only or for candidates in the Multiple Subjects program. Hands-on exploration of visual arts media and works of art.

*1 unit, Aut (Freeman, S)*

**EDUC 220A. Introduction to the Economics of Education**

The relationship between education and economic analysis. Topics: labor markets for teachers, the economics of child care, the effects of education on earnings and employment, the effects of education on economic growth and distribution of income, and the financing of education. Students who lack training in microeconomics, register for 220Y for 1 additional unit of credit. (SSPEP/APA)

*4 units, not given this year*

**EDUC 220B. Introduction to the Politics of Education**

(Same as GSBGEN 349.) The relationships between political analysis and policy formulation in education; focus is on alternative models of the political process, the nature of interest groups, political strategies, community power, the external environment of organizations, and the implementations of policy. Applications to policy analysis, implementation, and politics of reform. (APA)

*4 units, Aut (Bettinger, E)*

**EDUC 220C. Education and Society**

(Same as EDUC 120C, SOC 130, SOC 230) The effects of schools and schooling on individuals, the stratification system, and society. Education as socializing individuals and as legitimizing social institutions. The social and individual factors affecting the expansion of schooling, individual educational attainment, and the organizational structure of schooling.

*4-5 units, NEXTYEAR*

**EDUC 220D. History of School Reform: Origins, Policies,****Outcomes, and Explanations**

(Same as HISTORY 258E) Required for students in the POLS M.A. program; others welcome. Focus is on 20th-century U.S. Intended and unintended patterns in school change; the paradox of reform that schools are often reforming but never seem to change much; rhetorics of reform and factors that inhibit change. Case studies emphasize the American high school. (SSPEP/APA)

*3-5 units, Aut (Labaree, D)*

**EDUC 220Y. Introduction to the Economics of Education: Economics Section**

For those taking 220A who have not had microeconomics before or who need a refresher. Corequisite: 220A. (SSPEP/APA)

*1-2 units, not given this year*

**EDUC 221A. Policy Analysis in Education**

Major concepts associated with the development, enactment, and execution of educational policy. Issues of policy implementation, agenda setting and problem formulation, politics, and intergovernmental relations. Case studies. Goal is to identify factors that affect how analysts and policy makers learn about and influence education. Limited enrollment. Prerequisite: consent of instructor. (SSPEP/APA)

*4-5 units, Win (Staff)*

**EDUC 222. Resource Allocation in Education**

Problems of optimization and design, and evaluation of decision experience. Marginal analysis, educational production functions, cost effectiveness and cost-benefit analysis, constrained maximization, program evaluation. Introduction to linear models for large-scale data analysis. Implications to model assumptions. (SSPEP)

*4-5 units, Spr (Carnoy, M)*

**EDUC 223. Good Districts and Good Schools: Research, Policy, and Practice**

Recent studies of districts and schools that exceed expectations in producing desired results for students. Research methodologies, findings of studies, theories of change in reforming schools and districts and efforts to implement results. Components of good schools and districts. Required project studies a school or district to determine goodness. (SSPEP/APA, CTE)

*3-4 units, not given this year*

**EDUC 224. Social Entrepreneurship and Social Innovation**

(Same as STRAMGT 367). This course examines individuals and organizations that use entrepreneurial skills and approaches to develop innovative responses to social problems. Entrepreneurship has traditionally been seen as a way of creating wealth for the entrepreneur and for those who back her/his work. Social entrepreneurs employ entrepreneurial skills, such as finding opportunities, inventing new approaches, securing and focusing resources and managing risk, in the service of creating a social value. As the intensity and complexity of social and environmental problems has grown in recent years social entrepreneurship, defined as innovative, social value creating activity that can occur within or across the nonprofit, government or business sectors, has become increasingly prominent. While virtually all enterprises, commercial and social, generate social value, fundamental to this definition is that the primary focus of social entrepreneurship is to achieve social impact above all

*2-4 units, not given this year*

**EDUC 224A. Social Entrepreneurship and Social Innovation**

(Same as STRAMGT 367). This course examines individuals and organizations that use entrepreneurial skills and approaches to develop innovative responses to social problems. Entrepreneurship has traditionally been seen as a way of creating wealth for the entrepreneur and for those who back her/his work. Social entrepreneurs employ entrepreneurial skills, such as finding opportunities, inventing new approaches, securing and focusing resources and managing risk, in the service of creating a social value. As the intensity and complexity of social and environmental problems has grown in recent years social entrepreneurship, defined as innovative, social value creating activity that can occur within or across the nonprofit, government, or business sectors, has become increasingly prominent. While virtually all enterprises, commercial and social, generate social value, fundamental to this definition is that the primary focus of social entrepreneurship is to achieve social impact above all



4 units, Spr (Aubry, R; Wei, J)

**EDUC 224B. Social Entrepreneurship and Social Innovation**  
(Same as STRAMGT 367). This course examines individuals and organizations that use entrepreneurial skills and approaches to develop innovative responses to social problems. Entrepreneurship has traditionally been seen as a way of creating wealth for the entrepreneur and for those who back her/his work. Social entrepreneurs employ entrepreneurial skills, such as finding opportunities, inventing new approaches, securing and focusing resources and managing risk, in the service of creating a social value. As the intensity and complexity of social and environmental problems has grown in recent years social entrepreneurship, defined as innovative, social value creating activity that can occur within or across the nonprofit, government or business sectors, has become increasingly prominent. While virtually all enterprises, commercial and social, generate social value, fundamental to this definition is that the primary focus of social entrepreneurship is to achieve social impact above all

2 units, Spr (Aubry, R; Wei, J)

**EDUC 225X. Business Skills and Concepts for the Non-Business Student**

For non-business students. Knowledge and tools for operating effectively in an organizational management capacity. Focus is on concepts developed for use in the business world in the areas of strategy, organizational behavior, financial accounting, and marketing. Case studies, podcasts, video, guest speakers, and team-based projects.

3-4 units, not given this year

**EDUC 226X. Empirical Analysis of Education Governance**

Emphasis is on strategies for empirical evaluation. Topics include: school board, superintendent, and principal decision making; the state role in education policy and budgeting; the impact of teacher unionization; and the growing influence of private foundations and parent associations. Students participate in an original data collection effort for an ongoing research project.

3 units, not given this year

**EDUC 228E. Becoming Literate in School I**

First in a three course sequence. Introduction to reading and language arts theory and methodology for candidates STEP Elementary Teacher program. Instructional methods, formats, and materials.

2 units, Sum (Staff)

**EDUC 228F. Becoming Literate in School II**

Second in a three-course required sequence of reading and language arts theory and methodology for candidates in the STEP Elementary program. Theories for guiding instruction and curricular choices.

2 units, Aut (Juel, C)

**EDUC 228G. Becoming Literate in School III**

Third in a three-course required sequence of reading and language arts theory and methodology for candidates in STEP Elementary Teacher program. Theories for guiding instruction and curricular choices.

2 units, Win (Aukerman, M; Chambers Schuldt, L)

**EDUC 228H. Literacy, History, and Social Science**

How elementary school teachers can teach history and social science within a literacy framework. Topics include: historical thinking, reading, and writing; current research; applying nonfiction reading and writing strategies to historical texts; using primary sources with elementary students; adapting instruction to meet student needs; state standards; evaluating curriculum; assessing student knowledge; developing history and social science units; and embedding history and social science into the general literacy curriculum.

1 unit, Spr (Martin, D)

**EDUC 229A. Learning Design and Technology Seminar**

Four-quarter required seminar for the LDT master's program. Discussions and activities related to designing for learning with technology. Support for internships and Master's project. Theoretical and practical perspectives, hands-on development, and collaborative efforts. (LDT)

1 unit, Aut (Forssell, K)

**EDUC 229B. Learning Design and Technology Seminar**

Four-quarter required seminar for the LDT master's program. Discussions and activities related to designing for learning with technology. Support for internships and Master's project. Theoretical and practical perspectives, hands-on development, and collaborative efforts. (LDT)

1 unit, Win (Forssell, K)

**EDUC 229C. Learning Design and Technology Seminar**

Four-quarter required seminar for the LDT master's program. Discussions and activities related to designing for learning with technology. Support for internships and Master's project. Theoretical and practical perspectives, hands-on development, and collaborative efforts. (LDT)

1 unit, Spr (Forssell, K)

**EDUC 229D. Learning Design and Technology Seminar**

Four-quarter required seminar for the LDT master's program. Discussions and activities related to designing for learning with technology. Support for internships and Master's project. Theoretical and practical perspectives, hands-on development, and collaborative efforts. (LDT)

2-5 units, Sum (Staff)

**EDUC 230X. Social Enterprise**

(Same as STRAMGT 341.) Approaches for creating social value through a social enterprises including nonprofits, for-profits, and hybrid forms of organization. Perspectives include entrepreneur, CEO, funder, and board member. Topics include undertaking the social entrepreneurship process; mobilizing economic and human resources; achieving social objectives with commercial vehicles; crafting alliances; managing growth; measuring and managing performance; governing for excellence. Case studies. Student teams carry out field-based research in a significant strategic or operational issue of a social enterprise

4 units, not given this year

**EDUC 231X. Education Schools: Historical and Sociological Perspectives**

(Same as HISTORY 258F) The lowly status of the education school in the United States is the issue that defines the starting point of this course. Topics include an exploration the historical development of this institution, its major social function, and the interaction between the two. The course touches on a variety of scholarly domains, including the history of education, sociology of education, higher education, and educational policy.

3-4 units, alternate years, not given this year

**EDUC 233A. Counseling Theories and Interventions from a Multicultural Perspective**

(Same as AFRICAAM 233A, CSRE 233A) In an era of globalization characterized by widespread migration and cultural contacts, professionals face a unique challenge: How does one practice successfully when working with clients/students from so many different backgrounds? This course focuses upon the need to examine, conceptualize, and work with individuals according to the multiple ways in which they identify themselves. It will systematically examine multicultural counseling concepts, issues, and research. Literature on counselor and client characteristics such as social status or race/ethnicity and their effects on the counseling process and outcome will be reviewed. Issues in consultation with culturally and linguistically diverse parents and students and work with migrant children and their families are but a few of the topics covered in this course.

3-5 units, not given this year

**EDUC 233B. Adolescent Development and Mentoring in the Urban Context**

Continuation of 233A. Topics include: developmental psychology and service learning; collaborating with the community; psychological research on altruism and prosocial behavior; volunteers' motivations; attributions about poverty, and the problem of prejudice.

3 units, not given this year

**EDUC 234. Career and Personal Counseling**

(Same as EDUC 134, PSYCH 192) Theories and methods for helping people create more satisfying lives for themselves. Simulated counseling experiences.

3 units, Spr (Krumboltz, J)

**EDUC 235X. The Creative Arts in Schools and Classrooms**

Students work alongside teachers and performing artists to plan and implement classroom activities with elementary school children to prepare them for a Lively Arts performance. Background theory in education and arts education. Students develop a follow-up classroom activity for children in their own art form.

*2 units, not given this year*

**EDUC 236X. Beyond Bits and Atoms: Designing Technological Tools**

(Same as CS 402) Practicum in designing and building technology-enabled curricula and learning environments. Students use software toolkits and state-of-the-art fabrication machines to design educational software, educational toolkits, and tangible user interfaces. How to design low-cost technologies, particularly for urban school in the US and abroad. The constructionist learning design perspective, critical pedagogy, and the application of complexity sciences in education.

*3-5 units, Spr (Blikstein, P)*

**EDUC 240. Adolescent Development and Learning**

How do adolescents develop their identities, manage their inner and outer worlds, and learn? Presuppositions: that fruitful instruction takes into account the developmental characteristics of learners and the task demands of specific curricula; and that teachers can promote learning and motivation by mediating among the characteristics of students, the curriculum, and the wider social context of the classroom. Prerequisite: STEP student or consent of instructor. (STEP)

*5 units, Aut (Darling-Hammond, L)*

**EDUC 241S. Organizational Learning**

(Same as OB 586.) How firms learn from their experiences and the opportunities created by flawed learning. Common mistakes in learning and barriers to the adoption of effective practices. How to avoid common mistakes and build organizations that learn more effectively to identify possible opportunities in markets. Concepts and findings from organization theory, psychology, decision theory, and statistics.

*2 units, not given this year*

**EDUC 241X. Organizational Learning**

Why firms do not learn from their experiences and the opportunities created by flawed learning. Common mistakes in learning and barriers to the adoption of effective practices. How to avoid common mistakes and build organizations that learn more effectively to identify possible opportunities in markets. Concepts and findings from organization theory, psychology, decision theory, and statistics. Readings include teaching notes, papers in psychology and organization theory, HBR articles, and Moneyball by Michael Lewis who discusses market-level mistakes in professional baseball.

*4 units, not given this year*

**EDUC 242. Language Use in the Chicano Community**

(Same as SPANLIT 206) The significance and consequences of language diversity in the culture and society of the U.S. Experiences of non-English background individuals through focus on Spanish-English bilingual communities.

*3-5 units, not given this year*

**EDUC 243. Writing Across Languages and Cultures: Research in Writing and Writing Instruction**

Theoretical perspectives that have dominated the literature on writing research. Reports, articles, and chapters on writing research, theory, and instruction; current and historical perspectives in writing research and research findings relating to teaching and learning in this area.

*3-5 units, not given this year*

**EDUC 244. Classroom Management and Leadership**

Student and teacher roles in developing a classroom community. Strategies for classroom management within a theoretical framework. STEP secondary only.

*2 units, Aut (Haysman, C)*

**EDUC 244E. Elementary Classroom Leadership and Management**

How to best manage a classroom. Student and teacher roles in developing a classroom community. Strategies for classroom management within a theoretical framework. STEP elementary

only.

*1 unit, Sum (Staff)*

**EDUC 244F. Elementary Classroom Leadership and Management**

Skills for developing a positive classroom learning environment. Theoretical issues and opportunities to acquire strategies and make links with practice teaching class. STEP elementary only.

*1 unit, Aut (Rose, D)*

**EDUC 246A. Secondary Teaching Seminar**

Preparation and practice in issues and strategies for teaching in classrooms with diverse students. Topics: instruction, curricular planning, classroom interaction processes, portfolio development, teacher professionalism, patterns of school organization, teaching contexts, and government educational policy. Classroom observation and student teaching with accompanying seminars during each quarter of STEP year. 16 units required for completion of the program. Prerequisite: STEP student.

*3 units, Sum (Staff)*

**EDUC 246B. Secondary Teaching Seminar**

Preparation and practice in issues and strategies for teaching in classrooms with diverse students. Topics: guided observations, building classroom community, classroom interaction processes, topics in special education portfolio development, teacher professionalism, patterns of school organization, teaching contexts, and government educational policy. Classroom observation and student teaching with accompanying seminars during each quarter of STEP year. 16 units required for completion of the program. Prerequisite: STEP student.

*5 units, Aut (Lotan, R; Haysman, C; Fogo, B; Tovar, M)*

**EDUC 246C. Secondary Teaching Seminar**

Preparation and practice in issues and strategies for teaching in classrooms with diverse students. Topics: instruction, curricular planning, classroom interaction processes, portfolio development, teacher professionalism, patterns of school organization, teaching contexts, and government educational policy. Classroom observation and student teaching with accompanying seminars during each quarter of STEP year. 16 units required for completion of the program. Prerequisite: STEP student. (STEP)

*5 units, Win (Lotan, R; Haysman, C; Fogo, B; Tovar, M)*

**EDUC 246D. Secondary Teaching Seminar**

Preparation and practice in issues and strategies for teaching in classrooms with diverse students. Topics: instruction, curricular planning, classroom interaction processes, portfolio development, teacher professionalism, patterns of school organization, teaching contexts, and government educational policy. Classroom observation and student teaching with accompanying seminars during each quarter of STEP year. 16 units required for completion of the program. Prerequisite: STEP student.

*2-7 units, Spr (Lotan, R; Haysman, C; Fogo, B; Tovar, M)*

**EDUC 246E. Elementary Teaching Seminar**

Integrating theory and practice in teacher development. Topics include: equity, democracy, and social justice in the context of teaching and learning; teacher reflection, inquiry, and research; parent/teacher relationships; youth development and community engagement; professional growth and development; teacher leadership and school change processes; preparation for the job search, the STEP Elementary Portfolio, and the STEP Elementary Conference. Prerequisite: STEP student.

*3 units, Sum (Staff)*

**EDUC 246F. Elementary Teaching Seminar**

Integrating theory and practice in teacher development. Topics include: equity, democracy, and social justice in the context of teaching and learning; teacher reflection, inquiry, and research; parent/teacher relationships; youth development and community engagement; professional growth and development; teacher leadership and school change processes; preparation for the job search, the STEP Elementary Portfolio, and the STEP Elementary Conference. Prerequisite: STEP student.

*5-7 units, Aut (Lit, I)*

**EDUC 246G. Elementary Teaching Seminar**

Integrating theory and practice in teacher development. Topics include: equity, democracy, and social justice in the context of teaching and learning; teacher reflection, inquiry, and research; parent/teacher relationships; youth development and community

engagement; professional growth and development; teacher leadership and school change processes; preparation for the job search, the STEP Elementary Portfolio, and the STEP Elementary Conference. Prerequisite: STEP student.

3 units, Win (Lit, I)

#### **EDUC 246H. Elementary Teaching Seminar**

Integrating theory and practice in teacher development. Topics include: equity, democracy, and social justice in the context of teaching and learning; teacher reflection, inquiry, and research; parent/teacher relationships; youth development and community engagement; professional growth and development; teacher leadership and school change processes; preparation for the job search, the STEP Elementary Portfolio, and the STEP Elementary Conference. Prerequisite: STEP student.

4 units, Spr (Lit, I)

#### **EDUC 247. Moral Education**

Contemporary scholarship and educational practice related to the development of moral beliefs and conduct in young people. The psychology of moral development; major philosophical, sociological, and anthropological approaches. Topics include: natural capacities for moral awareness in the infant; peer and adult influences on moral growth during childhood and adolescence; extraordinary commitment during adulthood; cultural variation in moral judgment; feminist perspectives on morality; the education movement in today's schools; and contending theories concerning the goals of moral education. (PSE)

3 units, not given this year

#### **EDUC 248X. Issues of Curriculum and Pedagogy in Multicultural Classrooms**

Debates concerning race, class, gender and sexuality, and ethnicity as they impact curriculum and practice in heterogeneous classrooms. How teachers and students can become agents of educational change. Sources include videos, scholarship, popular press, and voices of practitioners, students, and families.

3-4 units, not given this year

#### **EDUC 249. Theory and Issues in the Study of Bilingualism**

(Same as EDUC 149) Sociolinguistic perspective. Emphasis is on typologies of bilingualism, the acquisition of bilingual ability, description and measurement, and the nature of societal bilingualism. Prepares students to work with bilingual students and their families and to carry out research in bilingual settings. (SSPEP)

3-5 units, Aut (Valdes, G)

#### **EDUC 250A. Inquiry and Measurement in Education**

Part of doctoral research core. The logic of scientific inquiry in education, including identification of research questions, selection of qualitative or quantitative research methods, design of research studies, measurement, and collection, analysis and interpretation of evidence.

3 units, Aut (Stevens, M; Loeb, S)

#### **EDUC 250B. Statistical Analysis in Education: Regression**

Primarily for doctoral students; part of doctoral research core; prerequisite for advanced statistical methods courses in School of Education. Basic regression, a widely used data-analytic procedure, including multiple and curvilinear regression, regression diagnostics, analysis of residuals and model selection, logistic regression. Proficiency with statistical computer packages.

4 units, Win (Bettinger, E)

#### **EDUC 250C. Qualitative Analysis in Education**

Primarily for doctoral students; part of doctoral research core. Methods for collecting and interpreting qualitative data including case study, ethnography, discourse analysis, observation, and interview.

4 units, Spr (Grossman, P; Wineburg, S)

#### **EDUC 251B. Statistical Analysis in Educational Research: Analysis of Variance**

Primarily for doctoral students. ANOVA models as widely used data analytic procedures, especially in experimental, quasi-experimental, and criterion-group designs. Topics: single-factor ANOVA; factorial between and within subjects and mixed design ANOVA (fixed, random, and mixed models); analysis of covariance; and multiple comparison procedures. Prerequisite: 250A or equivalent. (all areas)

4 units, not given this year

#### **EDUC 251C. Statistical Analysis in Educational Research:**

##### **Applied Multivariate Analysis**

Primarily for doctoral students in education, social, and behavioral sciences. Multivariate analysis of variance, discriminant analysis, factor analysis, correlation analysis. Advanced regression methods. Data compression: principal components analysis, clustering. Computer packages for data analysis. Prerequisite: 250B, 257, STATS 200, or equivalent. (all areas)

1-4 units, not given this year

#### **EDUC 252. Introduction to Test Theory**

Concepts of reliability and validity; derivation and use of test scales and norms; mathematical models and procedures for test validation, scoring, and interpretation. Prerequisite: STATS 190 or equivalent. (PSE)

3-4 units, Aut (Haertel, E)

#### **EDUC 253X. Teaching the Unteachable: Teaching and Representing the Holocaust**

(Same as HISTORY 237B) Theodore Adorno asked whether it was possible to write poetry after Auschwitz; whatever the answer, each year witnesses exponential growth in state-sponsored mandates to teach the Holocaust. How and to what end does catastrophe become curriculum? How to assess what students learn from these efforts. The Nazis' efforts to teach for hate, and contemporary parallels. Historical and educational sources, especially films and memoirs.

3-5 units, not given this year

#### **EDUC 254S. Leadership in Diverse Organizations**

(Same as OB 593) This course is designed to help students improve their capacity to exercise leadership and work effectively with others within the context of culturally diverse groups and organizations. The course is based on the premise that diversity can present unique challenges and opportunities and thereby pushes students to develop crucial leadership skills, many of which are relevant across a variety of situations. The class will address two primary questions: 1) What social and psychological obstacles limit people's ability to work effectively across identity-based differences? 2) What can you do to build the relational and organizational capacity to enable these differences to be a resource for learning and effectiveness within teams and organizations? Students should be prepared to experiment with various conceptual and analytic skills inside and outside of the classroom. While the course focuses on dynamics of race and gender, there will be opportunities for students to exp

2 units, not given this year

#### **EDUC 254X. Leadership in Diverse Organizations**

How improve capacity to exercise leadership and work effectively with others within the context of culturally diverse groups and organizations. Premise is that diversity presents challenges and opportunities that push students to develop leadership skills relevant across a variety of situations. What social and psychological obstacles limit people's ability to work effectively across identity-based differences? What can people do to build the relational and organizational capacity to enable these differences to be a resource for learning and effectiveness within teams and organizations? Focus is on dynamics of race and gender; attention to other dimensions of identity and difference in organizations, including sexual orientation, nationality, class, and religion.

4 units, not given this year

#### **EDUC 255A. Experimental Research Designs in Educational Research**

The course will cover the following topics: a) the logic of causal inference and the Fisher/Neyman/Rubin counterfactual causal model (Fisher, 1935; Heckman, 1979; Holland, 1986; Neyman, 1990; Rubin, 1978); b) randomized experiments; c) complex randomized experiments in education (cluster randomized trials, multi-site trials, staggered implementation via randomization, etc.); d) policy experiments with randomization; e) meta-analysis; and f) power in randomized experiments; g) the ethics and politics of randomized experiments.

3-5 units, Aut (Bettinger, E)

#### **EDUC 255B. Causal Inference in Quantitative Educational and Social Science Research**

(Same as SOC 257) Quantitative methods to make causal inferences in the absence of randomized experiment including the

use of natural and quasi-experiments, instrumental variables, regression discontinuity, matching estimators, longitudinal methods, fixed effects estimators, and selection modeling. Assumptions implicit in these approaches, and appropriateness in research situations. Students develop research proposals relying on these methods. Prerequisites: exposure to quantitative research methods; multivariate regression.

3-5 units, Win (Reardon, S)

### **EDUC 255C. Applied Quasi-Experimental Research in Education**

(Same as SOC 258) Course will provide hands-on practice in analysis of data from experimental and quasi-experimental research designs, including a) instrumental variables estimators; b) regression discontinuity estimators; c) difference-in-difference estimators; d) matching estimators; e) fixed effects estimators; and f) panel data methods (including individual fixed effects models, lagged covariate adjustment models, growth models, etc.). Prerequisites: satisfactory completion of EDUC 255B, EDUC 257C or SOC 257.

3-5 units, Spr (Reardon, S)

### **EDUC 256. Psychological and Educational Resilience Among Children and Youth**

(Same as HUMBIO 149) Theoretical, methodological, and empirical issues pertaining to the psychological and educational resilience of children and adolescents. Overview of the resilience framework, including current terminology and conceptual and measurement issues. Adaptive systems that enable some children to achieve successful adaptation despite high levels of adversity exposure. How resilience can be studied across multiple levels of analysis, ranging from cell to society. Individual, family, school, and community risk and protective factors that influence children's development and adaptation. Intervention programs designed to foster resilient adaptation in disadvantaged children's populations.

4 units, not given this year

### **EDUC 256C. Negotiation and Influence**

(Same as COMM 156, COMM 256) No matter how excellent your ideas, most significant achievements require the ability to communicate with and influence others. This course examines the theory, research, and practice of negotiation across a variety of settings. It provides multiple opportunities for students to develop negotiation skills through role-plays, exercises, and useful analytical frameworks. Topics include: distributive and integrative bargaining, psychological biases, lessons from game theory, principles of influence, multiparty negotiation, and the value of relationships and trust. The course meets intensively over a highly condensed period of time. Intended for graduate students and advanced undergraduates. No prerequisites. Limited enrollment; advance application required; see <http://comm.stanford.edu/faculty/curhan>

1-2 units, Aut (Staff), Win (Curhan, J), Spr (Staff)

### **EDUC 257A. Statistical Methods for Behavioral and Social Sciences**

For students with experience in empirical research. Analysis of data from experimental studies through factorial designs, randomized blocks, repeated measures; regression methods through multiple regression, model building, analysis of covariance; categorical data analysis through log-linear models, logistic regression. Integrated with the use of statistical computing packages. Prerequisite: analysis of variance and regression at the level of STATS 161.

3 units, not given this year

### **EDUC 257B. Statistical Methods for Behavioral and Social Sciences**

For students with experience in empirical research. Analysis of data from experimental studies through factorial designs, randomized blocks, repeated measures; regression methods through multiple regression, model building, analysis of covariance; categorical data analysis through log-linear models, logistic regression. Integrated with the use of statistical computing packages. Prerequisite: analysis of variance and regression at the level of STATS 161.

3 units, not given this year

### **EDUC 258. Literacy Development and Instruction**

Literacy acquisition as a developmental and educational process.

Problems that may be encountered as children learn to read. How to disentangle home, community, and school instruction from development.

3-5 units, Win (Juel, C)

### **EDUC 259X. Application of Hierarchical Linear Models in Behavioral and Social Research**

The fundamental phenomenon of interest in educational research is the growth in knowledge and skills of individual students. Two facts - that children's growth is typically the object of inquiry and that such growth occurs in organizational settings - correspond to two of the most troublesome and persistent methodological problems in the social sciences: the measurement of change and the assessment of multi-level effects (also referred to as the unit of analysis problem). Although these two methodological problems have distinct, long-standing, and non-overlapping literatures, these problems, in fact, share a common cause - the inadequacy of traditional statistical techniques for the modeling of hierarchy.

4 units, not given this year

### **EDUC 260X. Understanding Statistical Models and their Social Science Applications**

(Same as HRP 239, STATS 209) Critical examination of statistical methods in social science applications, especially for cause and effect determinations. Topics: path analysis, multilevel models, matching and propensity score methods, analysis of covariance, instrumental variables, compliance, longitudinal data, mediating and moderating variables. See <http://www-stat.stanford.edu/~rag/stat209>. Prerequisite: intermediate-level statistical methods

3 units, Win (Rogosa, D)

### **EDUC 262A. Curriculum and Instruction in English**

Approaches to teaching English in the secondary school, including goals for instruction, teaching techniques, and methods of evaluation. (STEP)

2 units, Sum (Staff)

### **EDUC 262B. Curriculum and Instruction in English**

Approaches to teaching English in the secondary school, including goals for instruction, teaching techniques, and methods of evaluation. STEP secondary only.

3 units, Aut (Grossman, P)

### **EDUC 262C. Curriculum and Instruction in English**

Approaches to teaching English in the secondary school, including goals for instruction, teaching techniques, and methods of evaluation. (STEP)

3 units, Win (Grossman, P)

### **EDUC 263A. Curriculum and Instruction in Mathematics**

The purposes and programs of mathematics in the secondary curriculum; teaching materials, methods. Prerequisite: STEP student or consent of instructor. (STEP) 263A. Sum, 263B. Aut, 263C. Win

2 units, Sum (Staff)

### **EDUC 263B. Curriculum and Instruction in Mathematics**

The purposes and programs of mathematics in the secondary curriculum; teaching materials, methods. Prerequisite: STEP student or consent of instructor. (STEP) 263A. Sum, 263B. Aut, 263C. Win

3 units, Aut (Boaler, J)

### **EDUC 263C. Curriculum and Instruction in Mathematics**

The purposes and programs of mathematics in the secondary curriculum; teaching materials, methods. Prerequisite: STEP student or consent of instructor. (STEP) 263A. Sum, 263B. Aut, 263C. Win

3 units, Win (Boaler, J; Dance, K)

### **EDUC 263E. Quantitative Reasoning in Mathematics I**

First of a three-course sequence in mathematics for STEP elementary teacher candidates. Content, pedagogy, and context. Mathematics subject matter; the orchestration of teaching and learning of elementary mathematics including curriculum, classroom and lesson design, and cases studies. Sociocultural and linguistic diversity, equity, differentiation of instruction, the impact of state and national standards, and home/community connections.

2 units, Sum (Staff)

**EDUC 263F. Quantitative Reasoning in Mathematics II**

Second of a three-course sequence in mathematics for STEP elementary teacher candidates. Content, pedagogy, and context. Mathematics subject matter; the orchestration of teaching and learning of elementary mathematics including curriculum, classroom and lesson design, and cases studies. Sociocultural and linguistic diversity, equity, differentiation of instruction, the impact of state and national standards, and home/community connections.

2-3 units, Aut (Murata, A)

**EDUC 263G. Quantitative Reasoning in Mathematics III**

Third of a three-course sequence in mathematics for STEP elementary teacher candidates. Content, pedagogy, and context. Mathematics subject matter; the orchestration of teaching and learning of elementary mathematics including curriculum, classroom and lesson design, and cases studies. Sociocultural and linguistic diversity, equity, differentiation of instruction, the impact of state and national standards, and home/community connections.

2 units, Win (Alexander, A)

**EDUC 264A. Curriculum and Instruction in World Languages**

Approaches to teaching foreign languages in the secondary school, including goals for instruction, teaching techniques, and methods of evaluation. Prerequisite: STEP student. (STEP)

2 units, Sum (Staff)

**EDUC 264B. Curriculum and Instruction in World Languages**

Approaches to teaching foreign languages in the secondary school, including goals for instruction, teaching techniques, and methods of evaluation. STEP secondary only.

3 units, Aut (Silva, M)

**EDUC 264C. Curriculum and Instruction in World Languages**

Approaches to teaching foreign languages in the secondary school, including goals for instruction, teaching techniques, and methods of evaluation. Prerequisite: STEP student. (STEP)

3 units, Win (Silva, M; Xu, X)

**EDUC 264E. Methods and Materials in Bilingual Classrooms**

Restricted to STEP elementary teacher candidates in the BCLAD program. Theories, research, and methods related to instruction of Spanish-English bilingual children, grades K-8. Approaches to dual language instruction, and pedagogical and curricular strategies for the instruction of reading, language arts, science, history, social science, and math in Spanish. Assessment issues and practices with bilingual students. In Spanish.

2 units, Aut (Poza, L)

**EDUC 265. History of Higher Education in the U.S.**

(Same as AMSTUD 165, EDUC 165, HISTORY 158C) Major periods of evolution, particularly since the mid-19th century. Premise: insights into contemporary higher education can be obtained through its antecedents, particularly regarding issues of governance, mission, access, curriculum, and the changing organization of colleges and universities. (SSPEP-APA)

3-5 units, Win (Labaree, D)

**EDUC 266X. Workshop in Practical Quantitative Research on Educational Policy and Inequality**

Conceptual and technical skills for analyzing data concerning educational policy and inequality. How to design analytic strategies using available data sources. Interpreting and presenting results. Prerequisite: 250A.

3 units, not given this year

**EDUC 267A. Curriculum and Instruction in Science**

Possible objectives of secondary science teaching and related methods: selection and organization of content and instructional materials; lab and demonstration techniques; evaluation, tests; curricular changes; ties with other subject areas. Prerequisite: STEP student or consent of instructor. (STEP)

2 units, Sum (Staff)

**EDUC 267B. Curriculum and Instruction in Science**

Possible objectives of secondary science teaching and related methods: selection and organization of content and instructional materials; lab and demonstration techniques; evaluation, tests; curricular changes; ties with other subject areas. Prerequisite: STEP student or consent of instructor. (STEP)

3 units, Aut (Brown, B)

**EDUC 267C. Curriculum and Instruction in Science**

Possible objectives of secondary science teaching and related methods: selection and organization of content and instructional materials; lab and demonstration techniques; evaluation, tests; curricular changes; ties with other subject areas. Prerequisite: STEP student or consent of instructor. (STEP)

3 units, Win (Osborne, J)

**EDUC 267E. Development of Scientific Reasoning and Knowledge**

For STEP elementary teacher candidates. Theories and methods of teaching and learning science. How to develop curricula and criteria for critiquing curricula. Students design a science curriculum plan for a real setting. State and national science frameworks and content standards. Alternative teaching approaches; how to select approaches that are compatible with learner experience and lesson objectives. Focus is on the linguistic and cultural diversity of California public school students.

2 units, Aut (Diffenbaugh, P; Patterson, A)

**EDUC 267F. Development of Scientific Reasoning and Knowledge II**

Continuation of 267E. Scientific knowledge and pedagogical skills for supporting science instruction. Topics include: how children build scientific understandings and what that understanding might look and sound like in young children; what school science is and how concepts are connected to the doing of it; physical, life, and earth science constructs.

2 units, Spr (Osborne, J)

**EDUC 267G. Integrating the Garden into the Elementary Curriculum**

This mini-course uses the garden and kitchen environments to provide teacher candidates with real-world contexts in which to explore some of the key issues that children face in health, nutrition, and sustainability. Teacher candidates will gain an understanding of how to integrate the various themes with content areas and standards and an appreciation for the importance of addressing children's health needs in an era when the country is facing increased obesity and other health problems.

1 unit, Spr (Costanzo, R; Cool, J)

**EDUC 268A. Curriculum and Instruction in History and Social Science**

The methodology of history instruction: teaching for historical thinking and reasoning; linking the goals of teaching history with literacy; curriculum trends; and opportunities to develop teaching and resource units. Prerequisite: STEP student.

2 units, Sum (Staff)

**EDUC 268B. Curriculum and Instruction in History and Social Science**

The methodology of history instruction: teaching for historical thinking and reasoning; linking the goals of teaching history with literacy; curriculum trends; and opportunities to develop teaching and resource units. Prerequisite: STEP student.

3 units, Aut (Breakstone, J; Terra, L)

**EDUC 268C. Curriculum and Instruction in History and Social Science**

The methodology of history instruction: teaching for historical thinking and reasoning; linking the goals of teaching history with literacy; curriculum trends; and opportunities to develop teaching and resource units. Prerequisite: STEP student.

3 units, Win (Breakstone, J; Terra, L)

**EDUC 268E. Elementary History and Social Science**

Teaching and learning history and social science in the elementary grades. What is included in the discipline and why it is important to teach. The development of historical thinking among children. How students learn and understand content in these disciplines.

3-4 units, not given this year

**EDUC 269. Analysis of Teaching**

Student learning and the epistemology of school subjects as related to the planning and implementation of teaching, analysis of curriculum, and evaluation of performance and understanding. Readings and activities are coordinated with student teaching activities of participants. Prerequisite: STEP student or consent of instructor.

3 units, not given this year

**EDUC 269X. The Ethics in Teaching**

Goal is to prepare for the ethical problems teachers confront in their professional lives. Skills of ethical reasoning, familiarity with ethical concepts, and how to apply these skills and concepts in the analysis of case studies. Topics: ethical responsibility in teaching, freedom of speech and academic freedom, equality and difference, indoctrination, and the teaching of values.

*1 unit, Win (Callan, E), Spr (Callan, E)*

**EDUC 270A. Learning to Lead in Public Service Organizations**

For Haas Center student service organization leaders. (Davis)

*3-5 units, not given this year*

**EDUC 270X. Youth Civic Development and Education**

The course will examine recent research on the development of civic understanding and action among diverse populations of youth. The role of communities, schools, and media will be considered. The course will also address the question of how young people from all backgrounds can be educated for participatory citizenship in a democratic society.

*3 units, Spr (Damon, W)*

**EDUC 271X. Education Policy in the United States**

The course will provide students from different disciplines with an understanding of the broad educational policy context. The course will cover topics including a) school finance systems; b) an overview of policies defining and shaping the sectors and institutional forms of schooling, c) an overview of school governance, d) educational human-resource policy, e) school accountability policies at the federal and state levels; and f) school assignment policies and law, including intra- and inter-district choice policies, desegregation law and policy.

*5 units, Spr (Loeb, S)*

**EDUC 272X. Understanding and Creating Value-Added Measures of Teacher Effectiveness**

This seminar will explore a variety of approaches to measuring teacher effectiveness using student performance on state standardized tests. We will read the recent research literature on value-added estimation, addressing issues such as bias and measurement error. We also will use administrative data from two large districts to create and compare multiple value-added measures. The class assumes a comfort with OLS regression and basic programming in Stata.

*3 units, not given this year*

**EDUC 273. Gender and Higher Education: National and International Perspectives**

(Same as SOC 273) The effects of interactions between gender and the structures of higher education; policies seeking changes in those structures. Topics: undergraduate and graduate education, faculty field of specialization, rewards and career patterns, sexual harassment, and the development of feminist scholarship and pedagogy.

*4 units, not given this year*

**EDUC 274X. School Choice: The Role of Charter Schools**

(Formerly EDUC 153X.) Is school choice, including vouchers, charter schools, contract schools, magnet schools, district options, and virtual schools, a threat or an opportunity for public education? Focus is on the charter school movement nationally and in California as reform strategy. Roles and responsibilities of charter schools emphasizing issues of governance, finance, curriculum, standards, and accountability.

*3 units, Win (Kushner, M)*

**EDUC 276. Educational Assessment**

Reliability, validity, bias, fairness, and properties of test scores. Uses of tests to monitor, manage, and reform instruction. Testing and competition, meritocracy, achievement gaps, and explanations for group differences.

*3 units, Spr (Haertel, E)*

**EDUC 277. Education of Immigrant Students: Psychological Perspectives**

Historical and contemporary approaches to educating immigrant students. Case study approach focuses on urban centers to demonstrate how stressed urban educational agencies serve immigrants and native-born U.S. students when confronted with overcrowded classrooms, controversy over curriculum, current school reform movements, and government policies regarding equal educational opportunity. (SSPEP)

*4 units, not given this year*

**EDUC 278. Introduction to Issues in Evaluation**

Open to master's and doctoral students with priority to students from education. Focus is on the basic literature and major theoretical and practical issues in program evaluation. Introduction to basic concepts and intellectual debates in the field: knowledge construction, purpose of evaluation, values in evaluation, knowledge utilization, professional standards of evaluation practice. Enrollment limited to 15. (SSPEP)

*3-4 units, Spr (Porteus, A)*

**EDUC 279. Urban Youth and Their Institutions: Research and Practice**

(Same as EDUC 179) The determinants and consequences of urban life for youth, emphasizing disciplinary and methodological approaches, and the gap between the perspectives of state and local organizations and those of youth and their communities. The diversity of urban youth experiences with respect to ethnicity, gender, and immigration histories. Case studies illustrate civic-level and grassroots institutions, their structures, networks, and philosophies; historical and contemporary realities of urban youth for policy makers, educators, and researchers. Limited enrollment. Prerequisite: consent of instructor. (SSPEP/APA)

*4-5 units, not given this year*

**EDUC 279B. Youth Empowerment and Civic Engagement**

(Same as EDUC 179B) Focus is on youth development policies and practices: what makes them effective, and how they operate in broader institutional contexts. Research-based information; conceptual underpinnings; best learning from experience; and the perspective of expert youth workers, policymakers, and youth about what works.

*2-4 units, not given this year*

**EDUC 281X. Technology for Learners**

Does the use of technology improve learning? Many hope that technology will make learning easier, faster, or accessible to more learners. This course explores a variety of different approaches to designing tools for learning, the learning theories behind them, and the research that tests their effectiveness.

*1-2 units, Aut (Forssell, K)*

**EDUC 282X. The Politics of Knowledge in the Twentieth Century United States**

This course examines the relationship between social scientific knowledge and power in the modern United States. Topics include the emergence of social scientific disciplines, debates over objectivity, and professionalization. The course examines both how universities, philanthropic foundations, and the federal government have shaped knowledge production and how social science has influenced law, social and educational policy, and popular social thought.

*3-5 units, not given this year*

**EDUC 283. Child Development In and Beyond Schools**

(Formerly EDUC 144). How schools form a context for children's social and cognitive development. Focus is on early and middle childhood. Transactional processes between children and learning opportunities in classroom contexts. Topics include: alternative theoretical perspectives on the nature of child development; early experience and fit with traditional school contexts; assessment practices and implications for developing identities as learners; psychological conceptions of motivational processes and alternative perspectives; the role of peer relationships in schools; and new designs for learning environments. Readings address social science and methodological issues. STEP Elementary only.

*2 units, Aut (Hill-Bonnet, L; Merino, N)*

**EDUC 284. Teaching and Learning in Heterogeneous Classrooms**

Teaching in academically and linguistically heterogeneous classrooms requires a repertoire of pedagogical strategies. Focus is on how to provide access to intellectually challenging curriculum and equal-status interaction for students in diverse classrooms. Emphasis is on group work and its cognitive, social, and linguistic benefits for students. How to prepare for group work, equalize participation, and design learning tasks that support conceptual understanding, mastery of content and language growth. How to assess group products and individual contributions. (STEP)

*3 units, Aut (Lotan, R)*

**EDUC 285. Supporting Students with Special Needs**

For STEP teacher candidates. Needs of exceptional learners, identification of learning differences and disabilities, and adaptations in the regular inclusion classroom. Legal requirements of special education, testing procedures, development of individualized education plans, and support systems and services. Students follow a special needs learner to understand diagnosis, student needs, and types of services.

2-3 units, Spr (Fur, E)

**EDUC 286B. Second Language Acquisition Research**

Major research findings and theories in second language acquisition. Second language research and theories in formal and informal settings where a second language is learned. (SSPEP)

4 units, Win (Hakuta, K)

**EDUC 287X. Graduate Research Workshop on Psychological Interventions**

(Same as PSYCH 274) Psychological research has the potential to create novel interventions that promote the public good. This workshop will expose students to psychologically 'wise' intervention research and to support their efforts to conduct such interventions, especially in the context of education, broadly conceived, as well as other areas. The first part of the class will address classic interventions and important topics in intervention research, including effective delivery mechanisms, sensitive behavioral outcomes, the role of theory and psychological process, and considerations of the role of time and of mechanisms that can sustain treatment effects over time. In the second part of the class, students will present and receive feedback on their own ongoing and/or future intervention research. Prerequisite: Graduate standing in Psychology or Education, or consent of instructor.

3 units, Win (Walton, G; Cohen, G)

**EDUC 288. Organization Studies: Theories and Analyses**

(Same as SOC 366) Principles of organizational behavior and analysis; theories of group and individual behavior; organizational culture; and applications to school organization and design. Case studies.

4-5 units, Aut (McFarland, D)

**EDUC 290. Leadership: Research, Policy, and Practice**

Conceptions of leadership that include the classroom, school, district office, and state capitol. The role of complexity; organizational leaders outside of schools past and present, and how that complexity permitted leadership to arise. Case studies. (SSPEP/APA)

4 units, not given this year

**EDUC 291. Learning Sciences and Technology Design Research Seminar and Colloquium**

Students and faculty present and critique new and original research relevant to the Learning Sciences and Technology Design doctoral program. Goal is to develop a community of scholars who become familiar with each other's work. Practice of the arts of presentation and scholarly dialogue while introducing seminal issues and fundamental works in the field.

1-3 units, Aut (Pea, R), Win (Schwartz, D), Spr (Goldman, S)

**EDUC 291X. Introduction to Survey Research**

(Same as EDUC 191X) Planning tasks, including problem formulation, study design, questionnaire and interview design, pretesting, sampling, interviewer training, and field management. Epistemological and ethical perspectives. Issues of design, refinement, and ethics in research that crosses boundaries of nationality, class, gender, language, and ethnicity.

3-4 units, Win (Rodriguez, E)

**EDUC 292A. Acquisition of Japanese as a Second Language**

(Same as JAPANLIT 292) Provides students with a broad overview of second language acquisition (SLA) research and introduces recent SLA studies on Japanese as a second language.

2-4 units, Aut (Ishida, M)

**EDUC 292X. Academic Writing for Clarity and Grace**

Students will acquire helpful writing strategies, habits, and critical faculties; increase their sense of writing as revision; and leave them with resources that will support them in their own lifelong pursuit of good writing. Students will work on revising their own papers and editing papers of other students. Class will focus on exercises in a variety of critical writing skills: framing, concision, clarity, emphasis, rhythm, action, actors, argument, data,

quotations, and usage.

2-4 units, Spr (Labaree, D)

**EDUC 293X. American Philosophy of Education**

A century of classical writers in American philosophy, focusing on work on education, democracy, learning, and culture. Texts by Emerson, Peirce, James, Dewey, and Mead.

3-4 units, not given this year

**EDUC 294X. History of the Learned Book**

The course takes full advantage of the university library's Special Collections to examine the key historic works contributing to the advancement of learning and the organization of knowledge. Beginning with medieval manuscripts and progressing through all areas of human inquiry during the age of print, the course explores the economic and educational history of learned publishing in the West, while examining what these historic artifacts reveal about developments in the structure and authority, production and circulation, technology and aesthetics, of learning and knowledge.

3-5 units, not given this year

**EDUC 295. Learning and Cognition in Activity**

(Same as PSYCH 261A) Methods and results of research on learning, understanding, reasoning, problem solving, and remembering, as aspects of participation in social organized activity. Principles of coordination that support cognitive achievements and learning in activity settings in work and school environments.

3 units, Spr (Pea, R)

**EDUC 296X. School Leadership**

Can one person really make a difference for all the students in a school? Accurate or not, that's the expectation faced by school principals. This course will give students practice in translating school improvement ideas into practice and also help them develop a personal vision for school improvement. For students in POLS or MA/MBA program in School of Education.

3 units, not given this year

**EDUC 297X. Teaching and Learning in Higher Education**

(Same as CTL 297X) Open to master's and doctoral students in all disciplines. How teachers can promote lasting learning and ask which pedagogies are most effective in today's college classrooms. Readings analyze teaching and learning in diverse disciplines and institutional types. Students observe the instruction of a Stanford master teacher. Students write a paper about the instruction of the teacher they observe or prepare a syllabus and commentary for a course of their design.

3-4 units, Win (Ehrlich, T; Miller, B)

**EDUC 298. Learning in a Networked World**

(Same as CS 377L) Foundations, theories and empirical studies for interdisciplinary advances in how we conceive of the potentials and challenges associated with lifelong, lifewide and life-deep learning in a networked world given the growth of always-on cyberinfrastructure for supporting information and social networks across space and time with personal computers, netbooks, and mobiles.

3 units, not given this year

**EDUC 299. Educating for Equity and Democracy**

(Formerly EDUC 167.) Introduction to the theories and practices of equity and democracy in education. How to think about teaching and schooling in new ways; the individual moral and political reasons for becoming a teacher. (STEP)

2 units, Sum (Staff)

**EDUC 301X. Workshop on Race, Ethnicity, and Language in Schools**

(Same as LINGUIST 253A) The Workshop on Race, Ethnicity, and Language in Schools is a new School of Education initiative that examines the profound and enduring relationships between race, ethnicity, and language in education in the U.S. and elsewhere. The seminar brings together an interdisciplinary group of leading scholars and graduate students in language in education to address the role of race and ethnicity in a host of complex and controversial language educational issues that cut across the areas of practice, policy, and pedagogy.

1-4 units, Spr (Alim, H)

**EDUC 302X. Incentives In Education**

Seminar. Theoretical and empirical literatures from psychology



and economics that focus on group and individual incentives and their potential effects. Emphasis is on seminal experiments in psychology and the recent wave of economic field experiments that test the how individual incentives affect educational outcomes and intrinsic motivation.

*1-4 units, not given this year*

**EDUC 303X. Designing Learning Spaces**

Project-based. How space shapes personal interactions and affords learning opportunities in formal and informal settings. How to integrate learning principles into the design of spaces and develop a rubric to assess the impact on learning.

*3-4 units, Win (Forssell, K)*

**EDUC 304X. Critical Theory and Pedagogy**

The course samples the work of Critical Theory, proper, critical theory more generally, and critical pedagogy in the schools, as it draws on the educational consequences of a school of thought. The project of critical theory is examined in light of the curricular applications that it has inspired and the scholarly implications of studying education in this seemingly critical theoretical manner. Students will evaluate a particular curricular point of application of these related theoretical developments.

*1-5 units, Win (Willinsky, J)*

**EDUC 305X. Deprivation and Alienation in Fiction and Education**

This course seeks categories and procedures for the appreciation, description, analysis, and reorganization of people in difficult circumstances. Examples from the history of fiction and classic political economy are used to explore the strengths and weaknesses of various approaches. In depth attention to individual lives and daily struggles give fiction and economic theory more appropriately positive views of people without the advantages of schooling than most educational research. Readings include fiction by Defoe, Austen, Dickens, Hurston, and Morrison and economic visions from Smith, Marx, Veblen, Keynes, and Galbraith.

*3-4 units, Spr (McDermott, R)*

**EDUC 306A. Economics of Education in the Global Economy**

Case material considers development problems in the U.S. and abroad. Discussion sections on economic aspects of educational development. (SSPEP/ICE)

*5 units, Aut (Carnoy, M)*

**EDUC 306B. Politics, Policy Making, and Schooling Around the World**

Education policy, politics, and development. Topics include: politics, interests, institutions, policy, and civil society; how schools and school systems operate as political systems; how policy making occurs in educational systems; and theories of development.

*3-4 units, Spr (Russell, S; Buckner, E)*

**EDUC 306C. Political Economy of the Mind**

Theories of political economy related to theories of the learning mind, emphasizing theories of genius. Readings from Pascal, Defoe, Smith, Balzac, Emerson, Marx, Veblen, Joyce, and Morrison. (SSPEP)

*3-4 units, not given this year*

**EDUC 306D. World, Societal, and Educational Change: Comparative Perspectives**

(Same as EDUC 136, SOC 231) Theoretical perspectives and empirical studies on the structural and cultural sources of educational expansion and differentiation, and on the cultural and structural consequences of educational institutionalization. Research topics: education and nation building; education, mobility, and equality; education, international organizations, and world culture.

*4-5 units, Win (Ramirez, F)*

**EDUC 306Y. Economic Support Seminar for Education and Economic Development**

Core economic concepts that address issues in education in developing and developed countries. Supply and demand, elasticity, discount rates, rate of return analysis, utility functions, and production functions. Corequisite: 306A. (Carnoy)

*1 unit, Aut (Carnoy, M)*

**EDUC 307X. Organizing for Diversity: Opportunities and Obstacles in Groups and Organizations**

Obstacles in organizations and groups that prevent people from participating, working effectively, and developing relationships in the context of diversity. How to create conditions in which diversity enhances learning and effectiveness? Experiential exercises; students experiment with conceptual and analytic skills inside and outside of the classroom.

*3-4 units, not given this year*

**EDUC 308X. Mobile Learning Technology for the Marginalized**

Learning design principles as a basis for developing and evaluating mobile learning systems to address educational inequalities in underserved communities. Students analyze mobile learning scenarios, prototypes, and authoring tools while collaborating with research teams to develop a small-scale mobile empowerment scenario addressing education needs such as language, math, health, and civic and life skills in developing countries.

*1-3 units, not given this year*

**EDUC 309X. Educational Issues in Contemporary China**

(Same as EDUC 109X) Reforms such as the decentralization of school finance, emergence of private schools, expansion of higher education, and reframing of educational policy to focus on issues of quality. Have these reforms exacerbated educational inequality.

*3-4 units, not given this year*

**EDUC 310. Sociology of Education: The Social Organization of Schools**

(Same as EDUC 110, SOC 132, SOC 332) Seminar. Key sociological theories and empirical studies of the links between education and its role in modern society, focusing on frameworks that deal with sources of educational change, the organizational context of schooling, the impact of schooling on social stratification, and the relationships between the educational system and other social institutions such as families, neighborhoods, and the economy.

*4 units, Spr (Carter, P)*

**EDUC 311X. Designing Learning for Development: Learning Theories, Technology Design and Social Change**

Perspectives on learning and human development as they relate to prior technological interventions in the development sphere. Case studies in the international development context; historical perspective on learning and development. Methods of inquiry useful in a design process engaging technology within a development framework.

*3 units, not given this year*

**EDUC 312A. Traditions of Microsociology**

(Same as SOC 224A) The educational applications of sociological and social psychological theory and research to interaction processes in schools. Readings include: foundational works by Mead, Schutz, and Simmel; contemporary work by Goffman, Homans, Merton, Blau, and Harold. Readings span empirical settings such as work, classrooms, gangs, primate societies, and children's games. Topics: processes of influence, role differentiation, identity formation, social mechanisms, and intra/inter group dynamics of peer relations. Methods for observation and analysis of small groups. (SSPEP)

*4 units, not given this year*

**EDUC 312B. Microsociology: Social Structure and Interaction**

(Same as SOC 224B) How to interpret interpersonal situations using microsociological theories. Focuses on the role of intention, identity, routines, scripts, rituals, conceptual frameworks, talk and emotions in social interaction. Processes by which interactions reverberate outward to transform groups and social structures. Special consideration will be placed on organizational contexts like schools, workplaces and policy decision arenas.

*4 units, not given this year*

**EDUC 314. Workshop in Economics of Education**

Research by students and faculty engaged in problems in the economics of education. Prerequisites: advanced graduate training in economics theory and methodology; current ongoing research. May be repeated for credit. (SSPEP)

*1-2 units, not given this year*



**EDUC 315X. Race and Ethnicity in Society and Institutions**

(Same as SOC 347) Primarily for doctoral students. Major theories and empirical research. Emphasis is on schooling and race, racial identity, urban issues, and the impact of immigration on race relations.

*1-5 units, not given this year*

**EDUC 316. Social Network Analysis**

(Same as SOC 369) Introduction to social network theory, methods, and research applications in sociology. Network concepts of interactionist (balance, cohesion, centrality) and structuralist (structural equivalence, roles, duality) traditions are defined and applied to topics in small groups, social movements, organizations, communities. Students apply these techniques to data on schools and classrooms. (SSPEP)

*4-5 units, Win (McFarland, D)*

**EDUC 317X. Workshop: Networks, Histories, and Theories of Action**

(Same as SOC 317W) Yearlong workshop where doctoral students are encouraged to collaborate with peers and faculty who share an interest in researching the network dynamics, histories and theories of action that help explain particular social phenomena. Students present their own research and provide helpful feedback on others' work. Presentations may concern dissertation proposals, grants, article submissions, book proposals, datasets, methodologies and other texts. Repeatable for credit.

*1-2 units, Aut (McFarland, D; Parigi, P), Win (McFarland, D; Parigi, P), Spr (McFarland, D; Parigi, P)*

**EDUC 318X. The Discourses of Teaching Reading**

Students examine language, social relationships, and students' textual sense-making to further develop their conceptions of reading comprehension and their pedagogical practice as reading teachers. What it means to comprehend text; how classroom discourse matters in the development of textual understanding; and what understandings, purposes, and relationships should matter in classroom talk about text. Field work in which students facilitate small group text discussions for the duration of the quarter at a location of their choice.

*3-5 units, not given this year*

**EDUC 319. Research on Teaching**

Introduction and historical perspective to theory, methods, and substantive findings of research on teaching.

*1-4 units, Win (Borko, H)*

**EDUC 320X. Sociology of Knowledge Creation**

(Same as EDUC 120X, SOC 330) The sociology of knowledge creation explores systematic relationships between thought and social structure in order to examine how human beings construct, interpret, and view reality. How knowledge is socially constructed, patterned, and used, and how everyday and tacit forms of knowledge are achieved. Emphasis is on the creation and patterning of scientific paradigms, social science disciplines, and the field of education.

*3-4 units, Aut (McFarland, D)*

**EDUC 321B. Analysis of Social Interaction**

Practicum on discourse, interactional, and cultural analysis of videotaped data. Analysis of interactional data, and the basis on which analytic claims can be founded. The transcription of speech and movement in social interaction, and how to identify the patterns which participants use to display and interpret cultural meanings. The theoretical assumptions hidden in transcription systems. Prerequisite: first- or second-year graduate student. (SSPEP/ICE)

*4 units, Win (McDermott, R)*

**EDUC 321X. Leading Social Change: Educational and Social Entrepreneurship**

(Same as OB 385) (Same as OB 385) The course provides an overview of different approaches to leading change in the social sector, drawing primarily, but not exclusively, on case examples in education. While there is a substantial need for innovation and visionary leadership in sectors such as education, social entrepreneurs who want to drive change must appreciate the significant barriers and unique opportunities presented by non-market forces in these sectors. The course will equip students with an appreciation for different mechanisms of change and theories of action as well as some of the challenges of initiating and sustaining

meaningful change in social sectors such as education. The course will draw on readings and case studies, and we will benefit from the wisdom of an inspirational group of guest lecturers. While the course will benefit any student concerned with making a positive impact in the world, it is particularly (although not exclusively) appropriate for students in the joint MA/MB

*4 units, not given this year*

**EDUC 322. Discourse of Liberation and Equity in Schools and Society**

Issues and strategies for studying oral and written discourse as a means for understanding classrooms, students, and teachers, and teaching and learning in educational contexts. The forms and functions of oral and written language in the classroom, emphasizing teacher-student and peer interaction, and student-produced texts. Individual projects utilize discourse analytic techniques. Prerequisite: graduate status or consent of instructor. (SSPEP)

*3-5 units, not given this year*

**EDUC 323A. The Practice of Education Policy Analysis**

Key issues in the K-12 education policy. Modern theories about the making of policy and its implementation. Preparation to do policy analysis in education. (SSPEP)

*3 units, Spr (Kelemen, M)*

**EDUC 324X. The Ecology of Equality**

This seminar is designed for doctoral students. One of the claims of American educational policy and practice is the desire to achieve equitable educational results across society. But what does equity really entail? This course will survey a range of research and literature that examines the landscape of myriad social institutions known to influence educational processes. The course will take an interdisciplinary approach to deconstructing the main issues confronting schools today and to discussing effective policies and practices.

*4 units, not given this year*

**EDUC 325A. Proseminar 1**

Required of and limited to first-year Education doctoral students. Core questions in education: what is taught, to whom, and why; how do people learn; how do teachers teach and how do they learn to teach; how are schools organized; how are educational systems organized; and what are the roles of education in society?

*3 units, Aut (Carnoy, M; Willinsky, J)*

**EDUC 325B. Proseminar 2**

Required of and limited to first-year Education doctoral students. Core questions in education: what is taught, to whom, and why; how do people learn; how do teachers teach and how do they learn to teach; how are schools organized; how are educational systems organized; and what are the roles of education in society?

*3 units, Win (Boaler, J; Murata, A)*

**EDUC 325C. Proseminar 3**

Required of and limited to first-year Education doctoral students. Core questions in education: what is taught, to whom, and why; how do people learn; how do teachers teach and how do they learn to teach; how are schools organized; how are educational systems organized; and what are the roles of education in society?

*2-4 units, Spr (Antonio, A; Carter, P)*

**EDUC 327A. The Conduct of Qualitative Inquiry**

(Same as SOC 331) Two quarter sequence for doctoral students to engage in research that anticipates, is a pilot study for, or feeds into their dissertations. Prior approval for dissertation study not required. Students engage in common research processes including: developing interview questions; interviewing; coding, analyzing, and interpreting data; theorizing; and writing up results. Participant observation as needed. Preference to students who intend to enroll in 327C.

*3-4 units, not given this year*

**EDUC 327C. The Conduct of Qualitative Inquiry**

For doctoral students. Students bring research data for analysis and writing. Preference to those who have completed 327A.

*1-4 units, not given this year*

**EDUC 328X. Topics in Learning and Technology: Core Mechanics for Learning**

(Same as COMM 180, COMM 280, CS 377H) Contents of the course change each year. The course can be repeated. In game

play, core mechanics refers to the rules of interaction that drive the game forward. This class will consider whether there are core mechanics that can drive learning forward, and if so, how to build them into learning environments.

3 units, Win (Schwartz, D)

**EDUC 329X. Seminar on Teacher Professional Development**

For master's and doctoral students. Theories, principles, and models of professional development. Issues include: different conceptions of teaching, practice, and development; what gets developed in professional development; pedagogies of professional development; structures to support teacher learning; evaluating professional development; and policy issues.

1-4 units, alternate years, not given this year

**EDUC 330X. Teaching English Language Learners: Issues in Policy, Leadership, and Instruction**

Current perspectives and research on issues facing educators serving the English language learner population. Issues include federal education legislation, civil rights law, national Common Core Standards, content and language proficiency standards assessment and accountability, school improvement models, school structure, community engagement, addressing issues of long-term English learners, programming for newcomer ELLs, early childhood education, and promoting bilingualism.

3-4 units, Spr (Hakuta, K)

**EDUC 331A. Introduction to Research Design in Administration and Policy Analysis**

Required for first-year APA doctoral students; SSPEP first-year doctoral students with consent of instructor. How to conduct literature reviews. How to use literature to frame and formulate problem statements, research questions, and conceptual frameworks. (APA)

3 units, not given this year

**EDUC 332X. Theory and Practice of Environmental Education**

Foundational understanding of the history, theoretical underpinnings, and practice of environmental education as a tool for addressing today's pressing environmental issues. The purpose, design, and implementation of environmental education in formal and nonformal settings with youth and adult audiences. Field trip and community-based project offer opportunities for experiencing and engaging with environmental education initiatives.

3 units, Spr (Ardoin, N)

**EDUC 333A. Understanding Learning Environments**

Advanced seminar. Theoretical approaches to learning used to analyze learning environments and develop goals for designing resources and activities to support effective learning practices.

3 units, Win (McDermott, R; Pea, R)

**EDUC 333B. Imagining the Future of Learning**

How to understand and forecast social, educational, technological trends; how to develop concepts and ideas for engaging learning and technology. Presentations of scenarios for future learning concepts from education, government, technology, business and leisure sectors. Experiments with the research and visioning processes.

3 units, not given this year

**EDUC 334A. Youth and Education Law Project: Clinical Practice**

(Same as LAW 660A). The Youth and Education Law Project offers students the opportunity to participate in a wide variety of educational rights and reform work, including direct representation of youth and families in special education and school discipline matters, community outreach and education, school reform litigation, and/or policy research and advocacy. All students have an opportunity to represent elementary and high school students with disabilities in special education proceedings, to represent students in school discipline proceedings, or to work with community groups in advocating for the provision of better and more equitable educational opportunities to their children. In addition, the clinic may pursue a specific policy research and advocacy project that will result in a written policy brief and policy proposal. Students working on special education matters have the opportunity to handle all aspects of their clients' cases. Students working in this area interview and cou

4 units, Win (Koski, W), Spr (Koski, W)

**EDUC 334B. Youth and Education Law Project: Clinical**

**Methods**

(Same as LAW 660B). The Youth and Education Law Project offers students the opportunity to participate in a wide variety of educational rights and reform work, including direct representation of youth and families in special education and school discipline matters, community outreach and education, school reform litigation, and/or policy research and advocacy. All students have an opportunity to represent elementary and high school students with disabilities in special education proceedings, to represent students in school discipline proceedings, or to work with community groups in advocating for the provision of better and more equitable educational opportunities to their children. In addition, the clinic may pursue a specific policy research and advocacy project that will result in a written policy brief and policy proposal. Students working on special education matters have the opportunity to handle all aspects of their clients' cases. Students working in this area interview and cou

4 units, Win (Koski, W), Spr (Koski, W)

**EDUC 334C. Youth and Education Law Project: Clinical Coursework**

(Same as LAW 660C). The Youth and Education Law Project offers students the opportunity to participate in a wide variety of educational rights and reform work, including direct representation of youth and families in special education and school discipline matters, community outreach and education, school reform litigation, and/or policy research and advocacy. All students have an opportunity to represent elementary and high school students with disabilities in special education proceedings, to represent students in school discipline proceedings, or to work with community groups in advocating for the provision of better and more equitable educational opportunities to their children. In addition, the clinic may pursue a specific policy research and advocacy project that will result in a written policy brief and policy proposal. Students working on special education matters have the opportunity to handle all aspects of their clients' cases. Students working in this area interview and cou

4 units, Win (Koski, W), Spr (Koski, W)

**EDUC 334X. Education Advocacy Clinic**

(Same as LAW 660.) For students enrolled in the Education (M.A.) and Law (J.D.) joint degree program and those who already possess Law degrees only. Students participate in educational rights and reform work with clients and communities, including direct representation of youth and families in special education and school discipline matters, community outreach and education, school reform litigation, and/or policy research and advocacy. May be repeated for credit. Prerequisite: consent of instructor.

2-10 units, Win (Staff), Spr (Staff)

**EDUC 336. Language, Identity, and Classroom Learning**

As contemporary research focuses on how people act and recognize each other, analyzing interaction while acknowledging identity allows for a dynamic examination of cultural interaction. Broad cultural categorization can be overly expansive in identifying the characteristics of large groups of individuals.

1-3 units, Aut (Brown, B)

**EDUC 336A. Law and Public Policy: Issues in Implementation**

(Same as LAW 636.) This seminar will focus on issues related to achieving successful implementation of the goals of legislation. It is widely recognized that the goals of legislation often are not realized and that the failure frequently rests in breakdowns in the implementation process by the agencies and organizations charged with implementing the legislation. In response to problems in implementation, the institutional context of public policy implementation is changing. One category of innovations, known by names such as management-based regulation and evidence-based social service delivery, gives broad discretion to street-level service providers but subjects them to intensive monitoring and disciplined performance comparison. Another category applies market concepts to regulation or social services, for example, by creating tradable rights (e.g. pollution allowances) or vouchers (for schools, housing, or healthcare). These, and other, new approaches are affecting both the

3 units, Win (Staff)

**EDUC 337. Race, Ethnicity, and Linguistic Diversity in Classrooms: Sociocultural Theory and Practices**

(Same as AFRICAAM 106, CSRE 103B, EDUC 103B) Focus is

on classrooms with students from diverse racial, ethnic and linguistic backgrounds. Studies, writing, and media representation of urban and diverse school settings; implications for transforming teaching and learning. Issues related to developing teachers with attitudes, dispositions, and skills necessary to teach diverse students.

3-5 units, *Spr* (Ball, A)

**EDUC 338X. Innovations in Education: Designing the teaching experience**

Design Institute class; see <http://dschool.stanford.edu>. Immersive experiences and real world projects focused around issues facing the teaching profession. Human capital as a top priority for the U.S. and other educational systems. Topics include teacher career ladders, induction, retention, and teacher knowledge sharing.

3-4 units, *not given this year*

**EDUC 339. Advanced Topics in Quantitative Policy Analysis**

For doctoral students. How to develop a researchable question and research design, identify data sources, construct conceptual frameworks, and interpret empirical results. Presentation by student participants and scholars in the field. May be repeated for credit.

1-2 units, *Aut* (Loeb, S), *Win* (Reardon, S), *Spr* (Staff)

**EDUC 340. Psychology and American Indian Mental Health**

(Same as NATIVEAM 240) Western medicine's definition of health as the absence of sickness, disease, or pathology; Native American cultures' definition of health as the beauty of physical, spiritual, emotional, and social things, and sickness as something out of balance. Topics include: historical trauma; spirituality and healing; cultural identity; values and acculturation; and individual, school, and community-based interventions. Prerequisite: experience working with American Indian communities.

3-5 units, *not given this year*

**EDUC 341X. Urban School System Reform**

Strategies for large-scale reform of complex school systems. Case studies of urban school systems. Sources include approaches developed in management studies, organizational behavior, and school reform. Political and community contexts; the role of urban superintendents and administrators in creating reform strategies. Factors such as labor relations and the regulatory environment. Guest speakers.

4 units, *not given this year*

**EDUC 342. Child Development and New Technologies**

Focus is on the experiences computing technologies afford children and how these experiences might influence development. Sociocultural theories of development as a conceptual framework for understanding how computing technologies interact with the social ecology of the child and how children actively use technology to meet their own goals. Emphasis is on influences of interactive technology on cognitive development, identity, and social development equity.

1-3 units, *Win* (Barron, B; Goldman, S)

**EDUC 343X. Navigating the Academic Profession**

For DARE doctoral fellows only. The roles and responsibilities of faculty members in American colleges and universities in the 21st century. How to become productive faculty members within the higher education enterprise.

1-2 units, *Aut* (Golde, C)

**EDUC 344. Child Development and Schooling**

How the practices and activities of schooling influence the social, emotional, and cognitive development of children. Metatheoretical approaches (mechanistic, organismic, developmental contextualist) and methods of conducting research on schooling and development (experimental, survey, ethnographic, intervention). Topics: how teaching practices influence cognitive growth in academic domains; how the organizational structures of schools (grade related transitions, class organizations) fit or fail to fit developmental needs; how friendship groups create contexts for learning and can lead to different trajectories of development; and how grading and other evaluative practices influence motivational orientations. Focus is on elementary school years. (PSE)

3-4 units, *not given this year*

**EDUC 346. Research Seminar in Higher Education**

Required for higher education students. Major issues, current structural features of the system, the historical context that shaped

it, and theoretical frameworks. The purposes of higher education in light of interest groups including students, faculty, administrators, and external constituents. Issues such as diversity, stratification, decentralization, and changes that cut across these groups. (APA)

4 units, *Aut* (Stevens, M)

**EDUC 347. The Economics of Higher Education**

Topics: the worth of college and graduate degrees, and the utilization of highly educated graduates; faculty labor markets, careers, and workload; costs and pricing; discounting, merit aid, and access to higher education; sponsored research; academic medical centers; and technology and productivity. Emphasis is on theoretical frameworks, policy matters, and the concept of higher education as a public good. Stratification by gender, race, and social class.

4 units, *Win* (Bettinger, E)

**EDUC 348X. Policy and Practice in Science Education**

Values and beliefs that dominate contemporary thinking about the role and practice of science education, what the distinctive features of science are, and the arguments for its value as part of compulsory education. Research on the conceptual and affective outcomes of formal science education, how the changing nature of contemporary society challenges current practice, and the rationale for an alternative pedagogy, curriculum and assessment.

3-4 units, *alternate years, not given this year*

**EDUC 350A. Psychological Studies in Education**

Required of first-year doctoral students in Psychological Studies; others by consent of instructor. Introduction to the doctoral program in Psychological Studies in Education and to faculty and student research. (PSE)

2 units, *not given this year*

**EDUC 350C. Psychological Studies in Education**

Individual research projects in a group context. (PSE)

1-2 units, *not given this year*

**EDUC 351A. Statistical Methods for Longitudinal Data**

(Same as STATS 222) Research designs and statistical procedures for time-ordered (repeated-measures) data. The analysis of longitudinal panel data is central to empirical research on learning and development. Topics: measurement of change, growth curve models, analysis of durations including survival analysis, experimental and non-experimental group comparisons, reciprocal effects, stability. See <http://www-stat.stanford.edu/~rag/stat222/>. Prerequisite: intermediate statistical methods.

2-3 units, *Spr* (Rogosa, D)

**EDUC 351B. Statistical Issues in Testing and Assessment**

The new book by Howard Wainer, *Uneducated Guesses: Using Evidence to Uncover Misguided Education Policies* is the basis for this seminar. Also included will be supporting research literature and data analysis activities for topics such as college admissions, methods for missing data, assessment of achievement gaps, and the use of value-added analysis. See <http://www-stat.stanford.edu/~rag/ed351B/>

2-3 units, *Aut* (Rogosa, D)

**EDUC 351C. Workshop in Technical Quality of Educational Assessments and Accountability**

Topics include: determinations of accuracy for individual scores and group summaries; design and reporting of educational assessments; achievement instruments in state-level accountability systems; and policy implications of statistical properties. See <http://www.stanford.edu/~rag/>.

3 units, *not given this year*

**EDUC 352X. Education Schools: Historical and Sociological Perspectives**

The lowly status of the education school, defined as college, school, or department, within a university. Why does the education school get no respect? Its historical development, how it evolved into its current position in the academic hierarchy, and contemporary factors that help to reinforce that position. (SSPEP) (Labaree)

2-4 units, *not given this year*

**EDUC 353A. Problems in Measurement: Item Response Theory**

Alternative mathematical models used in test construction, analysis, and equating. Emphasis is on applications of item

response theory (latent trait theory) to measurement problems, including estimation of item parameters and person abilities, test construction and scoring, tailored testing, mastery testing, vertical and horizontal test equating, and detection of item bias. Prerequisites: 252 and 257, or PSYCH 248 and 252, or equivalent. (PSE)

3 units, Win (Haertel, E)

**EDUC 353C. Problems in Measurement: Generalizability Theory**

Application to analysis of educational achievement data, including performance assessments. Fundamental concepts, computer programs, and actual applications. (PSE)

3 units, Spr (Haertel, E)

**EDUC 354X. School-Based Decision Making**

Leadership and organizational issues. Leadership as it plays out in the pragmatic demands and tensions of site-level decision processes. The interdependence of factors critical to school achievement and equity outcomes: governance and culture, instruction, resource alignment, inquiry, community engagement. The complexity of decisions in these arenas and the capacity-building process of leadership for results.

3-4 units, Win (Hoagland, G)

**EDUC 355X. Higher Education and Society**

For undergraduates and graduate students interested in what colleges and universities do, and what society expects of them. The relationship between higher education and society in the U.S. from a sociological perspective. The nature of reform and conflict in colleges and universities, and tensions in the design of higher education systems and organizations.

3 units, not given this year

**EDUC 356. Street History: Learning the Past in School and Out**

(Same as HISTORY 337C) Interdisciplinary. Since Herodotus, history and memory have competed to shape minds: history cultivates doubt and demands interpretation; memory seeks certainty and detests that which thwarts its aims. History and memory collide in modern society, often violently. How do young people become historical amidst these forces; how do school, family, nation, and mass media contribute to the process?

3-5 units, not given this year

**EDUC 357X. Science and Environmental Education in Informal Contexts**

There are ever-expanding opportunities to learn science in contexts outside the formal classroom, in settings such as zoos, museums, and science centers. How are issues around science and the environment presented in these contexts, how do people behave and learn in these contexts, and what messages do they take away? This course will cover the learning theories and empirical research that has been conducted in these settings. Case studies of nearby science centers will add an experiential dimension.

3-4 units, Win (Osborne, J; Ardoin, N)

**EDUC 358X. Learning, Sharing, Publishing, and Intellectual Property**

This course explores the legalities and economics entailed in sharing intellectual property (books, websites, games, journals, etc.) associated with learning at all age levels in the digital era. It assesses the implications of historical, contemporary, and innovative approaches to intellectual property in designing for learning and teaching, as well as for the place of knowledge in the society at large. The course considers new licensing agreements and economic models that apply to learning resources, software systems, research, archives, and data. And the course publishes its own open access and open source journal as a demonstration project: <http://accesscourse.stanford.edu>

1-4 units, Win (Willinsky, J)

**EDUC 359A. Research in Science and Mathematics Education: Assessment and Evaluation**

Historical and international perspectives. Emphasis is on trends and issues in contemporary American research and policy. Opportunity to develop and discuss dissertation plans. (CTE) (Shavelson)

2-4 units, Aut (Nandagopal, K)

**EDUC 359B. The History of Research in Science Education**

For doctoral students interested in science education and literacy in school subjects.

2-3 units, Win (Brown, B)

**EDUC 359C. Science Literacy**

The changing debate over conceptions of the nature of science and the calls to broaden it. Themes, directions, limitations, and epistemological foundations of the body of research on the nature of science.

2-3 units, not given this year

**EDUC 359E. Research on Mathematics Education**

Comparative and cultural perspectives on mathematics teaching and learning practices in the U.S. mathematics education in the context of cultural and educational systems. Teaching and learning as an interactive system, classroom discourse and math talk, teacher professional development, classroom culture and norms, educational equity, and issues of curriculum and standards.

2-4 units, Aut (Murata, A)

**EDUC 359F. Research in Mathematics Education: Conducting Inquiry**

The focus of this seminar is an exploration of relationships between theory, research, and practice. At the center will be the participants' own research studies in mathematics education that they will conduct throughout the 10 weeks of the course. These will be accompanied by focused readings that illustrate various issues within the research enterprise as well as give participants a broad perspective on the field of mathematics education.

2-4 units, not given this year

**EDUC 360X. Developmental Psychopathology and Resilience**

In this course students will learn about theoretical, methodological, and empirical issues pertaining to developmental psychopathology and resilience of children and adolescents. The course focuses on (1) current conceptual and empirical issues; (2) cognitive, affective, and motivational processes that underlie some of the most salient childhood mental health symptoms and disorders; (3) family, school, and cultural factors that contribute to developmental psychopathology and resilience; and (4) cutting-edge analytic methods that are currently employed in studies of developmental psychopathology and resilience.

3-4 units, Spr (Obradovic, J)

**EDUC 361. Workshop: Networks and Organizations**

(Same as SOC 361W) For students doing advanced research. Group comments and criticism on dissertation projects at any phase of completion, including data problems, empirical and theoretical challenges, presentation refinement, and job market presentations. Collaboration, debate, and shaping research ideas. Prerequisite: courses in organizational theory or social network analysis.

1-3 units, Aut (Powell, W), Win (Powell, W), Spr (Powell, W)

**EDUC 362X. The Science Curriculum: Values and Ideology in a Contested Terrain**

The issue of what should be taught in schools is a site of contestation where issues of beliefs, values and ideologies emerge. This course will use the school science curriculum and the history of its development to explore the common positions adopted and argued for in approaching curriculum development. Course will help students develop a knowledge of curriculum reform in school science and a deeper understanding of the arguments that have shaped its present form and their historical antecedents.

3-5 units, Spr (Osborne, J)

**EDUC 363X. Stress Reactivity and Biological Sensitivity to Context**

This class is designed to introduce students to two biological systems, the autonomic nervous system (ANS) and the hypothalamic-pituitary-adrenal (HPA) axis that help children respond to and cope with daily challenges, stressors, and adversities. We will examine: (1) how the ANS and HPA systems respond to daily stressors, as well as experiences of poverty, maltreatment, and neglect; (2) how different indices of stress reactivity independently and jointly relate to various domains of competence and psychopathology; and (3) how stress reactivity moderates contextual influences on children's adaptation.

3-4 units, Aut (Obradovic, J)

**EDUC 364. Cognition and Learning**

Cognitive psychology is the study of human thought including topics including the nature of expertise, creativity, and memory. Emphasis is on learning. The role of cognitive psychology in helping people learn, and determining the most desirable type of learning and whether people have learned. Students design and conduct their own learning study.

*3-4 units, alternate years, not given this year*

**EDUC 365. Social, Emotional, and Personality Development**

Limited to doctoral students in PSE and those with a background in child and adolescent development. Developmental processes that account for psychological adaptation in social relationships, schools, and other interpersonal settings. Theoretical models of social, personality, and emotional development. Topics such as self-concept, empathy, motivation, aggression, and personality formation.

*3 units, Win (Damon, W)*

**EDUC 366X. Learning in Formal and Informal Environments**

How learning opportunities are organized in schools and non-school settings including museums, after-school clubs, community art centers, theater groups, aquariums, sports teams, and new media contexts. Sociocultural theories of development as a conceptual framework. Readings from empirical journals, web publications, and books. Collaborative written or multimedia research project in which students observe and document a non-school learning environment.

*3 units, Spr (Barron, B)*

**EDUC 367. Cultural Psychology**

(Formerly 292.) The relationship between culture and psychological processes; how culture becomes an integral part of cognitive, social, and moral development. Both historical and contemporary treatments of cultural psychology, including deficit models, crosscultural psychology, ecological niches, culturally specific versus universal development, sociocultural frameworks, and minority child development. The role of race and power in research on cultural psychology.

*3-5 units, Spr (LaFromboise, T)*

**EDUC 368. Cognitive Development in Childhood and Adolescence**

This course aims to broaden and deepen students' understanding of cognitive development from the prenatal period through adolescence. It will examine various theoretical, methodological, and empirical issues pertaining to different domains of cognitive development, such as neurobiological plasticity, infant cognition, theory of mind, memory, language, and executive functions. Throughout the course, as we survey research findings, we will discuss (1) methods that researchers have employed in their study of cognitive development; (2) limitations of current research and directions for future research; and (3) translation of research findings for practitioners and policymakers.

*3-4 units, Aut (Obradovic, J)*

**EDUC 369. Human Cognitive Abilities**

(Same as PSYCH 133) Psychological theory and research on human cognitive abilities; their nature, development, and measurement; and their importance in society. Persistent controversies and new areas of research, recent perspectives on the nature-nurture debate and the roles of genetics, health and education in shaping HCAs. Prerequisite: PSYCH 1 or equivalent. (PSE)

*3 units, not given this year*

**EDUC 370X. Theories of Cognitive Development**

The contributions of Jean Piaget and Lev Vygotsky to the study of the developing mind of the child. Their theories, concepts, perspectives, empirical work, and lives. Topics: Piaget's genetic epistemology, constructivism, and idea of sensorimotor through formal operational stages; Vygotsky's cultural-historical approach, egocentric speech, and the relation between learning and development.

*3 units, not given this year*

**EDUC 371X. Social Psychology and Social Change**

(Same as PSYCH 265, PUBLPOL 305B) The course is intended an exploration of the major ideas, theories, and findings of social psychology and their applied status. Special attention will be given to historical issues, classic experiments, and seminal theories, and

their implications for topics relevant to education. Contemporary research will also be discussed. Advanced undergraduates and graduate students from other disciplines are welcome.

*2-3 units, Spr (Cohen, G)*

**EDUC 373X. Teaching in the Humanities-Research into Adolescent Literacy**

Relatively little attention has been paid to the role of humanities courses in teaching both general and disciplinary skills in reading and writing. With the growth of small schools, more middle and high school teachers find themselves teaching 'Humanities' courses. This seminar will explore what it means to teach the humanities, with special attention to how such courses can develop disciplinary reading and writing skills. Course will investigate how we develop tools to assess teaching and learning in the humanities.

*3-5 units, not given this year*

**EDUC 374. Philanthropy and Civil Society**

(Same as POLISCI 334, SOC 374) Associated with the Center for Philanthropy and Civil Society (PACS). Year-long workshop for doctoral students and advanced undergraduates writing senior theses on the nature of civil society or philanthropy. Focus is on pursuit of progressive research and writing contributing to the current scholarly knowledge of the nonprofit sector and philanthropy. Accomplished in a large part through peer review. Readings include recent scholarship in aforementioned fields. May be repeated for credit for a maximum of 9 units.

*1-3 units, Aut (Powell, W), Win (Powell, W), Spr (Powell, W)*

**EDUC 375A. Seminar on Organizational Theory**

(Same as MS&E 389, SOC 363A) The social science literature on organizations assessed through consideration of the major theoretical traditions and lines of research predominant in the field.

*5 units, Aut (Powell, W)*

**EDUC 375B. Seminar on Organizations: Institutional Analysis**

(Same as SOC 363B) Seminar. Key lines of inquiry on organizational change, emphasizing network, institutional, and evolutionary arguments.

*3-5 units, not given this year*

**EDUC 376. State Theory and Educational Policy**

The relationship between political system structures and educational change by analyzing theories and interpretations of how political systems function, and the implications of these theories for understanding education. Classical and Marxist interpretations. (SSPEP/ICE)

*4 units, not given this year*

**EDUC 377. Comparing Institutional Forms: Public, Private, and Nonprofit**

(Same as GSBGEN 346, PUBLPOL 317, SOC 377) For students interested in the nonprofit sector, those in the joint Business and Education program, and for Public Policy MA students. The focus is on the missions, functions, and capabilities of nonprofit, public, and private organizations, and the managerial challenges inherent in the different sectors. Focus is on sectors with significant competition among institutional forms, including health care, social services, the arts, and education. Sources include scholarly articles, cases, and historical materials.

*4 units*

**EDUC 377B. Strategic Management of Nonprofits**

(Same as STRAMGT 368). Strategic, governance, and management issues facing nonprofit organizations and their leaders in the era of venture philanthropy and social entrepreneurship. Development and fundraising, investment management, performance management, and nonprofit finance. Case studies include smaller, social entrepreneurial and larger, more traditional organizations, including education, social service, environment, health care, religion, NGOs, and performing arts.

*4 units, Win (Meehan, W)*

**EDUC 377C. Strategic Issues in Philanthropy**

(Also GSBGEN 381). Operational and strategic distinctions between traditional philanthropic entities, such as community, private, and corporate foundations, and contemporary models, such as funding intermediaries and venture philanthropy partnerships. Philanthropic strategies as they relate to foundation mission, grant making, evaluation, financial management, infrastructure, and board governance. Guest speakers include philanthropists, foundation presidents, and Silicon Valley business leaders. Group

project in which students solicit a grant proposal from a local nonprofit organization and make a funding recommendation to a Silicon Valley-based foundation.

*4 units, Aut (Arrillaga, L)*

**EDUC 377D. Strategic Leadership of Nonprofits**

(Same as STRAMGT 378) Formulating, evaluating, and implementing mission and strategy. Case studies from nonprofits in social services, health care, education, and arts and culture. The interaction of strategy and mission, industry structure and evolution, strategic change, growth and replication, corporate strategy, governance, commercialization, alliances, capacity building, and leadership.

*4 units, not given this year*

**EDUC 378X. Seminar on Social Change Processes and Organizations**

Theories of social change and influence processes within and through organizations. Social change organizations. The interaction of philanthropic institutions and other social change organizations within civil society. Meso-level theories of change.

*3-4 units, not given this year*

**EDUC 379X. Educational Inequality: Legal and Social Science Perspectives (LAW 505)**

This class will examine the issue of inequality in primary and secondary education, particularly with respect to race and socioeconomic status, from the perspectives of both law and social science. The course will distinguish between inequality in terms of inputs versus outputs, presenting the empirical evidence about each and the relationship between the two. The course will explore the history of legal and policy responses to persistent inequality, and consider the challenge of contemporary educational inequality and survey the competing policy approaches, from desegregation to increased and redistributed funding to efforts to improve instructional quality, to centralized accountability and testing to market-based solutions.

*3-5 units, not given this year*

**EDUC 380. Supervised Internship**

*1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**EDUC 381. Multicultural Issues in Higher Education**

(Same as EDUC 181) The primary social, educational, and political issues that have surfaced in American higher education due to the rapid demographic changes occurring since the early 80s. Research efforts and the policy debates include multicultural communities, the campus racial climate, and student development; affirmative action in college admissions; multiculturalism and the curriculum; and multiculturalism and scholarship.

*4 units, not given this year*

**EDUC 382. Student Development and the Study of College Impact**

The philosophies, theories, and methods that undergird most research in higher education. How college affects students. Student development theories, models of college impact, and issues surrounding data collection, national databases, and secondary data analysis.

*4 units, not given this year*

**EDUC 384. Advanced Topics in Higher Education**

Topics vary each year and may include faculty development, legal issues, curricular change, knowledge production, professional socialization, management of organizational decline, leadership and innovation, authority and power, diversity and equity, and interactions with government and industry. May be repeated for credit. Prerequisites: 346, consent of instructor. (APA)

*3-5 units, not given this year*

**EDUC 386X. Leadership and Administration in Higher Education**

Definitions of leadership and leadership roles within colleges and universities. Leadership models and organizational concepts. Case study analysis of the problems and challenges facing today's higher education administrators.

*4 units, Spr (Ehrlich, T)*

**EDUC 387A. Workshop: Comparative Studies of Educational and Political Systems**

(Same as SOC 311A) Analysis of quantitative and longitudinal data on national educational systems and political structures. May

be repeated for credit. Prerequisite: consent of instructor. (SSPEP/ICE)

*1-5 units, Aut (Ramirez, F; Meyer, J)*

**EDUC 387B. Workshop: Comparative Systems of Educational and Political Systems**

(Same as SOC 311B) Analysis of quantitative and longitudinal data on national educational systems and political structures. May be repeated for credit. Prerequisite: consent of instructor. (SSPEP/ICE)

*1-5 units, Win (Ramirez, F; Meyer, J)*

**EDUC 387C. Workshop: Comparative Studies of Educational and Political Systems**

(Same as SOC 311C) Analysis of quantitative and longitudinal data on national educational systems and political structures. Prerequisite: consent of instructor. May be repeated for credit. (SSPEP/ICE)

*1-5 units, Spr (Ramirez, F; Meyer, J)*

**EDUC 388A. Language Policies and Practices**

For STEP teacher candidates seeking to meet requirements for the English Learner Authorization on their preliminary credential. Historical, political, and legal foundations of education programs for English learners. Theories of second language learning, and research on the effectiveness of bilingual education. Theory-based methods to facilitate and measure English learners' growth in language and literacy acquisition, and create environments which promote English language development and content area learning through specially designed academic instruction in English. (STEP)

*2 units, Win (Goldenberg, C; Hill-Bonnet, L)*

**EDUC 388F. Introduction to Academic Language**

This course will provide opportunities for pre-service teachers to begin to develop an understanding of language uses, forms, and mechanics through application of a functional approach to academic language. By exploring language structures (phonology, morphology, syntax, semantics) as well as language-in-use (pragmatics and discourse), teacher candidates will be able to better recognize linguistic demands and challenges of students in the classroom.

*1 unit, Aut (Hill-Bonnet, L)*

**EDUC 389X. Race, Ethnicity, and Language**

(Same as ANTHRO 320A, LINGUIST 253) This seminar explores the linguistic construction of race and ethnicity across a wide variety of contexts and communities. Throughout the course, we will take a comparative perspective and highlight how different racial/ethnic formations participate in similar, yet different, ways of doing race through language, interaction and culture. Readings draw heavily from perspectives in (linguistic) anthropology and sociolinguistics.

*3-4 units, Win (Alim, H)*

**EDUC 390X. Computational Modeling in Cognitive and Social Science**

(Same as CS 424M) Computational modeling and data-mining are dramatically changing the physical sciences, and more recently also the social and behavioral sciences. Traditional analysis techniques are insufficient to investigate complex dynamic social phenomena as social networks, online gaming, diffusion of innovation, opinion dynamics, classroom behavior, and other complex adaptive systems. In this course, we will learn about how modeling, network theory, and basic data-mining can support research in cognitive, and social sciences, in particular around issues of learning, cognitive development, and educational policy.

*3-4 units, Win (Blikstein, P)*

**EDUC 391X. Web-Based Technologies in Teaching and Learning**

Project-based. Overview of instructional design theories and educational technologies to evaluate and develop a web-based educational application or system. Web-based applications and technologies designed for online interactions and collaborations. Instructional systems strategies to develop online environments that support and facilitate interactive learning. Students create a small-scale, web-based learning system.

*3 units, not given this year*

**EDUC 392X. The Political Economy of Global Higher**

## Education

The course is intended to introduce students to the analysis of higher education and higher educational change in an international context, reviewing critically the current literature and showing how social scientists study higher education using quantitative and qualitative tools. The course will present a model of studying change, review political, sociological, and economic theories applied to higher education, and focus on four important case studies of higher education in the developing world: Brazil, Russia, India, and China, known also as the BRIC countries.

3-4 units, *Win (Carnoy, M; Kuhns, K)*

### EDUC 393. Proseminar on Research in Education

Overview of the field of education for joint degree (M.B.A./M.A.) students. (SSPEP) (Strober)

4 units, *Spr (Staff)*

### EDUC 394X. Research in Progress Seminar

This seminar will provide a forum where graduate students could discuss prospective research ideas, present ongoing research, and consider theoretical issues of broad interest to the field. In this research in progress seminar students are expected to present ongoing research and have a discussion about it -- or a specific research article related to it --, with the purpose of eliciting feedback from the instructor and other seminar participants.

1 unit, *Spr (Rodriguez, E)*

### EDUC 395. Scholarly Writing in Education and the Social Sciences

Focus is on producing articles for scholarly journals in education and the social sciences. Ethics and craft of scholarly publishing. Writing opinion articles for lay audiences on issues of educational and social import.

3-5 units, *Win (Wineburg, S)*

### EDUC 396X. The Design of Technologies for Casual Learning

(Same as EDUC 196X) Studio-based, participatory, and user-centered development of casual learning technologies is explored, using the Apple iPhone as a prototype platform. The term casual is borrowed from casual gaming to denote that the learning technologies are meant for learners to use in extreme informal learning circumstances (while on the go, any time and any place). The class builds on learning about and synthesizing knowledge, theory and development activity in four areas including learning theories, mobile technologies, games and participatory design processes.

3 units, *not given this year*

### EDUC 397X. Math Mentoring: Working in the Zone with Learners

(Same as EDUC 187X) The course focuses on how the tutorial relationship can help students learn mathematics. The course will provide background theory and knowledge as well as provide practical approaches to tutoring, supports for targeting activities to students' needs, selection of materials and activities, and ways to assess the progress of the students and reflect on your own experience. Topics will include social theories of learning, teaching for understanding, and challenges of students who are English language learners. In addition to attending 4, two-hour workshop classes, 1 hour of tutoring is required each week. The course will meet 4 times during the quarter for workshops and discussions following Friday tutoring sessions. Students will submit assignments on the Coursework site on weeks that the course does not meet. A 1 unit section of the course will run in Winter and Spring quarters.

1-2 units, *Win (Goldman, S; O'Connor, K)*

### EDUC 398X. Market-Based Education Reforms

(Same as GSBGEN 577). This seminar course examines market-based education reforms and evidence on their impacts. Topics considered in depth will include public school choice, charter schools, vouchers, incentives for students and teachers, and accountability. We will pay special attention to the design and operation of education markets, the politics and legal challenges of market-based school reform, and methods for evaluating reform initiatives. The course will draw on cases both within the United States and internationally.

2 units, *Win (Staff)*

### EDUC 399X. Mixed Methods Research

This advanced course will address the theory and practice of

mixing inquiry methodologies in social inquiry. The course will cover: 1) selected roots of the contemporary interest in mixing methods, 2) conceptualizations of mixed methods design and analysis, and 3) challenges of mixed methods practice.

3 units, *Spr (Rodriguez, E)*

### EDUC 401A. Mini Courses in Methodology: Statistical Packages for the Social Sciences

Statistical analysis using SPSS, including generating descriptive statistics, drawing graphs, calculating correlation coefficients, conducting t-tests, analysis of variance, and linear regression. Building up datasets, preparing datasets for analysis, conducting statistical analysis, and interpreting results.

1 unit, *Aut (Chiatovich, T), Win (Chiatovich, T)*

### EDUC 401B. Mini Courses in Methodology: Stata

The computer as research tool. Statistical software Stata for data analysis, including t-tests, correlation, ANOVA, and multivariate linear regression.

1 unit, *Aut (Arshan, N), Win (Arshan, N)*

### EDUC 402X. Formative Assessment of Literacy Learning and Performance

With the emergence of national standards and assessments, the role of classroom assessments has received diminished attention. Literacy acquisition - learning to read and write as facets of academic language - is critical through the grades and across content areas. This course will cover (1) the recent history of classroom assessment, (2) a conception of assessment as practical inquiry, (3) a review of performance-based assessment methods, and (4) practical implementation of the preceding ideas.

2 units, *Aut (Calfee, R)*

### EDUC 405X. The Teaching of Literature: How We Teach & Why

(Same as ENGLISH 397X) This course is designed for graduate students in English and English Education who are interested in questions surrounding the teaching of literature at both the secondary and collegiate level. The course weaves together theoretical considerations of the purposes for teaching literature, including assumptions about the kinds of readings and readers literature teachers are trying to create, with investigation of pedagogical practices.

2-4 units, *not given this year*

### EDUC 410. Second-Year Research Workshop

For second-year doctoral students in APA and ICE. Issues in conceptualizing and designing research in the social sciences: methodology and epistemology; research proposals; and findings by students and faculty. Prerequisites: 306A,B,C,D or equivalents. (APA/ICE)

2-5 units, *not given this year*

### EDUC 412X. Organization Studies Research Workshop

For graduate students whose research is rooted in organization theory. Participants to present and receive feedback on their work including paper drafts, proposals and dissertation chapter. Sources include recent scholarship. May be repeated for credit.

1-2 units, *not given this year*

### EDUC 417. Research and Policy on Postsecondary Access

(Same as EDUC 117) The transition from high school to college. K-16 course focusing on high school preparation, college choice, remediation, pathways to college, and first-year adjustment. The role of educational policy in postsecondary access. Service Learning Course (certified by Haas Center).

3 units, *not given this year*

### EDUC 418. Foundations of Case Study Research

Rationales for case study research in academic organizations emphasizing colleges and universities; high schools and related organizational contexts. Methodological training in fieldwork through hands-on data collection and analysis from interviews and documents. For doctoral students developing qualifying papers or dissertation proposals; required for higher education doctoral students; APA, SSE, and C&TE students with consent of instructor. (APA)

3-5 units, *not given this year*

### EDUC 419X. Academic Achievement of Language Minority Students

Emphasis is on the current state of knowledge in the research



literature and comparisons to students' experiences and observations in bilingual education, English as a second language, reading instruction, cultural issues in education, and research methods.

3-5 units, Spr (Goldenberg, C)

#### **EDUC 424. Introduction to Research in Curriculum and Teacher Education**

Required for first-year CTE Doctoral students. How to conceptualize, design, and interpret research. How to read, interpret, and critique research; formulate meaningful research questions; evaluate and conduct a literature review; and conceptualize a study. Readings include studies from different research paradigms. Required literature review in an area students expect to explore for their qualifying paper. (Darling-Hammond)

2-5 units, Spr (Borko, H)

#### **EDUC 435X. Research Seminar in Applied Linguistics**

(Same as LINGUIST 293) For graduate students in the schools of Education and Humanities and Sciences who are engaged in research pertaining to applied linguistic topics in original research. Topics: language policies and planning, language and gender, writing and critical thinking, foreign language education, and social applications of linguistic science. (SSPEP)

1-4 units, not given this year

#### **EDUC 453. Doctoral Dissertation**

For doctoral students only. (all areas)

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

#### **EDUC 465. Seminar in the Pedagogy of Teacher Education**

For doctoral students interested in working in teacher education. Pedagogical approaches, including the use of modeling and simulations and hypermedia materials. Theoretical considerations of how teachers learn to teach.

3 units, not given this year

#### **EDUC 466. Doctoral Seminar in Curriculum Research**

Required of all doctoral students in CTE, normally during their second year in the program. Students present their ideas regarding a dissertation or other research project, and prepare a short research proposal that often satisfies their second-year review. (CTE)

2-4 units, Aut (Goldenberg, C)

#### **EDUC 470. Practicum**

For advanced graduate students. (all areas)

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

#### **EDUC 480. Directed Reading**

For advanced graduate students. (all areas)

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

#### **EDUC 490. Directed Research**

For advanced graduate students. (all areas)

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

#### **EDUC 493. Workshop in Design and Analysis of Comparative Studies**

A workshop for second-year and later students with data analysis or research design activities including dissertation planning or analysis. Readings and exercises developed around participating student research. Topics have included: multilevel data analysis, within-subjects designs, and implementation of matching methods for comparing non-equivalent groups. Various computing customs accommodated. See <http://www-stat.stanford.edu/~rag/ed493/>. Prerequisite: intermediate statistical methods course work.

1-3 units, Spr (Rogosa, D)

#### **EDUC 496. Research in History and Social Science Education**

(Same as HISTORY 464E) For doctoral students. Literature on historical learning and teaching and corresponding social sciences research designs, assessment, and curriculum evaluation.

3-5 units, not given this year

#### **EDUC 801. TGR Project**

For advanced graduate students. Instructor consent required. (all areas)

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

#### **EDUC 802. TGR Dissertation**

For advanced graduate students. Instructor consent required. (all areas)

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

## ELECTRICAL ENGINEERING (EE) COURSES

### UNDERGRADUATE COURSES IN ELECTRICAL ENGINEERING

Primarily for undergraduates; graduate students may enroll with consent of adviser.

#### **EE 14N. Things about Stuff**

Preference to freshmen. The stories behind disruptive inventions such as the telegraph, telephone, wireless, television, transistor, and chip are as important as the inventions themselves, for they elucidate broadly applicable scientific principles. Focus is on studying consumer devices; projects include building batteries, energy conversion devices and semiconductors from pocket change. Students may propose topics and projects of interest to them. The trajectory of the course is determined in large part by the students themselves. GER:DB-EngrAppSci

3 units, not given this year

#### **EE 15N. The Art and Science of Engineering Design**

The goal of this seminar is to introduce freshmen to the design process associated with an engineering project. The seminar will consist of a series of lectures. The first part of each lecture will focus on the different design aspects of an engineering project, including formation of the design team, developing a project statement, generating design ideas and specifications, finalizing the design, and reporting the outcome. Students will form teams to follow these procedures in designing a term project of their choice over the quarter. The second part of each lecture will consist of outside speakers, including founders of some of the most exciting companies in Silicon Valley, who will share their experiences about engineering design. On-site visits to Silicon Valley companies to showcase their design processes will also be part of the course. The seminar serves three purposes: (1) it introduces students to the design process of turning an idea into a final design, (2) it presents the GER:DB-EngrAppSci

3 units, not given this year

#### **EE 17N. Engineering the Micro and Nano Worlds: From Chips to Genes**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. The first part is hands-on micro- and nano-fabrication including the Stanford Nanofabrication Facility (SNF) and the Stanford Nanocharacterization Laboratory (SNL) and field trips to local companies and other research centers to illustrate the many applications; these include semiconductor integrated circuits ('chips'), DNA microarrays, microfluidic bio-sensors and microelectromechanical systems (MEMS). The second part is to create, design, propose and execute a project. Most of the grade will be based on the project. By the end of the course you will, of course, be able to read critically a New York Times article on nanotechnology. More importantly you will have experienced the challenge (and fun) of designing, carrying out and presenting your own experimental project. As a result you will be better equipped to choose your major. This course can complement (and differs from) the seminars offered by Profs Philip Wong and Hari Manohar GER:DB-EngrAppSci

3 units, Spr (Pease, R)

#### **EE 19N. The Internet: how it works and the services it offers**

(F,Sem) Stanford Introductory Seminar. The Internet is a universal communication system that spans the entire globe and enables a wide range of services. It is very loosely managed, yet it works very well. The goal of this seminar is two-fold: (i) to describe how the Internet infrastructure works (its underlying functions and protocols) and (ii) to explore the many services that it offers (web browsing, social networking, VoIP, IPTV, etc.) Students will work in groups of two on projects related to Internet functions and services. GER:DB-EngrAppSci

3 units, Win (Tobagi, F)

#### **EE 21N. What is Nanotechnology?**

(F,Sem) Stanford Introductory Seminar. Nanotechnology is an often used word and it means many things to different people. Scientists and Engineers have some notion of what



nanotechnology is, societal perception may be entirely different. In this course, we start with the classic paper by Richard Feynman (There's Plenty of Room at the Bottom), which laid down the challenge to the nanotechnologists. Then we discuss two classic books that offer a glimpse of what nanotechnology is: *Engines of Creation: The Coming Era of Nanotechnology* by Eric Drexler, and *Prey* by Michael Crichton. Drexler's thesis sparked the imagination of what nano machinery might do, whereas Crichton's popular novel channeled the public's attention to this subject by portraying a disastrous scenario of a technology gone astray. We will use the scientific knowledge to analyze the assumptions and predictions of these classic works. We will draw upon the latest research advances to illustrate the possibilities and impossibilities

GER:DB-EngrAppSci  
3 units, Win (Wong, P)

#### EE 22N. Medical Imaging Systems

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. The technology of major imaging modalities used for disease diagnosis: x-ray, ultrasound, and magnetic resonance; their history, societal impact, and clinical applications. Field trips to a medical center and an imaging research lab. Term paper and presentation. Prerequisites: high school physics and calculus. GER:DB-EngrAppSci

3 units, Win (Nishimura, D)

#### EE 25Q. Electric Automobiles and Aircraft

(S,Sem) (Same as AA 116N) Stanford Introductory Seminar. Transportation accounts for nearly one-third of American energy use and greenhouse gas emissions and three-quarters of American oil consumption. It has crucial impacts on climate change, air pollution, resource depletion, and national security. Students wishing to address these issues will need to reconsider how we move, finding sustainable transportation solutions. This course will provide an introduction to the issue, covering the past and present of transportation and its impacts; examining alternative fuel proposals; and digging deeper into the most promising option: battery electric vehicles. Energy requirements of air, ground, and maritime transportation; design of electric motors, power control systems, drive trains, and batteries; and technologies for generating renewable energy. Two fun opportunities for hands-on experiences with electric cars. Prerequisites: Introduction to calculus and Physics AP or elementary mechanics. GER:DB-EngrAppSci

3 units, Win (Cox, D; Enge, P)

#### EE 26N. Green Electronics

(F,Sem) Stanford Introductory Seminar. Many green technologies including hybrid cars, photovoltaic energy systems, efficient power supplies, and energy-conserving control systems have at their heart intelligent, high-power electronics. This freshman seminar examines the technology at the heart of the green-tech revolution and uses green-tech examples to teach the engineering principles of modeling, optimization, analysis, simulation, and design. The class will include a hands-on lab, readings, and discussion. Preference given to Freshman. GER:DB-EngrAppSci

3 units, Win (Dally, W)

#### EE 27N. Electronics Rocks

(F,Sem) Stanford Introductory Seminar. Electronics pervades our lives, yet we often feel obliged to let a device function as it was intended. This course is about not being intimidated by voiding a warranty and modding some commercial gadget and about being confident enough to build something cool from scratch. To get there, we will study the basics of how things work and learn how to hack/mod and scratch build. Students will be mentored and encouraged to work, in teams, to play with interesting electronics and ultimately to develop a creative final project. GER:DB-EngrAppSci

3 units, Win (Kovacs, G)

#### EE 28N. What Is Information?

(F,Sem) Stanford Introductory Seminar. Information is everywhere in our lives, from speaking and writing to web pages and social networking, but what is it actually? How do we define it? Is it physical? Can we measure it? Does it obey scientific laws? How do we send it, store it, access it and manipulate it? Are there limits to it? Will information technology save the planet or destroy it? This freshman seminar will examine the history, science, technology and future of information.

3 units, Spr (Miller, D)

#### EE 41. Physics of Electrical Engineering

(Same as ENGR 40P) How everything from electrostatics to quantum mechanics is used in common high-technology products. Electrostatics are critical in micro-mechanical systems used in many sensors and displays, and Electromagnetic waves are essential in all high-speed communication systems. How to propagate energy on transmission lines, optical fibers, and in free space. Which aspects of modern physics are needed to generate light for the operation of a DVD player or TV. Introduction to semiconductors, solid-state light bulbs, and laser pointers. Hands-on labs to connect physics to everyday experience. Prerequisites: Physics 43 GER:DB-EngrAppSci

5 units, Win (Solgaard, O)

#### EE 46. Engineering For Good: Save the World and Have Fun Doing It

Projects that provide immediate and positive impact on the world. Focus is on global health by learning from experts in this field. Students work on real-world projects with help from members of NGOs and social entrepreneurial companies as part of the hands-on learning experience. Prerequisite: ENGR 40 or EE 122A or CS 106B or consent of instructor.

3 units, not given this year

#### EE 47. Press Play: Interactive Device Design

Introduction to the human-centered and technical workings behind interactive devices ranging from cellphones and video controllers to smart cars and appliances. Students build a working MP3 player prototype of their own design, using embedded microcontrollers, digital audio decoders and component sensors, and other electronic hardware. Topics include electronics prototyping, interface prototyping, sensors and actuators, micro-controller development, physical prototyping, and user testing. Prerequisite: CS106A and X or consent of instructor.

3 units, Spr (Ju, W)

#### EE 48. Hacking Stuff

In this course, you will build miniature autonomous cars that compete in a race against the clock. You will learn how to design a complete system by bringing together the various disciplines of electrical engineering such as control theory, circuit design, microprocessor programming, and semiconductor device physics. You will design, build and program each component of your autonomous vehicle yourself and in doing so, you will be introduced to the broad discipline of electrical engineering through lab work. GER:DB-EngrAppSci

3 units, not given this year

#### EE 60N. Man versus Nature: Coping with Disasters Using Space Technology

(F,Sem) (Same as GEOPHYS 60N) Stanford Introductory Seminar. Preference to freshman. Natural hazards, earthquakes, volcanoes, floods, hurricanes, and fires, and how they affect people and society; great disasters such as asteroid impacts that periodically obliterate many species of life. Scientific issues, political and social consequences, costs of disaster mitigation, and how scientific knowledge affects policy. How spaceborne imaging technology makes it possible to respond quickly and mitigate consequences; how it is applied to natural disasters; and remote sensing data manipulation and analysis. Offered every year, winter quarter. GER:DB-EngrAppSci

4 units, Win (Zebker, H)

#### EE 100. The Electrical Engineering Profession

(Same as EE 100X) Lectures/discussions on topics of importance to the electrical engineering professional. Continuing education, professional societies, intellectual property and patents, ethics, entrepreneurial engineering, and engineering management.

1-2 units, Aut (Dutton, R)

#### EE 100X. The Electrical Engineering Profession

(Same as EE 100) Lectures/discussions on topics of importance to the electrical engineering professional. Continuing education, professional societies, intellectual property and patents, ethics, entrepreneurial engineering, and engineering management. WIM

1-2 units, Aut (Dutton, R)

#### EE 101A. Circuits I

First of two-course sequence. Introduction to circuit modeling and analysis. Topics include creating the models of typical components in electronic circuits and simplifying non-linear models for

restricted ranges of operation (small signal model); and using network theory to solve linear and non-linear circuits under static and dynamic operations. Prerequisite: Physics 43 GER:DB-EngrAppSci

4 units, Win (Wong, S)

### EE 101B. Circuits II

Second of two-course sequence. MOS large-signal and small-signal models. MOS amplifier design including DC bias, small signal performance, multistage amplifiers, frequency response, and feedback. Prerequisite: 101A. GER:DB-EngrAppSci

4 units, Spr (Staff)

### EE 102A. Signal Processing and Linear Systems I

Concepts and mathematical tools in continuous-time signal processing and linear systems analysis, illustrated with examples from signal processing, communications, and control. Mathematical representation of signals and systems. Linearity and time-invariance. System impulse and step response. Frequency domain representations: Fourier series and Fourier transforms. Filtering and signal distortion. Time/frequency sampling and interpolation. Continuous-discrete time signal conversion and quantization. Stability and causality in linear systems. Laplace transforms and Bode plots. Feedback and control system design. Examples from filter design and linear control. Prerequisite: MATH 53 or ENGR 155A. GER:DB-EngrAppSci

4 units, Win (Pauly, J)

### EE 102B. Signal Processing and Linear Systems II

Concepts and mathematical tools in discrete-time signal processing and linear systems analysis with examples from digital signal processing, communications, and control. Discrete-time signal models. Continuous-discrete-continuous signal conversion. Discrete-time impulse and step response. Frequency domain representations: Fourier series and transforms. Connection between continuous and discrete time frequency representations. Discrete Fourier transform (DFT) and fast Fourier transform (FFT). Digital filter and signal processing examples. Discrete-time and hybrid linear systems. Stability and causality. Z transforms and their connection to Laplace transforms. Frequency response of discrete-time systems. Discrete-time control. Prerequisite: 102A. GER:DB-EngrAppSci

4 units, Spr (Kahn, J)

### EE 108A. Digital Systems I

Digital circuit, logic, and system design. Digital representation of information. CMOS logic circuits. Combinational logic design. Logic building blocks, idioms, and structured design. Sequential logic design and timing analysis. Clocks and synchronization. Finite state machines. Microcode control. Digital system design. Control and datapath partitioning. Lab. Prerequisite: ENGR 40. Corequisite for WIM: ENGR 102E. GER:DB-EngrAppSci, WIM

3-4 units, Aut (Dally, W), Win (Mitra, S)

### EE 108B. Digital Systems II

The design of processor-based digital systems. Instruction sets, addressing modes, data types. Assembly language programming, low-level data structures, introduction to operating systems and compilers. Processor microarchitecture, microprogramming, pipelining. Memory systems and caches. Input/output, interrupts, buses and DMA. System design implementation alternatives, software/hardware tradeoffs. Labs involve the design of processor subsystems and processor-based embedded systems. Prerequisite: 108A, CS 106B. GER:DB-EngrAppSci

3-4 units, Aut (Olukotun, O), Win (Kozyrakis, C)

### EE 109. Digital Systems Design Lab

The design of integrated digital systems encompassing both customized software and hardware. Software/hardware design tradeoffs. Algorithm design for pipelining and parallelism. System latency and throughput tradeoffs. FPGA optimization techniques. Integration with external systems and smart devices. Firmware configuration and embedded system considerations. Enrollment limited to 25; preference to graduating seniors. Prerequisites: 108B, and CS 106B or X. GER:DB-EngrAppSci

4 units, Spr (Olukotun, O)

### EE 114. Fundamentals of Analog Integrated Circuit Design

(Same as EE 214A) Analysis and simulation of elementary transistor stages, current mirrors, supply- and temperature-independent bias, and reference circuits. Overview of integrated

circuit technologies, circuit components, component variations and practical design paradigms. Performance evaluation using computer-aided design tools. Prerequisite: 101B. GER:DB-EngrAppSci GER:DB-EngrAppSci

4 units, Aut (Dutton, R)

### EE 116. Semiconductor Device Physics

The fundamental operation of semiconductor devices and overview of applications. The physical principles of semiconductors, both silicon and compound materials; operating principles and device equations for junction devices (diodes, bipolar transistor, photodetectors). Introduction to quantum effects and band theory of solids. Prerequisite: ENGR 40. Corequisite: 101B. GER:DB-EngrAppSci

3 units, Spr (Staff)

### EE 122A. Analog Circuits Laboratory

Practical applications of analog circuits, including simple amplifiers, filters, oscillators, power supplies, and sensors. Design skills, computer-aided design, and circuit fabrication and debugging. The design process through proposing, designing, simulating, building, debugging, and demonstrating a project. Radio frequency and largely digital projects not suitable for EE 122. Prerequisite: ENGR 40 or equivalent. GER:DB-EngrAppSci

3 units, Aut (Kovacs, G)

### EE 122B. Introduction to Biomedical Electronics

Key components of modern systems, their application in physiology measurements, and reduction to practice in labs. Fundamentals of analog/digital conversion and filtering techniques for biosignals, typical transducers (biopotential, electrochemical, temperature, pressure, acoustic, movement), and interfacing circuits. Issues of biomedical electronics (safety, noise). Prerequisite: EE122A or equivalent.

3 units, Spr (Kovacs, G)

### EE 124. Introduction to Neuroelectrical Engineering

Fundamental properties of electrical activity in neurons, technology for measuring and altering neural activity, and operating principles of modern neurological and neural prosthetic medical systems. Topics: action potential generation and propagation, neuro-MEMS and measurement systems, experimental design and statistical data analysis, information encoding and decoding, clinical diagnostic systems, and fully-implantable neural prosthetic systems design. Prerequisite: EE 101B and EE 102B.

3 units, Win (Shenoy, K)

### EE 133. Analog Communications Design Laboratory

(Same as EE 233) Design, testing, and applications. Amplitude modulation (AM) using multiplier circuits. Frequency modulation (FM) based on discrete oscillator and integrated modulator circuits such as voltage-controlled oscillators (VCOs). Phased-lock loop (PLL) techniques, characterization of key parameters, and their applications. Practical aspects of circuit implementations. Labs involve building and characterization of AM and FM modulation/demodulation circuits and subsystems. Enrollment limited to 30 undergraduates and coterminous EE students. Prerequisite: EE101B. Undergraduate students enroll in EE133 and Graduate students enroll in EE233. Recommended: EE114/214A. GER:DB-EngrAppSci

3-4 units, Win (Dutton, R)

### EE 134. Introduction to Photonics

Photonics, optical components, and fiber optics. Conceptual and mathematical tools for design and analysis of optical communication, sensor and imaging systems. Experimental characterization of semiconductor lasers, optical fibers, photodetectors, receiver circuitry, fiber optic links, optical amplifiers, and optical sensors. Class project on confocal microscopy or other method of sensing or analyzing biometric data. Laboratory experiments. Prerequisite: 41 or equivalent. GER:DB-EngrAppSci

4 units, Spr (Ellerbee, A)

### EE 136. Introduction to Nanophotonics and Nanostructures

Electromagnetic and quantum mechanical waves and semiconductors. Confining these waves, and devices employing such confinement. Localization of light and applications: metallic mirrors, photonic crystals, optical waveguides, microresonators, plasmonics. Localization of quantum mechanical waves: quantum

wells, wires, and dots. Generation of light in semiconductors: spontaneous and stimulated emission, lasers, and light emitting diodes. Devices incorporating localization of both electromagnetic and quantum mechanical waves such as resonant cavity quantum well lasers and microcavity-based single photon sources. System-level applications such as optical communications, biochemical sensing, and quantum cryptography. Prerequisite: familiarity with electromagnetic and quantum mechanical waves and semiconductors at the level of EE 41 or equivalent. GER:DB-EngrAppSci

3 units, Win (Vuckovic, J)

#### EE 141. Engineering Electromagnetics

Lumped versus distributed circuits. Transient response of transmission lines with resistive and reactive loads. Reflection, transmission, attenuation and dispersion. Steady-state waves on transmission lines. Standing wave ratio, impedance matching, and power flow. Coulomb's law, electrostatic field, potential and gradient, electric flux and Gauss's Law and divergence. Metallic conductors, Poisson's and Laplace's equations, capacitance, dielectric materials. Electrostatic energy and forces. Steady electric currents, Ohm's Law, Kirchoff's Laws, charge conservation and the continuity equation, Joule's Law. Biot-Savart's law and the static magnetic field. Ampere's Law and curl. Vector magnetic potential and magnetic dipole. Magnetic materials, forces and torques. Faraday's Law, magnetic energy, displacement current and Maxwell's equations. Uniform plane waves. Prerequisites: 102A, MATH 52. GER:DB-EngrAppSci

3 units, Aut (Hesselink, L)

#### EE 151. Sustainable Energy Systems

Energy demand is expected to grow by 30% by 2025, while at the same time the European Union is demanding a carbon footprint at 1990 levels. We examine energy flow in the US and Europe, and deduce from it a strategy for sustainable growth. Potential solutions include distributed small scale networked energy generation, solar energy, wind and water, as well as nuclear energy. A systems perspective allows optimization. Fundamental concepts will be demonstrated in class through hands-on experiments.

3 units, Win (Hesselink, L)

#### EE 168. Introduction to Digital Image Processing

Computer processing of digital 2-D and 3-D data, combining theoretical material with implementation of computer algorithms. Topics: properties of digital images, design of display systems and algorithms, time and frequency representations, filters, image formation and enhancement, imaging systems, perspective, morphing, and animation applications. Instructional computer lab exercises implement practical algorithms. Final project consists of computer animations incorporating techniques learned in class. Prerequisite: Matlab programming. GER:DB-EngrAppSci

3-4 units, Win (Zebker, H)

#### EE 169. Introduction to Bioimaging

Bioimaging is important for both clinical medicine, and medical research. This course will provide an introduction to several of the major imaging modalities, using a signal processing perspective. The course will start with an introduction to multi-dimensional Fourier transforms, and image quality metrics. It will then study projection imaging systems (projection X-Ray), backprojection based systems (CT, PET, and SPECT), systems that use beam forming (ultrasound), and systems that use Fourier encoding (MRI).

3 units, Spr (Pauly, J)

#### EE 178. Probabilistic Systems Analysis

(Same as EE 278A) Introduction to probability and statistics and their role in modeling and analyzing real world phenomena. Events, sample space, and probability. Discrete random variables, probability mass functions, independence and conditional probability, expectation and conditional expectation. Continuous random variables, probability density functions, independence and expectation, derived densities. Transforms, moments, sums of independent random variables. Simple random processes. Limit theorems. Introduction to statistics: significance, estimation and detection. Prerequisites: basic calculus and linear algebra. GER:DB-EngrAppSci

3-4 units, Aut (Weissman, I), Spr (Prabhakar, B)

#### EE 179. Analog and Digital Communication Systems

This course covers the fundamental principles underlying the analysis, design and optimization of analog and digital communication systems. Design examples will be taken from the most prevalent communication systems today: cell phones, Wifi, radio and TV broadcasting, satellites, and computer networks. Analysis techniques based on Fourier transforms and energy/power spectral density will be developed. Mathematical models for random variables and random (noise) signals will be presented, which are used to characterize filtering and modulation of random noise. These techniques will then be used to design analog (AM and FM) and digital (PSK and FSK) communication systems and determine their performance over channels with noise and interference. Prerequisite: 102A. GER:DB-EngrAppSci

3 units, Spr (Staff)

#### EE 190. Special Studies or Projects in Electrical Engineering

Independent work under the direction of a faculty member. Individual or team activities involve lab experimentation, design of devices or systems, or directed reading.

1-15 units, Aut (Wong, S), Win (Wong, S), Spr (Wong, S), Sum (Staff)

#### EE 191. Special Studies and Reports in Electrical Engineering

Independent work under the direction of a faculty member given for a letter grade only. If a letter grade given on the basis of required written report or examination is not appropriate, enroll in 190.

1-15 units, Aut (Wong, S), Win (Wong, S), Spr (Wong, S), Sum (Staff)

## GRADUATE COURSES IN ELECTRICAL ENGINEERING

Primarily for graduate students; undergraduates may enroll with consent of instructor.

#### EE 202. Electrical Engineering in Biology and Medicine

Open to all. Primarily biological in nature, introduction to the physiological and anatomic aspects of medical instrumentation. Areas include patient monitoring, imaging, medical transducers, the unique aspects of medical electronic systems, the socio-economic impact of technology on medical care, and the constraints unique to medicine. Prerequisite: familiarity with circuit instrumentation techniques as in 101B.

3 units, Spr (Poon, A)

#### EE 203. The Entrepreneurial Engineer

Seminar. For prospective entrepreneurs with an engineering background. Contributions made to the business world by engineering graduates. Speakers include Stanford and other engineering and M.B.A. graduates who have founded large and small companies in nearby communities. Contributions from EE faculty and other departments including Law, Business, and MS&E.

1 unit, Win (Melen, R)

#### EE 204. Business Management for Electrical Engineers and Computer Scientists

For graduate students with little or no business experience. Leading computer, high-tech, and Silicon Valley companies and their best practices. Tools and frameworks for analyzing decisions these companies face. Corporate strategy, new product development, marketing, sales, distribution, customer service, financial accounting, outsourcing, and human behavior in business organizations. Case studies. Prerequisite: graduate standing.

3 units, Spr (Gibbons, F; Siegel, M)

#### EE 212. Integrated Circuit Fabrication Processes

For students interested in the physical bases and practical methods of silicon VLSI chip fabrication, or the impact of technology on device and circuit design, or intending to pursue doctoral research involving the use of Stanford's Nanofabrication laboratory. Process simulators illustrate concepts. Topics: principles of integrated circuit fabrication processes, physical and chemical models for crystal growth, oxidation, ion implantation, etching, deposition, lithography, and back-end processing. Required for 410.

3 units, Aut (Plummer, J)

#### EE 214A. Fundamentals of Analog Integrated Circuit Design

(Same as EE 114) Analysis and simulation of elementary transistor

stages, current mirrors, supply- and temperature-independent bias, and reference circuits. Overview of integrated circuit technologies, circuit components, component variations and practical design paradigms. Performance evaluation using computer-aided design tools. Prerequisite: 101B.GER:DB-EngrAppSci

4 units, Aut (Dutton, R)

#### EE 214B. Advanced Analog Integrated Circuit Design

Analysis and design of analog integrated circuits in advanced MOS and bipolar technologies. Device operation and compact modeling in support of circuit simulations needed for design. Emphasis on quantitative evaluations of performance using hand calculations and circuit simulations; intuitive approaches to design. Analytical and approximate treatments of noise and distortion; analysis and design of feedback circuits. Design of archetypal analog blocks for networking and communications such as broadband gain stages and transimpedance amplifiers. Prerequisites: EE114/214A.

3 units, Win (Staff)

#### EE 216. Principles and Models of Semiconductor Devices

Carrier generation, transport, recombination, and storage in semiconductors. Physical principles of operation of the p-n junction, heterojunction, metal semiconductor contact, bipolar junction transistor, MOS capacitor, MOS and junction field-effect transistors, and related optoelectronic devices such as CCDs, solar cells, LEDs, and detectors. First-order device models that reflect physical principles and are useful for integrated-circuit analysis and design. Prerequisite: 116 or equivalent.

3 units, Aut (Harris, J), Win (Saraswat, K; Howe, R)

#### EE 218. Introduction to Nanotechnology and Nanoelectronics

Device physics and operation principles. Device and material options beyond silicon FETs at the nanoscale. Topics identified by the International Technology Roadmap for Semiconductors, emerging research devices section; see <http://public.itrs.net>. Non-silicon-based devices such as carbon nanotubes, semiconductor nanowires, and molecular devices; and non-FET based devices such as single-electron transistors (SET), resonant tunneling diodes (RTD), and quantum dots. Logic and memory devices. Sources include current literature and reference books. Prerequisite: Undergraduate device physics. Recommended: Introductory graduate solid state physics.

3 units, not given this year

#### EE 222. Applied Quantum Mechanics I

Emphasis is on applications in modern devices and systems. Topics include: Schrödinger's equation, eigenfunctions and eigenvalues, solutions of simple problems including quantum wells and tunneling, quantum harmonic oscillator, coherent states, operator approach to quantum mechanics, Dirac notation, angular momentum, hydrogen atom, calculation techniques including matrix diagonalization, perturbation theory, variational method, and time-dependent perturbation theory with applications to optical absorption, nonlinear optical coefficients, and Fermi's golden rule. Prerequisites: MATH 52 and 53, PHYSICS 65 (or PHYSICS 43 and 45).

3 units, Aut (Miller, D)

#### EE 223. Applied Quantum Mechanics II

Continuation of 222, including more advanced topics: quantum mechanics of crystalline materials, methods for one-dimensional problems, spin, systems of identical particles (bosons and fermions), introductory quantum optics (electromagnetic field quantization, coherent states), fermion annihilation and creation operators, interaction of different kinds of particles (spontaneous emission, optical absorption, and stimulated emission). Quantum information and interpretation of quantum mechanics. Other topics in electronics, optoelectronics, optics, and quantum information science. Prerequisite: 222.

3 units, Win (Miller, D)

#### EE 225. Bio-chips, Imaging and Nanomedicine

(Same as MATSCI 382) The course covers state-of-the-art and emerging bio-sensors, bio-chips, imaging modalities, and nano-therapies which will be studied in the context of human physiology including the nervous system, circulatory system and immune system. Medical diagnostics will be divided into bio-chips (in-vitro diagnostics) and medical and molecular imaging (in-vivo imaging). In-depth discussion on cancer and cardiovascular diseases and the role of diagnostics and nano-therapies.

3 units, Win (Wang, S; de la Zerda, A; Akin, D)

#### EE 228. Basic Physics for Solid State Electronics

Topics: energy band theory of solids, energy bandgap engineering, classical kinetic theory, statistical mechanics, and equilibrium and non-equilibrium semiconductor statistics. Prerequisite: course in modern physics.

3 units, not given this year

#### EE 231. Introduction to Lasers

How lasers work, including quantum transitions in atoms, stimulated emission and amplification, rate equations, saturation, feedback, coherent optical oscillation, laser resonators, and optical beams. Limited primarily to steady-state behavior; classical models for atomic transitions with little quantum mechanics background required. Prerequisites: electromagnetic theory to the level of 142, preferably 241, and some atomic or modern physics such as PHYSICS 70 or 130, 131.

3 units, not given this year

#### EE 232. Laser Dynamics

Continuation of 231, emphasizing dynamic and transient effects including spiking, Q-switching, mode locking, frequency modulation, frequency and spatial mode competition, linear and nonlinear pulse propagation, short pulse expansion, and compression. Prerequisite: 231.

3 units, Spr (Fejer, M)

#### EE 233. Analog Communications Design Laboratory

(Same as EE 133) Design, testing, and applications. Amplitude modulation (AM) using multiplier circuits. Frequency modulation (FM) based on discrete oscillator and integrated modulator circuits such as voltage-controlled oscillators (VCOs). Phased-lock loop (PLL) techniques, characterization of key parameters, and their applications. Practical aspects of circuit implementations. Labs involve building and characterization of AM and FM modulation/demodulation circuits and subsystems. Enrollment limited to 30 undergraduates and coterminial EE students. Prerequisite: EE101B. Undergraduate students enroll in EE133 and Graduate students enroll in EE233. Recommended: EE114/214A.

3-4 units, Win (Dutton, R)

#### EE 234. Photonics Laboratory

Photonics and fiber optics with a focus on communication and sensing. Experimental characterization of semiconductor lasers, optical fibers, photodetectors, receiver circuitry, fiber optic links, optical amplifiers, and optical sensors and photonic crystals. Prerequisite: EE 142 or equivalent.

3 units, Aut (Solgaard, O; Ellerbee, A)

#### EE 235. Guided Wave Optical Devices

Guided wave optics, optical waveguide devices, and integrated optics. Wave propagation in layered media, slab waveguides, and optical fibers. Rectangular waveguides. Optical waveguide technology. Coupled-mode theory. Numerical analysis of complex waveguides. Photonic crystals and surface plasmon optics. Physics and design of waveguide devices. Fiber sensors, waveguide gratings, waveguide modulators, directional couplers, ring filters. Prerequisite: electromagnetic theory to the level of 142 or equivalent.

3 units, not given this year

#### EE 237. Solar Energy Conversion

Basics of solar energy conversion in photovoltaic devices and solar thermal systems. Solar cell device physics: electrical and optical. Solar system issues including module assembly, inverters, and micro-inverters. Concentrated solar power. Students design solar cells. Prerequisite: EE 116 or EE 216.

3 units, not given this year

#### EE 242. Electromagnetic Waves

Continuation of 141. Maxwell's equations. Plane waves in lossless and lossy media. Skin effect. Flow of electromagnetic power (Poynting's theorem). Reflection and refraction of waves at planar boundaries. Snell's law and total internal reflection. Reflection and refraction from lossy media. Guided waves. Parallel-plate and dielectric-slab waveguides. Hollow wave-guides, cavity resonators, microstrip waveguides, optical fibers. Interaction of fields with matter and particles. Antennas and radiation of electromagnetic energy. Prerequisite: 141 or PHYSICS 120.

3 units, Win (Fraser-Smith, A)

**EE 243. Semiconductor Optoelectronic Devices**

Semiconductor physics and optical processes in semiconductors. Operating principles and practical device features of semiconductor optoelectronic materials and heterostructures. Devices include: optical detectors (p-i-n, avalanche, and MSM); light emitting diodes; electroabsorptive modulators (Franz-Keldysh and QCSE), electrorefractive (directional couplers, Mach-Zehnder), switches (SEEDs); and lasers (waveguide and vertical cavity surface emitting). Prerequisites: semiconductor devices and solid state physics such as EE 216 or equivalent.

3 units, Win (Harris, J)

**EE 247. Introduction to Optical Fiber Communications**

Fibers: single- and multi-mode, attenuation, modal dispersion, group-velocity dispersion, polarization-mode dispersion. Nonlinear effects in fibers: Raman, Brillouin, Kerr. Self- and cross-phase modulation, four-wave mixing. Sources: light-emitting diodes, laser diodes, transverse and longitudinal mode control, modulation, chirp, linewidth, intensity noise. Modulators: electro-optic, electro-absorption. Photodiodes: p-i-n, avalanche, responsivity, capacitance, transit time. Receivers: high-impedance, transimpedance, bandwidth, noise. Digital intensity modulation formats: non-return-to-zero, return-to-zero. Receiver performance: Q factor, bit-error ratio, sensitivity, quantum limit. Sensitivity degradations: extinction ratio, intensity noise, jitter, dispersion. Wavelength-division multiplexing. System architectures: local-area, access, metropolitan-area, long-haul. Prerequisites: 102A, 242 or consent of instructor.

3 units, Aut (Kahn, J)

**EE 248. Fundamentals of Noise Processes**

Fundamentals of statistic, Fourier analysis, statistical and quantum mechanics, and linear and nonlinear circuit theory. Thermal, quantum and 1/f noise in resistors, pn junctions, lasers, and parametric amplifiers. Energy efficiency (bit/photon) and spectral efficiency (bit/s/Hz) in coherent and single photon optical communications. Protocols and security in quantum cryptography. Decoherence of qubits in quantum computation. Prerequisites: elementary device, circuit, and electromagnetic waves to the level of 101A,B and 242.

3 units, Aut (Yamamoto, Y)

**EE 252. Antenna Theory**

Fundamental properties. Dipoles, loops, reflectors, Yagis, helices, slots, horns, micro-strips. Antennas as transitions between guided and free radiation, ultrasound analogue. Famous antennas. Pattern measurements. Friis and radar equations. Feeds, matching, baluns. Broadbanding. Arrays, aperture synthesis, interferometry, very-long-baseline interferometry. Thermal radiation, antenna temperature, microwave passive remote sensing. Prerequisite: EE 141 or Physics 120.

3 units, Win (Poon, A)

**EE 254. Principles of Radar Systems**

Analysis and design. Radar equation and systems parameters, components of radar systems, radar cross-section and target characteristics, signal detection in noise, ambiguity function (with applications to measurement precision, resolution, clutter rejection, and waveform design); pulse compression waveforms, synthetic aperture radar, tracking and scanning radars, HF (OTH) radar, radar environmental and remote sensing, radar astronomy. Prerequisite: senior or graduate standing.

3 units, not given this year

**EE 257. Scientific Data Processing**

(Same as GEOPHYS 258) Assimilation, processing, and modeling of large observational data sets. Solution of scientific and engineering problems, especially those requiring large amounts of data. Inverse methods and transform domain analysis for indirect measurements, implemented on digital computers using scientific languages. Large-scale computing, including hardware architectures, input/output and data bus bandwidth, programming efficiency, parallel programming techniques. Student projects involve analyzing real data by implementing an observational system such as tomography for medical and Earth observation uses, radar and matched filtering, multispectral/multitemporal studies, or migration processing. Prerequisites: Programming with high level language. Recommended: EE261, EE178/278A, ME300 or equivalent.

3-4 units, not given this year

**EE 261. The Fourier Transform and Its Applications**

The Fourier transform as a tool for solving physical problems. Fourier series, the Fourier transform of continuous and discrete signals and its properties. The Dirac delta, distributions, and generalized transforms. Convolutions and correlations and applications; probability distributions, sampling theory, filters, and analysis of linear systems. The discrete Fourier transform and the FFT algorithm. Multidimensional Fourier transform and use in imaging. Further applications to optics, crystallography. Emphasis is on relating the theoretical principles to solving practical engineering and science problems. Prerequisites: Math through ODEs, Fourier series at the level of 102A, and linear algebra.

3 units, Aut (Osgood, B), Win (Gill, J)

**EE 262. Two-Dimensional Imaging**

Time and frequency representations, two-dimensional auto- and cross-correlation, Fourier spectra, diffraction and antennas, coordinate systems and the Hankel and Abel transforms, line integrals, impulses and sampling, restoration in the presence of noise, reconstruction and tomography, imaging radar. Tomographic reconstruction using projection-slice and layergarm methods. Students create software to form images using these techniques with actual data. Final project consists of design and simulation of an advanced imaging system. Prerequisite: EE261. Recommended: EE278B, EE279.

3 units, not given this year

**EE 263. Introduction to Linear Dynamical Systems**

(Same as CME 263) Applied linear algebra and linear dynamical systems with application to circuits, signal processing, communications, and control systems. Topics: least-squares approximations of over-determined equations and least-norm solutions of underdetermined equations. Symmetric matrices, matrix norm, and singular value decomposition. Eigenvalues, left and right eigenvectors, with dynamical interpretation. Matrix exponential, stability, and asymptotic behavior. Multi-input/multi-output systems, impulse and step matrices; convolution and transfer matrix descriptions. Control, reachability, and state transfer; observability and least-squares state estimation. Prerequisites: linear algebra and matrices as in MATH 103; differential equations and Laplace transforms as in EE 102A.

3 units, Aut (Lall, S)

**EE 264. Digital Signal Processing**

The fundamentals of digital signal processing techniques and their applications. Topics include review of two sided Z-transform, linear time invariant discrete-time systems, and sampling theory; A/D and D/A conversion, rate conversion, and oversampling techniques for ADC and DAC; filter design; quantization in digital filter implementation; discrete Fourier analysis; and parametric signal modeling. Prerequisite: EE102A and EE102B . Recommended: EE261, EE278B.

3 units, Aut (Schafer, R)

**EE 265. Digital Signal Processing Laboratory**

Applying 102A,B to real-world signal processing applications. Lab exercises use a programmable DSP to implement signal processing tasks. Topics: A/D conversion and quantization, sampling theorem, Z-transform, discrete-time Fourier transform, digital filter design and implementation, spectral analysis, rate conversion, wireless data communication, and OFDM receiver design. Prerequisites: 102A,B. Recommended: 261.

3-4 units, Win (Meng, T)

**EE 268. Introduction to Modern Optics**

Geometrical optics: ray matrices, Gaussian beams, optical instruments, and radiometry. Wave nature of light: Maxwell's equations, propagation through media with varying index of refraction (e.g., fibers). Interferometry: basic principles, practical systems, and applications.

3 units, Aut (Byer, R)

**EE 271. Introduction to VLSI Systems**

Provides a quick introduction to MOS transistors and IC fabrication and then creates abstractions to allow you to create and reason about complex digital systems. It uses a switch resistor model of a transistor, uses it to model gates, and then shows how gates and physical layout can be synthesized from Verilog or SystemVerilog descriptions. Most of the class will be spent on providing techniques to create designs that can be validated, are

low power, provide good performance, and can be completed in finite time. Prerequisites: 101A and 108B; familiarity with transistors, logic design, Verilog, and digital system organization.

3 units, Aut (Mittra, S)

### EE 272. Design Projects in VLSI Systems

Mixed signal design. Student teams create a small mixed-signal VLSI design using a modern design flow and CAD tools. The project involves writing a Verilog model of the chip, creating a testing/debug strategy for the chip, wrapping custom layout to fit into a std cell system, using synthesis and place and route tools to create the layout of your chip, and understanding all the stuff you need to do to tape-out a chip. Useful for those who plan to build a chip in their Ph.D. work. Prerequisites: EE 271 and experience in digital/analog circuit design.

3-4 units, Spr (Horowitz, M)

### EE 273. Digital Systems Engineering

Electrical issues in the design of high-performance digital systems, including signaling, timing, synchronization, noise, and power distribution. High-speed signaling methods; noise in digital systems, its effect on signaling, and methods for noise reduction; timing conventions; timing noise (skew and jitter), its effect on systems, and methods for mitigating timing noise; synchronization issues and synchronizer design; clock and power distribution problems and techniques; impact of electrical issues on system architecture and design. Prerequisites: EE101A and EE108A. Recommended: EE114/214A.

3 units, Win (Weaver, J)

### EE 276. Introduction to Wireless Personal Communications

Frequency reuse, cellular concepts, cochannel interference, handoff. Radio propagation in and around buildings: Friis equation, multipath, narrow-band and wide-band channels, small scale and large-scale statistics, space and time signal variation. Diversity. Receiver sensitivity, sources of noise, range. Performance statistics: coverage, margin, digital modulation, adjacent channel interference, and digital error rates. Wide band channels: maximum transmission rates. Multi-server queuing and traffic: Erlang formulas. Multiple access: FDMA, TDMA, CDMA; Duplexing: TDD, FDD. Prerequisites: 242 and 278B or equivalent. Corequisite: 279 or equivalent.

3 units, Spr (Cox, D)

### EE 278A. Probabilistic Systems Analysis

(Same as EE 178) Introduction to probability and statistics and their role in modeling and analyzing real world phenomena. Events, sample space, and probability. Discrete random variables, probability mass functions, independence and conditional probability, expectation and conditional expectation. Continuous random variables, probability density functions, independence and expectation, derived densities. Transforms, moments, sums of independent random variables. Simple random processes. Limit theorems. Introduction to statistics: significance, estimation and detection. Prerequisites: basic calculus and linear algebra.

3-4 units, Aut (Weissman, I), Spr (Prabhakar, B)

### EE 278B. Introduction to Statistical Signal Processing

Review of basic probability and random variables. Random vectors and processes; convergence and limit theorems; IID, independent increment, Markov, and Gaussian random processes; stationary random processes; autocorrelation and power spectral density; mean square error estimation, detection, and linear estimation. Prerequisites: EE178/278A and linear systems and Fourier transforms at the level of EE102A,B or EE261.

3 units, Aut (El Gamal, A), Win (El Gamal, A)

### EE 279. Introduction to Communication Systems

Analysis and design of communication systems; analog and digital modulation and demodulation, frequency conversion, multiplexing, noise and distortion; spectral and signal-to-noise ratio analysis, probability of error in digital systems, spread spectrum. Prerequisites: EE179 or EE261, and EE178/278A or EE278B.

3 units, Win (Cox, D)

### EE 282. Computer Systems Architecture

Course focuses on how to build modern computing systems, namely notebooks, smartphones, and data centers, covering primarily their hardware architecture and certain system software aspects. For each system class, we cover the system architecture,

processor technology, advanced memory hierarchy and I/O organization, power and energy management, and reliability. We will also cover topics such as interactions with system software, virtualization, solid state storage, and security. The programming assignments allow students to explore performance/energy tradeoffs when using heterogeneous hardware resources on smartphone devices. Prerequisite: EE108B. Recommended: CS 140.

3 units, Spr (Kozyrakis, C)

### EE 284. Introduction to Computer Networks

Structure and components of computer networks; functions and services; packet switching; layered architectures; OSI reference model; physical layer; data link layer; error control; window flow control; media access control protocols used in local area networks (Ethernet, Token Ring, FDDI) and satellite networks; network layer (datagram service, virtual circuit service, routing, congestion control, Internet Protocol); transport layer (UDP, TCP); application layer.

3 units, Aut (Tobagi, F)

### EE 290A. Curricular Practical Training for Electrical Engineers

For EE majors who need work experience as part of their program of study. Final report required. Prerequisites: for 290B, candidacy for Engineer or Ph.D. in Electrical Engineering; for 290C, candidacy for Ph.D. degree in Electrical Engineering; for 290D, consent of instructor.

1 unit, Aut (Nishimura, D), Win (Nishimura, D), Spr (Nishimura, D), Sum (Staff)

### EE 290B. Curricular Practical Training for Electrical Engineers

For EE majors who need work experience as part of their program of study. Final report required. Prerequisites: for 290B, candidacy for Engineer or Ph.D. in Electrical Engineering; for 290C, candidacy for Ph.D. degree in Electrical Engineering; for 290D, consent of instructor.

1 unit, Aut (Nishimura, D), Win (Nishimura, D), Spr (Nishimura, D), Sum (Staff)

### EE 290C. Curricular Practical Training for Electrical Engineers

For EE majors who need work experience as part of their program of study. Final report required. Prerequisites: for 290B, candidacy for Engineer or Ph.D. in Electrical Engineering; for 290C, candidacy for Ph.D. degree in Electrical Engineering; for 290D, consent of instructor.

1 unit, Aut (Nishimura, D), Win (Nishimura, D), Spr (Nishimura, D), Sum (Staff)

### EE 290D. Curricular Practical Training for Electrical Engineers

For EE majors who need work experience as part of their program of study. Final report required. Prerequisites: for 290B, candidacy for Engineer or Ph.D. in Electrical Engineering; for 290C, candidacy for Ph.D. degree in Electrical Engineering; for 290D, consent of instructor.

1 unit, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### EE 292E. Analysis and Control of Markov Chains

Finite-state and countable-state Markov chains. Controlled Markov chains and dynamic programming algorithms. Application to modeling and analysis of engineering systems. Prerequisites: EE263, EE178/278A.

3 units, not given this year

### EE 292H. Engineering and Climate Change

The purpose of this seminar series is to help equip students and professionals with the tools to apply the engineering mindset to problems that stem from climate change, in order to consider and evaluate possible interventional, remedial and adaptive approaches. This course is not a crash course on climate change (established climate experts are better equipped for that), nor is it a crash course in policy; instead the course focuses on discovering and exploring climate problems that seem most likely to benefit from adding the engineering mindset as solutions are considered. In each weekly class, a guest speaker will deliver a brief introductory talk (20-30 minutes) in his/her area of expertise to set the framework in terms of climate, energy, resource, policy and public opinion, and then proceed to explore with the class some of

the problems that seem most amenable to engineering input. Reference material, made available as optional reading, will include quantitative and overvi

*1 unit, Aut (Field, L)*

### EE 292I. Insanely Great Products: How do they get built?

Great products emerge from a sometimes conflict-laden process of collaboration between different functions within companies. This Seminar seeks to demystify this process via case-studies of successful products. Engineers and businesspeople will share their experiences in discussion with students. This year, the co-founder of Twitter will be one of our guests. Previous guests include: Apple, Intel, Facebook, and Genentech to name a few. Students will have the opportunity to present product ideas to industry professionals (investors, developers, etc.). Pre-requisites: None

*1 unit, not given this year*

### EE 292J. Power Electronics

This power electronics overview course serves as a practical primer for specialists from other disciplines or an introduction for those wishing to investigate the field more deeply. The course covers a broad range of topics, including; power conversion circuit modeling and analysis, passive and active devices, converter topologies, control theory, power magnetics, and numerous applications. A field trip to the SLAC National Accelerator Laboratory focuses on specialty converters that are unique to high energy physics. Prerequisites: EE 101B.

*3 units, Win (Staff)*

### EE 293A. Fundamentals of Energy Processes

(Same as ENERGY 293A) For seniors and graduate students. Thermodynamics, heat engines, thermoelectrics, biomass. Recommended: MATH 41, 43; PHYSICS 41, 43, 45

*3-4 units, Aut (Brandt, A; Horne, R; Krevor, S)*

### EE 293B. Fundamentals of Energy Processes

(Same as ENERGY 293B) For seniors and graduate students. Fuel cells. Production of hydrogen: electrolytic, chemical, thermolytic, photolytic. Hydrogen storage: hydrides. Photoelectric converters; photo-thermovoltaic converters. Wind turbines. Recommended: EE 293A; MATH 41; PHYSICS 41, 43, 45

*3 units, Win (Brandt, A; Gerritsen, M; Wilcox, J)*

### EE 300. Master's Thesis and Thesis Research

Independent work under the direction of a department faculty. Written thesis required for final letter grade. The continuing grade 'N' is given in quarters prior to thesis submission. See 390 if a letter grade is not appropriate.

*1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

### EE 303. Autonomous Implantable Systems

How implantable systems can revolutionize health care in the coming decades. Potential applications include implantable sensors and monitoring devices for preventive and post-surgery monitoring; drug delivery systems that can be placed closer to cancer cells and are able to administer dosage automatically; medical robots that perform surgery inside patients with greater precision and less pain; and neural implants for brain-machine interface. Focus is on the analysis and design of remotely-powered, miniature implantable devices for those applications. Prerequisites: EE114/214A.

*3 units, not given this year*

### EE 309. Semiconductor Memory Devices and Technology

Focus is on the device physics and operation principles of nanoelectric devices. Topics identified by the International Technology Roadmap for Semiconductors, emerging research devices section; see <http://www.itrs.net>. Non-silicon-based devices such as carbon nanotubes, grapheme, semiconductor nanowires, and molecular devices; and non-FET based devices such as single electron transistors (SET) and resonant tunneling diodes (RTD). Logic and memory devices are covered. Prerequisite: undergraduate device physics, EE 222, EE 216. Recommended: EE 212, EE 223, EE 228, EE 311, and EE 316 Offered Alternate years.

*3 units, Spr (Wong, P)*

### EE 310. Integrated Circuits Technology and Design Seminar

State-of-the-art micro- and nanoelectronics, nanotechnology, advanced materials, and nanoscience for device applications. Prerequisites: EE216, EE316.

*1 unit, Win (Nishi, Y)*

### EE 311. Advanced Integrated Circuits Technology

What are the practical and fundamental limits to the evolution of the technology of modern MOS devices and interconnects? How are modern devices and circuits fabricated and what future changes are likely? Advanced techniques and models of MOS devices and back-end (interconnect and contact) processing. What are future device structures and materials to maintain progress in integrated electronics? MOS front-end and back-end process integration. Prerequisites: EE212, EE216 or equivalent.

*3 units, not given this year*

### EE 312. Micromachined Sensors and Actuators

Solid-state sensors and actuators, focusing on the use of integrated circuit fabrication technology for their realization. Categories of sensors and actuators include biological, chemical, mechanical, optical, and thermal. Mechanisms of transduction, fabrication techniques, and relative merits of different technologies. Micromachining techniques for monolithic integration of active circuits with sensors or actuators. Directions for future research. Prerequisite: 212 or equivalent.

*3 units, Win (Kovacs, G)*

### EE 313. Digital MOS Integrated Circuits

Looks a little more deeply at how digital circuits operate, what makes a gate digital, and how to cheat to improve performance or power. To aid this analysis we create a number of different models for MOS transistors and choose the simplest one that can explain our circuit's operation, using both hand and computer analysis. We explore static, dynamic, pulse-mode, and current mode logic, and show how they are used in SRAM design. Topics include sizing for min delay, noise and noise margins, power dissipation. The class uses memory design (SRAM) as a motivating example. DRAM and EEPROM design issues are also covered. Prerequisites: 101B, 108A. Recommended: 271.

*3 units, Win (Patil, D)*

### EE 314. RF Integrated Circuit Design

Design of RF integrated circuits for communications systems, primarily in CMOS. Topics: the design of matching networks and low-noise amplifiers at RF, mixers, modulators, and demodulators; review of classical control concepts necessary for oscillator design including PLLs and PLL-based frequency synthesizers. Design of low phase noise oscillators. Design of high-efficiency (e.g., class E, F) RF power amplifiers, coupling networks. Behavior and modeling of passive and active components at RF. Narrowband and broadband amplifiers; noise and distortion measures and mitigation methods. Overview of transceiver architectures. Prerequisite: EE214B.

*3 units, Spr (Rategh, H)*

### EE 315A. VLSI Signal Conditioning Circuits

Design and analysis of integrated circuits for active filters, precision gain stages, and sensor interfaces in CMOS VLSI technology. Operational transconductance amplifiers; sampled-data and continuous-time analog filters. Analysis of noise and amplifier imperfections; compensation techniques such as correlated double sampling. Sensor interfaces for micro-electromechanical and biomedical applications. Layout techniques for analog integrated circuits. Prerequisites: EE214B.

*3 units, Spr (Staff)*

### EE 315B. VLSI Data Conversion Circuits

Architectural and circuit level design and analysis of integrated analog-to-digital and digital-to-analog interfaces in CMOS VLSI technology. Fundamental circuit elements such as sampling circuits and voltage comparators. Circuits and architectures for Nyquist-rate and oversampling analog-to-digital and digital-to-analog conversion; digital decimation and interpolation filters. Examples of calibration and digital enhancement techniques. Prerequisite: EE 214B. Recommended: EE 315A.

*3 units, Aut (Vleugels, K)*

### EE 316. Advanced VLSI Devices

In modern VLSI technologies, device electrical characteristics are sensitive to structural details and therefore to fabrication techniques. How are advanced VLSI devices designed and what future changes are likely? What are the implications for device electrical performance caused by fabrication techniques? Physical models for nanometer scale structures, control of electrical characteristics (threshold voltage, short channel effects, ballistic



transport) in small structures, and alternative device structures for VLSI. Prerequisites: 212 and 216, or equivalent.

3 units, Win (Wong, P)

### EE 317. Micropatterning for Integrated Circuits

The fundamentals of generating submicron patterns in integrated circuit manufacturing. Technologies include the formation of submicron images of ultraviolet light, the resulting exposure of polymeric resists, the subsequent development of resist patterns and their transfer into functional circuit material patterns through plasma etching and other techniques. Use of phase-shifting masks and other wavefront-engineering approaches. Hands-on computer simulations. Prerequisites: 141 or equivalent, 212 or equivalent.

3 units, not given this year

### EE 319. Advanced Nanoelectronic Devices and Technology

Recent advances in materials science, device physics and structures, and processing technology, to extend VLSI device scaling towards atomistic and quantum-mechanical physics boundaries. Topics include: mobility-enhancement techniques; nanomaterial structures including tube, wire, beam, and crystal; conducting polymer; 3D FET; gate-wraparound FET; nonvolatile memory phenomena and devices; self-assembly; flash annealing; plasma doping; and nano patterning. Prerequisites: 216, 316.

3 units, not given this year

### EE 320. Nanoelectronics

Focus is on the device physics and operation principles of nanoelectronic devices. Topics identified by the International Technology Roadmap for Semiconductors, emerging research devices section; see <http://www.itrs.net>. Non-silicon-based devices such as carbon nanotubes, grapheme, semiconductor nanowires, and molecular devices; and non-FET based devices such as single electron transistors (SET) and resonant tunneling diodes (RTD). Logic and memory devices. Offered alternative years. Prerequisites: undergraduate device physics, EE 222, 216. Recommended: EE 223, 228, or 316.

3 units, alternate years, not given this year

### EE 322. Molecular Electronics and Photonics

Physics of charge and energy transfer in molecular systems and connection with traditional mesoscopic transport theories. Analysis of molecular organic light-emitting diodes, photovoltaic cells and transistors. Technology and applications of molecular semiconductors. Prerequisite: 228 or equivalent.

3 units, not given this year

### EE 327. Properties of Semiconductor Materials

Modern semiconductor devices and integrated circuits are based on unique energy band, carrier transport, and optical properties of semiconductor materials. How to choose these properties for operation of semiconductor devices. Emphasis is on quantum mechanical foundations of the properties of solids, energy bandgap engineering, semi-classical transport theory, semi-conductor statistics, carrier scattering, electro-magneto transport effects, high field ballistic transport, Boltzmann transport equation, quantum mechanical transitions, optical absorption, and radiative and non-radiative recombination that are the foundations of modern transistors and optoelectronic devices. Prerequisites: EE216 or equivalent.

3 units, not given this year

### EE 328. Physics of Advanced Semiconductor Devices

Principles governing the operation of modern semiconductor devices. Assumptions and approximations commonly made in analyzing devices. Emphasis is on the application of advanced semiconductor physics to the development of advanced semiconductor devices such as heterojunctions, HJ-bipolar transistors, HJ-FETs, nanostructures, tunneling, single electron transistor and photonic devices. Use of SENTARUS, a 2-D Poisson solver, for simulation of ultra-small devices. Examples related to state-of-the-art devices and current device research. Prerequisite: 216. Recommended: 316.

3 units, Spr (Harris, J)

### EE 329. The Electronic Structure of Surfaces and Interfaces

Physical concepts and phenomena for surface science techniques probing the electronic and chemical structure of surfaces, interfaces and nanomaterials. Microscopic and atomic models of microstructures; applications including semiconductor device technology, catalysis and energy. Physical processes of UV and X-

ray photoemission spectroscopy, Auger electron spectroscopy, surface EXAFS, low energy electron diffraction, electron/photon stimulated ion desorption, scanning tunneling spectroscopy, ion scattering, energy loss spectroscopy and related imaging methods; and experimental aspects of these surface science techniques. Prerequisites: PHYSICS 70 and MATSCI 199/209, or consent of instructor.

3 units, not given this year

### EE 331. Biophotonics: Light in Medicine and Biology

Current topics and trends in the use of light in medicine and for advanced microscopy. Course begins with a review of relevant optical principles (basic physics required). Key topics include: light-tissue interactions; sensing and spectroscopy; contrast-enhanced imaging; super-resolution and label-free microscopy; medical applications of light for diagnostics, in-vivo imaging, and therapy; nanophotonics and array technologies. Open to non-majors; programming experience (Matlab and/or C) required.

3 units, Win (Ellerbee, A)

### EE 334. Micro and Nano Optical Device Design

Lecture and project course on design and analysis of optical devices with emphasis on opportunities and challenges created by scaling to the micrometer and nanometer ranges. The emphasis is on fundamentals, combined with some coverage of practical implementations. Prerequisite: 242 or equivalent

3 units, not given this year

### EE 336. Nanophotonics

(Same as MATSCI 346) Recent developments in micro- and nanophotonic materials and devices. Basic concepts of photonic crystals. Integrated photonic circuits. Photonic crystal fibers. Superprism effects. Optical properties of metallic nanostructures. Sub-wavelength phenomena and plasmonic excitations. Metamaterials. Prerequisite: electromagnetic theory at the level of 242.

3 units, Aut (Brongersma, M; Fan, S)

### EE 340. Optical micro- and nano-cavities

Optical micro- and nano-cavities and their device applications. Types of optical cavities (microdisks, microspheres, photonic crystal cavities, plasmonic cavities), and their electromagnetic properties, design, and fabrication techniques. Cavity quantum electrodynamics: strong and weak-coupling regime, Purcell factor, spontaneous emission control. Applications of optical cavities, including low-threshold lasers, optical modulators, quantum information processing devices, and bio-chemical sensors.

3 units, Spr (Vuckovic, J)

### EE 344. High Frequency Laboratory

Lecture/lab emphasizing lab. Techniques in the 1MHz-1GHz range useful in designing and measuring oscillators, amplifiers, and mixers. High frequency measurement techniques including s-parameter measurements, amplifier noise figure, and oscillator phase noise. Guest speakers from Lucent and Hewlett-Packard. Enrollment limited to 25. Prerequisites: transmission lines, Smith charts. Recommended: 314.

3 units, Aut (Scherer, D; Cox, D)

### EE 345. Optical Fiber Communication Laboratory

Experimental techniques in optical fiber communications and networking. Experimental investigation of key optical communications components including fibers, lasers, modulators, photodiodes, optical amplifiers, and WDM multiplexers and demultiplexers. Fundamental optical communications systems techniques: eye diagrams, BER measurements, experimental evaluation of nonlinearities. Prerequisites: Undergraduate physics and optics.

3 units, alternate years, not given this year

### EE 346. Introduction to Nonlinear Optics

Wave propagation in anisotropic, nonlinear, and time-varying media. Microscopic and macroscopic description of electric dipole susceptibilities. Free and forced waves-phasematching; slowly varying envelope approximation-dispersion, diffraction, space-time analogy; harmonic generation; frequency conversion; parametric amplification and oscillation; electro-optic light modulation; nonlinear processes in optical fibers. Prerequisites: 141, 242.

3 units, not given this year

### EE 347. Optical Methods in Engineering Science

Design and understanding of modern optical systems. Topics:



geometrical optics; aberration theory; systems layout; applications such as microscopes, telescopes, optical processors. Computer ray tracing program as a design tool. Prerequisite: 268 or 366, or equivalent.

3 units, not given this year

### EE 348. Advanced Optical Fiber Communications

Optical amplifiers: gain, saturation, noise. Semiconductor amplifiers. Erbium-doped fiber amplifiers. System applications: preamplified receiver performance, amplifier chains. Raman amplifiers, lumped vs. distributed amplification. Group-velocity dispersion management: dispersion-compensating fibers, filters, gratings. Interaction of dispersion and nonlinearity, dispersion maps. Multichannel systems. Wavelength-division multiplexing components: filters, multiplexers. WDM systems, crosstalk. Time, subcarrier, code and polarization-division multiplexing. Comparison of modulation techniques: differential phase-shift keying, phase-shift keying, quadrature-amplitude modulation. Comparison of detection techniques: noncoherent, differentially coherent, coherent. Prerequisite: 247.

3 units, Win (Kahn, J)

### EE 349. Nano Optics and Grating Photonics

Coupled wave analysis of periodic structures, gratings structures for optical communications, wave-matter interactions with periodic media and photonic crystals, applications of periodic structures. Prerequisite: 268 or 366, or equivalent.

3 units, not given this year

### EE 355. Imaging Radar and Applications

(Same as GEOPHYS 265) Radar remote sensing, radar image characteristics, viewing geometry, range coding, synthetic aperture processing, correlation, range migration, range/Doppler algorithms, wave domain algorithms, polar algorithm, polarimetric processing, interferometric measurements. Applications: surface deformation, polarimetry and target discrimination, topographic mapping surface displacements, velocities of ice fields. Prerequisites: EE261. Recommended: EE254, EE278B, EE279.

3 units, not given this year

### EE 356. Elementary Plasma Physics: Principles and Applications

Plasmas in nature and industry. Single particle motions. Plasma kinetic theory. Boltzmann equation and its moments. Cold and warm plasma models. Plasma as a fluid. Magnetohydrodynamics. Plasma conductivity and diffusion. Langmuir oscillations. Debye shielding. Plasma sheath. Waves in cold, magnetized, warm, and hot plasmas. Electron and ion waves. MHD waves. Landau damping. Nonlinear effects. Applications in industry and space science. Prerequisite: 242 or PHYSICS 122.

3 units, not given this year

### EE 359. Wireless Communications

This course will cover advanced topics in wireless communications for voice, data, and multimedia. Topics include: an overview of current and future wireless systems; wireless channel models including path loss, shadowing, and statistical multipath channel models; fundamental capacity limits of wireless channels; digital modulation and its performance in fading and intersymbol interference; techniques to combat fading including adaptive modulation, diversity, and multiple antenna systems (MIMO); techniques to combat intersymbol interference including equalization, multicarrier modulation (OFDM), and spread spectrum; and an overview of wireless network design. Prerequisite: 279 or instructor consent.

3-4 units, Aut (Goldsmith, A)

### EE 360. Multiuser Wireless Systems and Networks

Design, analysis, and fundamental limits. Topics include multiuser channel capacity, multiple and random access techniques, interference mitigation, cellular system design, ad hoc wireless network design, sensor networks, green wireless networks, cognitive radios, and cross-layer design. Prerequisite: EE 359.

3 units, Win (Goldsmith, A)

### EE 363. Linear Dynamic Systems

Continuation of 263. Optimal control and dynamic programming; linear quadratic regulator. Lyapunov theory and methods. Linear estimation and the Kalman filter. Perron-Frobenius theory. Examples and applications from digital filters, circuits, signal processing, and control systems. Prerequisites: 263 or equivalent;

basic probability.

3 units, not given this year

### EE 364A. Convex Optimization I

(Same as CME 364A) Convex sets, functions, and optimization problems. The basics of convex analysis and theory of convex programming: optimality conditions, duality theory, theorems of alternative, and applications. Least-squares, linear and quadratic programs, semidefinite programming, and geometric programming. Numerical algorithms for smooth and equality constrained problems; interior-point methods for inequality constrained problems. Applications to signal processing, communications, control, analog and digital circuit design, computational geometry, statistics, machine learning, and mechanical engineering. Prerequisite: linear algebra such as EE263, EE178/278A.

3 units, Win (Boyd, S)

### EE 364B. Convex Optimization II

(Same as CME 364B) Continuation of 364. Subgradient, cutting-plane, and ellipsoid methods. Decentralized convex optimization via primal and dual decomposition. Exploiting problem structure in implementation. Convex relaxations of hard problems. Global optimization via branch and bound. Robust and stochastic optimization. Applications in areas such as control, circuit design, signal processing, and communications. Substantial project. Prerequisite: 364A.

3 units, not given this year

### EE 366. Introduction to Fourier Optics

Applications of Fourier theory to the analysis and synthesis of optical imaging and optical data processing systems. Propagation and diffraction of light, Fresnel and Fraunhofer approximations, Fourier transforming properties of lenses, image formation with coherent and incoherent light, transform functions of imaging systems, optical data processing, and holography. Prerequisite: familiarity with Fourier analysis. Recommended: 261.

3 units, not given this year

### EE 368. Digital Image Processing

Image sampling and quantization color, point operations, segmentation, morphological image processing, linear image filtering and correlation, image transforms, eigenimages, multiresolution image processing, wavelets, noise reduction and restoration, feature extraction and recognition tasks, image registration. Emphasis is on the general principles of image processing. Students write and investigate image processing algorithms in Matlab. Term project. Prerequisites: EE261, EE278B.

3 units, Spr (Girod, B)

### EE 369A. Medical Imaging Systems I

Imaging internal structures within the body using high-energy radiation studied from a systems viewpoint. Modalities covered: x-ray, computed tomography, and nuclear medicine. Analysis of existing and proposed systems in terms of resolution, frequency response, detection sensitivity, noise, and potential for improved diagnosis. Prerequisite: 261.

3 units, not given this year

### EE 369B. Medical Imaging Systems II

Imaging internal structures within the body using non-ionizing radiation studied from a systems viewpoint. Modalities include ultrasound and magnetic resonance. Analysis of ultrasonic systems including diffraction and noise. Analysis of magnetic resonance systems including physics, Fourier properties of image formation, and noise. Prerequisite: 261.

3 units, Spr (Nishimura, D)

### EE 369C. Medical Image Reconstruction

Reconstruction problems from medical imaging, including magnetic resonance imaging (MRI), computed tomography (CT), and positron emission tomography (PET). Problems include reconstruction from non-uniform frequency domain data, automatic deblurring, phase unwrapping, reconstruction from incomplete data, and reconstruction from projections. Prerequisite: 369B.

3 units, Aut (Pauly, J)

### EE 371. Advanced VLSI Circuit Design

Design of high-performance digital systems, the things that cause them to fail, and how to avoid these problems. Topics will focus

on current issues including: wiring resistance and how to deal with it, power and Gnd noise and regulation, clock (or asynchronous) system design and how to minimize clocking overhead, high-speed I/O design, energy minimization including leakage control, and structuring your Verilog code to result in high-performance, low energy systems. Extensive use of modern CAD tools. Prerequisites: 271 and 313, or consent of instructor.

*3 units, alternate years, not given this year*

### EE 373A. Adaptive Signal Processing

Learning algorithms for adaptive digital filters. Self optimization. Wiener filter theory. Quadratic performance functions, their eigenvectors and eigenvalues. Speed of convergence. Asymptotic performance versus convergence rate. Applications of adaptive filters to statistical prediction, process modeling, adaptive noise canceling, adaptive antenna arrays, adaptive inverse control, and equalization and echo cancelling in modems. Theoretical and experimental research projects in adaptive filter theory, communications, and audio systems. Biomedical research projects, supervised jointly by EE and Medical School faculty. Recommended: EE263, EE264, EE278B.

*3 units, Win (Widrow, B)*

### EE 374. Inference in Graphical Models

Probabilistic models with sparse graphical structures, low-complexity inference algorithms, and their analysis. Algorithmic methods: variational inference; message passing algorithms; belief propagation; generalized belief propagation; survey propagation. Learning graphical models, structural learning. Applications/examples include: Gaussian models with sparse inverse covariance; hidden Markov models (Viterbi and BCJR algorithms, Kalman filter); computer vision (segmentation, tracking, etc); constraint satisfaction problems; machine learning (clustering, classification); communications. Prerequisite: EE178/EE278A, STATS 116, or CS 228. Recommended: 376A or STATS 217/218.

*3 units, not given this year*

### EE 376A. Information Theory

(Same as STATS 376A) The fundamental ideas of information theory. Entropy and intrinsic randomness. Data compression to the entropy limit. Huffman coding. Arithmetic coding. Channel capacity, the communication limit. Gaussian channels. Kolmogorov complexity. Asymptotic equipartition property. Information theory and Kelly gambling. Applications to communication and data compression. Prerequisite: EE178/278A or STATS 116, or equivalent.

*3 units, Win (Weissman, I)*

### EE 376B. Information Theory

(Same as STATS 376B) Rate distortion theory and Kolmogorov complexity. Information theory and statistics. Method of types. Stein's lemma. AEP. Information capacity of networks. Slepian-Wolf theorem. Optimal investment and information theory. Universal portfolios and universal data compression. Maximum entropy and Burg's theorem. Prerequisite: EE376A.

*3 units, Spr (Cover, T)*

### EE 378A. Statistical Signal Processing

Random signals in electrical engineering. Discrete-time random processes: stationarity and ergodicity, covariance sequences, power spectral density, parametric models for stationary processes. Fundamentals of linear estimation: minimum mean squared error estimation, optimum linear estimation, orthogonality principle, the Wold decomposition. Causal linear estimation of stationary processes: the causal Wiener filter, Kalman filtering. Parameter estimation: criteria of goodness of estimators, Fisher information, Cramer-Rao inequality, Chapman-Robbins inequality, maximum likelihood estimation, method of moments, consistency, efficiency. ARMA parameter estimation: Yule-Walker equations, Levinson-Durbin algorithm, least squares estimation, moving average parameter estimation, modified Yule-Walker method for model order selection. Spectrum estimation: sample covariances, covariance estimation, Bartlett formula, periodogram, periodogram averaging, windowed periodograms. Prerequisites: EE 278B

*3 units, not given this year*

### EE 378B. Inference, Estimation, and Information Processing

Techniques and models for signal, data and information processing, with emphasis on incomplete data, non-ordered index

sets and robust low-complexity methods. Linear models; regularization and shrinkage; dimensionality reduction; streaming algorithms; sketching; clustering, search in high dimension; low-rank models; principal component analysis. Applications include: positioning from pairwise distances; distributed sensing; measurement/traffic monitoring in networks; finding communities/clusters in networks; recommendation systems; inverse problems. Prerequisites: EE278B and EE263 or equivalent. Recommended but not required: EE378A

*3 units, not given this year*

### EE 379. Digital Communication

Modulation methods and bandwidth requirements, baseband and passband system analysis, minimum-probability-of-error and maximum-likelihood detection, error-probability analysis, intersymbol interference, maximum-likelihood sequence detection, equalization methods, orthogonal frequency-division multiplexing. Prerequisite: EE102B, EE278B

*3 units, NEXTYEAR*

### EE 380. Colloquium on Computer Systems

Live presentations of current research in the design, implementation, analysis, and applications of computer systems. Topics range over a wide range and are different every quarter. Topics may include fundamental science, mathematics, cryptography, device physics, integrated circuits, computer architecture, programming, programming languages, optimization, applications, simulation, graphics, social implications, venture capital, patent and copyright law, networks, computer security, and other topics of related to computer systems.

*1 unit, Aut (Allison, D; Freeman, J), Win (Allison, D; Freeman, J), Spr (Allison, D; Freeman, J)*

### EE 382A. Advanced Processor Architecture

Provides in-depth coverage of fundamental architecture and implementation techniques for modern processor chips. Course covers topics such as advanced pipelining, superscalar execution, out-of-order processing, speculative execution, VLIW, data parallelism, multithreading, graphics processors, and multi-core chips. The students will become familiar with complex trade-offs between performance-power-complexity and the common techniques for addressing the challenges in historical and modern processors. A central part of EE382A is a group project on an open research question. Prerequisites: EE108B, CS140. Recommended: EE282, CS315A

*3 units, not given this year*

### EE 382C. Interconnection Networks

The architecture and design of interconnection networks used to communicate from processor to memory, from processor to processor, and in switches and routers. Topics: network topology, routing methods, flow control, router microarchitecture, and performance analysis. Enrollment limited to 30. Prerequisite: 282.

*3 units, alternate years, not given this year*

### EE 384A. Internet Routing Protocols and Standards

Local area networks addressing and switching; IEEE 802.1 bridging protocols (transparent bridging, virtual LANs). Internet routing protocols: interior gateways (RIP, OSPF) and exterior gateways (BGP); multicast routing; multiprotocol label switching (MPLS). Routing in mobile networks: Mobile IP, Mobile Ad Hoc Networks (MANET), Wireless Mesh Networks. Prerequisite: 284 or CS 144.

*3 units, alternate years, not given this year*

### EE 384B. Multimedia Communication over the Internet

Applications and requirements. Traffic generation and characterization: voice encoding (G.711, G.729, G.723); image and video compression (JPEG, H.261, MPEG-2, H.263, H.264), TCP data traffic. Quality impairments and measures. Networking technologies: LAN technologies; home broadband services (ADSL, cable modems, PONs); and wireless LANs (802.11). Network protocols for multimedia applications: resource reservation (ST2+, RSVP); differentiated services (DiffServ); and real-time transport protocol (RTP, RTCP). Audio-video-data conferencing standards: Internet architecture (SDP, SAP, SIP); ITU recommendations (H.320, H.323 and T.120); and real-time streaming protocol (RTSP). Emphasis will be placed on advances in network infrastructure and new services (VoIP, IPTV, Peer-to-peer communications, etc.) Prerequisite: 284 or CS 144.

Recommended: 384A.

3 units, Spr (Tobagi, F)

### EE 384C. Wireless Local and Wide Area Networks

Characteristics of wireless communication: multipath, noise, and interference. Communications techniques: spread-spectrum, CDMA, and OFDM. IEEE 802.11 physical layer specifications: FHSS, DSSS, IEEE 802.11b (CCK), and 802.11a/g (OFDM). IEEE 802.11 media access control protocols: carrier sense multiple access with collision avoidance (CSMA/CA), point coordination function (PCF), IEEE802.11e for differentiated services. IEEE 802.11 network architecture: ad hoc and infrastructure modes, access point functionality. Management functions: synchronization, power management and association. IEEE 802.11s Mesh Networks. IEEE 802.16 (WiMAX) network architecture and protocols: Physical Layer (OFDMA) and Media Access Control Layer. Current research papers in the open literature. Prerequisite: 284 or CS 244A.

3 units, alternate years, not given this year

### EE 384E. Networked Wireless Systems

(Same as CS 244E) Design and implementation of wireless networks and mobile systems. The course will commence with a short retrospective of wireless communication and initially touch on some of the fundamental physical layer properties of various wireless communication technologies. The focus will then shift to design of media access control and routing layers for various wireless systems. The course will also examine adaptations necessary at transport and higher layers to cope with node mobility and error-prone nature of the wireless medium. Finally, it will conclude with a brief overview of other related issues including emerging wireless/mobile applications. Prerequisites: EE 284

3 units, Win (Katti, S)

### EE 384M. Network Science

Modern large-scale networks consist of (i) Information Networks, such as the Web and Social Networks, and (ii) Data Centers, which are networks interconnecting computing and storage elements for servicing the users of an Information Network. This course is concerned with the mathematical models and the algorithms used in Information Networks and Data Centers. Prerequisite: EE178/278A or CS365.

3 units, not given this year

### EE 384S. Performance Engineering of Computer Systems & Networks

Modeling and control methodologies for high-performance network engineering, including: Markov chains and stochastic modeling, queueing networks and congestion management, dynamic programming and task/processor scheduling, network dimensioning and optimization, and simulation methods. Applications for design of high-performance architectures for wireline/wireless networks and the Internet, including: traffic modeling, admission and congestion control, quality of service support, power control in wireless networks, packet scheduling in switches, video streaming over wireless links, and virus/worm propagation dynamics and countermeasures. Enrollment limited to 30. Prerequisites: basic networking technologies and probability.

3 units, not given this year

### EE 384X. Packet Switch Architectures

The theory and practice of designing packet switches, such as Internet routers, and Ethernet switches. Introduction: evolution of switches and routers. Output queued switches: motivation and methods for providing bandwidth and delay guarantees. Switching: output queueing, parallelism in switches, distributed shared memory switches, input-queued switches, combined input-output queued switches, how to make fast packet buffers, buffered crossbar switches. Scheduling input queued crossbars: connections with bipartite graph matching, algorithms for 100% throughput, practical algorithms and heuristics. Looking forward: Architectures and switches for data center networks. Prerequisites: EE284 or CS 244A. Recommended: EE 178/278A or EE 278B or STAT 116.

3 units, Spr (Prabhakar, B; McKeown, N)

### EE 385A. Robust and Testable Systems Seminar

Student/faculty discussions of research problems in the design of reliable digital systems. Areas: fault-tolerant systems, design for testability, production testing, and system reliability. Emphasis is on student presentations and Ph.D. thesis research. May be

repeated for credit. Prerequisite: consent of instructor.

1-4 units, Aut (McCluskey, E; Mitra, S), Win (McCluskey, E; Mitra, S), Spr (McCluskey, E; Mitra, S)

### EE 386. Robust System Design

Causes of system malfunctions; techniques for building robust systems that avoid or are resilient to such malfunctions through built-in error detection and correction, prediction, self-test, self-recovery, and self-repair; case studies and new research problems. Prerequisites: 108A,B, 282.

3 units, alternate years, not given this year

### EE 387. Algebraic Error Control Codes

Theory and implementation of algebraic codes for detection and correction of random and burst errors. Introduction to finite fields. Linear block codes, cyclic codes, Hamming codes, BCH codes, Reed-Solomon codes. Decoding algorithms for BCH and Reed-Solomon codes. Prerequisites: elementary probability, linear algebra.

3 units, not given this year

### EE 388. Modern Coding Theory

Tools for analysis and optimization of iterative coding systems. LDPC, turbo and, RA codes. Optimized ensembles, message passing algorithms, density evolution, and analytic techniques. Prerequisite: 376A.

3 units, Spr (Montanari, A)

### EE 390. Special Studies or Projects in Electrical Engineering

Independent work under the direction of a faculty member. Individual or team activities may involve lab experimentation, design of devices or systems, or directed reading.

1-15 units, Aut (Wong, S), Win (Wong, S), Spr (Wong, S), Sum (Staff)

### EE 391. Special Studies and Reports in Electrical Engineering

Independent work under the direction of a faculty member; written report or written examination required. Letter grade given on the basis of the report; if not appropriate, student should enroll in 390.

1-15 units, Aut (Wong, S), Win (Wong, S), Spr (Wong, S), Sum (Staff)

### EE 392F. Logic Synthesis of VLSI Circuits

Similar to former 318. Solving logic design problems with CAD tools for VLSI circuits. Exact and heuristic algorithms for logic synthesis. Representation and optimization of combinational logic functions (encoding problems, binary decision diagrams) and of multiple-level networks (algebraic and Boolean methods, don't-care set computation, timing verification, and optimization); and modeling and optimization of sequential functions and networks (retiming), semicustom libraries, and library binding. Prerequisites: familiarity with logic design, algorithm development, and programming.

3 units, not given this year

### EE 392J. Digital Video Processing

Spatio-temporal sampling, motion analysis, parametric motion models, motion-compensated filtering, and video processing operations including noise reduction, restoration, superresolution, deinterlacing and video sampling structure conversion, and compression (frame-based and object-based methods). Video segmentation and layered video representations, video streaming, compressed-domain video processing, and digital TV. Prerequisite: 368.

3 units, not given this year

### EE 392N. INTELLIGENT ENERGY SYSTEMS

The key systems engineering steps for design of automated systems in application to of existing and future intelligent energy systems. Existing design approaches and practices for the energy systems. Every second lecture of the course will be a guest lecture discussing the communication system design for a certain type of energy system. They will alternate with guest lectures discussing the on-line analytical functions.

1 unit, not given this year

### EE 392T. Seminar in Chip Test and Debug

Seminars by industry professionals in digital IC manufacturing test and silicon debug. Topics include yield and binsplit modeling, defect types and detection, debug hardware, physical analysis, and design for test/debug circuits. Case studies of silicon failures. Prerequisite: basic digital IC design (271 or 371).

1 unit, Win (Stinson, J)

#### EE 392V. Signal Processing in VoIP Systems

VoIP protocols: RTP and SIP. Voice encoding standards: PCM, ADPCM, and LPC. Speech quality measurement: MOS, PESQ, and E-model. Characterization of VoIP impairments: delay, jitter, packet loss, and clock skew. Signal processing algorithms to improve VoIP quality: echo cancellation, adaptive jitter buffering, packet loss concealment, and decoder clock synchronization. Prerequisites: EE261 and EE278B, or equivalents.

3 units, not given this year

#### EE 395. Electrical Engineering Instruction: Practice Teaching

Open to advanced EE graduate students who plan to make teaching their career. Students conduct a section of an established course taught in parallel by an experienced instructor. Enrollment limited.

1-15 units, Aut (Nishimura, D), Win (Staff), Spr (Nishimura, D)

#### EE 398A. Image and Video Compression

Replaces EE398. The principles of source coding for the efficient storage and transmission of still and moving images. Entropy and lossless coding techniques. Run-length coding and fax compression. Arithmetic coding. Rate-distortion limits and quantization. Lossless and lossy predictive coding. Transform coding, JPEG. Subband coding, wavelets, JPEG2000. Motion-compensated coding, MPEG. Students investigate image and video compression algorithms in Matlab or C. Term project. Prerequisites: EE261, EE278B.

3 units, Win (Girod, B)

#### EE 398B. Advanced Topics in Image, Video, and Multimedia Systems

Replaces previous EE398B Image Communication II. Lectures on selected advanced topics, given by instructor, staff, and invited speakers from industry and academia. Emphasis on systems aspects. Topics covered depend on students' interest. Relevant topics include, but are not limited to: videoconferencing, telepresence, digital TV broadcasting, HDTV, 3-d television, digital cinema, audio and video streaming over the Internet, IPTV, peer-to-peer media delivery, mobile media delivery, mobile augmented reality, content-based retrieval, visual search, image and video databases. Students implement and investigate advanced algorithms for image, video, and multimedia signal processing and communication. Term project.

3 units, not given this year

#### EE 400. Thesis and Thesis Research

Limited to candidates for the degree of Engineer or Ph.D.

1-15 units, Aut (Wong, S), Win (Wong, S), Spr (Wong, S), Sum (Staff)

#### EE 402A. Topics in International Technology Management

Theme for Autumn 2011 is Mobile Internet Technologies and Businesses in Asia. Recent innovations in location based services, mobile online games, payment solutions, etc., and challenges such as privacy, business models, and differing regulatory regimes in major Asian economies. Implications for US firms and researchers.

1 unit, Aut (Dasher, R)

#### EE 402S. Topics in International Advanced Technology Research

Theme for Spring 2011 is Recent Approaches to Chip-Level Integration. Survey of advanced research into 3D integration, CMOS on encapsulated MEMS, III-V on Si, multi-processor architectures, etc. Distinguished speakers from industry and universities. May be repeated for credit. Recommended: basic electronics.

1 unit, not given this year

#### EE 402T. Entrepreneurship in Asian High Tech Industries

Distinctive patterns and challenges of entrepreneurship in Asia; update of business and technology issues in the creation and growth of start-up companies in major Asian economies. Distinguished speakers from industry, government, and academia.

1 unit, Spr (Dasher, R)

#### EE 410. Integrated Circuit Fabrication Laboratory

Fabrication, simulation, and testing of a submicron CMOS process. Practical aspects of IC fabrication including silicon wafer cleaning, photolithography, etching, oxidation, diffusion, ion implantation, chemical vapor deposition, physical sputtering, and electrical testing. Students also simulate the CMOS process using process

simulator TSUPREM4 of the structures and electrical parameters that should result from the process flow. Taught in the Stanford Nanofabrication Facility (SNF). Preference to students pursuing doctoral research program requiring SNF facilities. Enrollment limited to 20. Prerequisites: 212, 216, consent of instructor.

3-4 units, Win (Saraswat, K)

#### EE 412. Advanced Nanofabrication Laboratory

Experimental projects and seminars on integrated circuit fabrication using epitaxial, oxidation, diffusion, evaporation, sputtering, and photolithographic processes with emphasis on techniques for achieving advanced device performance. May be repeated for additional credit. Prerequisites: ENGR341 or EE410 or consent of instructor.

3 units, Aut (Howe, R), Spr (Solgaard, O)

#### EE 414. RF Transceiver Design Laboratory

Students design, build, and test GHz transceivers using microstrip construction techniques and discrete components. The design, construction, and experimental characterization of representative transceiver building blocks: low noise amplifiers (LNAs), diode ring mixers, PLL-based frequency synthesizers, voltage-controlled oscillators (VCOs), power amplifiers (PAs), and microstrip filters and patch antennas. The characteristics of passive microstrip components (including interconnect). Emphasis is on a quantitative reconciliation of theoretical predictions and extensive experimental measurements performed with spectrum and network analyzers, time-domain reflectometers (TDRs), noise figure meter and phase noise analyzers. Prerequisites: EE 314, EE 344.

3 units, not given this year

#### EE 418. Topics in Neuroengineering

Neuroscience and electrical engineering, focusing on principles and theory in modern neural prosthetic systems (brain-computer or brain-machine interfaces). Electrical properties of neurons, information encoding, neural measurement techniques and technology, processing electronics, information decoding and estimators, and statistical data analysis. Prerequisites: EE 214B, EE 278B.

3 units, not given this year

#### EE 469B. RF Pulse Design for Magnetic Resonance Imaging

Magnetic resonance imaging (MRI) and spectroscopy (MRS) based on the use of radio frequency pulses to manipulate magnetization. Analysis and design of major types of RF pulses in one and multiple dimensions, analysis and design of sequences of RF pulses for fast imaging, and use of RF pulses for the creation of image contrast in MRI. Prerequisite: 369B.

3 units, not given this year

#### EE 476. Network Information Theory

Network information theory deals with the fundamental limits on information flow in networks and the optimal coding schemes that achieve these limits. It aims to extend Shannon's point-to-point information theory and the Ford-Fulkerson max-flow min-cut theorem to networks with multiple sources and destinations. The course presents the basic results and tools in the field in a simple and unified manner. Topics covered include: multiple access channels, broadcast channels, interference channels, channels with state, distributed source coding, multiple description coding, network coding, relay channels, interactive communication, and noisy network coding. Prerequisites: EE376A.

3 units, not given this year

#### EE 477. Universal Schemes in Information Theory

Universal schemes for lossless and lossy compression, channel coding and decoding, prediction, denoising, and filtering. Characterization of performance limitations in the stochastic setting: entropy rate, rate-distortion function, channel capacity, Bayes envelope for prediction, denoising, and filtering. Lempel-Ziv lossless compression, and Lempel-Ziv based schemes for lossy compression, channel coding, prediction, and filtering. Discrete universal denoising. Compression-based approach to denoising. The compound decision problem. Prerequisites: EE278B, EE376A,B.

3 units, Aut (Weissman, I)

#### EE 801. TGR Project

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

#### EE 802. TGR Dissertation

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

# ENERGY RESOURCES ENGINEERING (ENERGY) COURSES

## UNDERGRADUATE COURSES IN ENERGY RESOURCES ENGINEERING

Primarily for undergraduates; graduate students may enroll with consent of adviser.

### ENERGY 24. Making Molehills out of Mountains: Energy and Development in Appalachia

Preparation for Alternative Spring Break trip to examine the past, present, and future role of energy in Appalachia. Positive and negative impacts of energy production; meetings with energy industry leaders, community groups, and policymakers. The larger role of energy development and energy issues in society. May be repeated for credit.

*1 unit, not given this year*

### ENERGY 101. Energy and the Environment

(Same as EARTHSYS 101) Energy use in modern society and the consequences of current and future energy use patterns. Case studies illustrate resource estimation, engineering analysis of energy systems, and options for managing carbon emissions. Focus is on energy definitions, use patterns, resource estimation, pollution. Recommended: MATH 21 or 42. GER:DB-EngrAppSci

*3 units, Win (Durlofsky, L)*

### ENERGY 102. Renewable Energy Sources and Greener Energy Processes

(Same as EARTHSYS 102) The energy sources that power society are rooted in fossil energy although energy from the core of the Earth and the sun is almost inexhaustible; but the rate at which energy can be drawn from them with today's technology is limited. The renewable energy resource base, its conversion to useful forms, and practical methods of energy storage. Geothermal, wind, solar, biomass, and tidal energies; resource extraction and its consequences. Recommended: MATH 21 or 42. GER:DB-EngrAppSci

*3 units, Spr (Gerritsen, M; Monroe, I)*

### ENERGY 104. Transition to sustainable energy systems

This course explores the transition to a sustainable energy system at large scales (national and global), and over long time periods (decades). Explores the drivers of global energy demand and the fundamentals of technologies that can meet this demand sustainably. Focuses on constraints affecting large-scale deployment of technologies, as well as inertial factors affecting this transition. Problems will involve modeling global energy demand, deployment rates for sustainable technologies, technological learning and economics of technical change. Recommended: ENERGY 101, 102.

*3 units, Spr (Benson, S; Brandt, A)*

### ENERGY 120. Fundamentals of Petroleum Engineering

(Same as ENGR 120) Lectures, problems, field trip. Engineering topics in petroleum recovery; origin, discovery, and development of oil and gas. Chemical, physical, and thermodynamic properties of oil and natural gas. Material balance equations and reserve estimates using volumetric calculations. Gas laws. Single phase and multiphase flow through porous media. GER:DB-EngrAppSci

*3 units, Aut (Horne, R; Wilcox, J)*

### ENERGY 120A. Flow Through Porous Media Laboratory

Laboratory measurements of permeability and porosity in rocks. Applications to subsurface fluid mechanics. Course is intended as an accompaniment to Energy 120.

*1 unit, Aut (Al Askar, M; Horne, R)*

### ENERGY 121. Fundamentals of Multiphase Flow

(Same as ENERGY 221) Multiphase flow in porous media. Wettability, capillary pressure, imbibition and drainage, Leverett J-function, transition zone, vertical equilibrium. Relative permeabilities, Darcy's law for multiphase flow, fractional flow equation, effects of gravity, Buckley-Leverett theory, recovery

predictions, volumetric linear scaling, JBN and Jones-Rozelle determination of relative permeability. Frontal advance equation, Buckley-Leverett equation as frontal advance solution, tracers in multiphase flow, adsorption, three-phase relative permeabilities. GER:DB-EngrAppSci

*3 units, Win (Tchelepi, H)*

### ENERGY 125. Modeling and Simulation for Geoscientists and Engineers

Hands-on. Topics include deterministic and statistical modeling applied to problems such as flow in the subsurface, atmospheric pollution, biological populations, wave propagation, and crustal deformation. Student teams define and present a modeling problem.

*3 units, alternate years, not given this year*

### ENERGY 130. Well Log Analysis I

For earth scientists and engineers. Interdisciplinary, providing a practical understanding of the interpretation of well logs. Lectures, problem sets using real field examples: methods for evaluating the presence of hydrocarbons in rock formations penetrated by exploratory and development drilling. The fundamentals of all types of logs, including electric and non-electric logs.

*3 units, Aut (Lindblom, R)*

### ENERGY 141. Seismic Reservoir Characterization

(Same as GEOPHYS 241A, ENERGY 241) (Same as GP241) Practical methods for quantitative characterization and uncertainty assessment of subsurface reservoir models integrating well-log and seismic data. Multidisciplinary combination of rock-physics, seismic attributes, sedimentological information and spatial statistical modeling techniques. Student teams build reservoir models using limited well data and seismic attributes typically available in practice, comparing alternative approaches. Software provided (SGEMS, Petrel, Matlab). Recommended: ERE240/260, or GP222/223, or GP260/262 or GES253/257; ERE246, GP112

*3-4 units, Spr (Mukerji, T)*

### ENERGY 146. Reservoir Characterization and Flow Modeling with Outcrop Data

(Same as GES 246, ENERGY 246) Project addressing a reservoir management problem by studying an outcrop analog, constructing geostatistical reservoir models, and performing flow simulation. How to use outcrop observations in quantitative geological modeling and flow simulation. Relationships between disciplines. Weekend field trip.

*3 units, Aut (Graham, S; Tchelepi, H; Mukerji, T; Boucher, A)*

### ENERGY 153. Carbon Capture and Sequestration

(Same as ENERGY 253) CO<sub>2</sub> separation from syngas and flue gas for gasification and combustion processes. Transportation of CO<sub>2</sub> in pipelines and sequestration in deep underground geological formations. Pipeline specifications, monitoring, safety engineering, and costs for long distance transport of CO<sub>2</sub>. Comparison of options for geological sequestration in oil and gas reservoirs, deep unmineable coal beds, and saline aquifers. Life cycle analysis.

*3-4 units, Aut (Wilcox, J; Benson, S)*

### ENERGY 155. Undergraduate Report on Energy Industry Training

On-the-job practical training under the guidance of on-site supervisors. Required report detailing work activities, problems, assignments and key results. Prerequisite: written consent of instructor.

*1-3 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

### ENERGY 160. Modeling Uncertainty in the Earth Sciences

(Same as ENERGY 260) Whether Earth Science modeling is performed on a local, regional or global scale, for scientific or engineering purposes, uncertainty is inherently present due to lack of data and lack of understanding of the underlying phenomena. This course highlights the various issues, techniques and practical modeling tools available for modeling uncertainty of complex 3D/4D Earth systems. The course focuses on a practical breath rather than theoretical depth. Topics covered are: the process of building models, sources of uncertainty, probabilistic techniques, spatial data analysis and geostatistics, grid and scale, spatio-temporal uncertainty, visualizing uncertainty in large dimensions, Monte Carlo simulation, reducing uncertainty with data, value of information. Applications to both local (reservoir, aquifer) and global (climate) are covered through literature study. Extensive

software use with SGEMS and Petrel. Project homework. Prerequisites: algebra (CME 104 or equivalent), introductory stat  
3 units, Win (Caers, J)

**ENERGY 161. Statistical Methods for the Earth and Environmental Sciences: Geostatistics**

(Same as EESS 161, EARTHSYS 161) Statistical analysis and graphical display of data, common distribution models, sampling, and regression. The variogram as a tool for modeling spatial correlation; variogram estimation and modeling; introduction to spatial mapping and prediction with kriging; integration of remote sensing and other ancillary information using co-kriging models; spatial uncertainty; introduction to geostatistical software applied to large environmental, climatological, and reservoir engineering databases; emphasis is on practical use of geostatistical tools. GER: DB-NatSci

3-4 units, not given this year

**ENERGY 167. Engineering Valuation and Appraisal of Oil and Gas Wells, Facilities, and Properties**

(Same as ENERGY 267) Appraisal of development and remedial work on oil and gas wells; appraisal of producing properties; estimation of productive capacity, reserves; operating costs, depletion, and depreciation; value of future profits, taxation, fair market value; original or guided research problems on economic topics with report. Prerequisite: consent of instructor. GER:DB-EngrAppSci

3 units, Win (Kourt, W; Pande, K)

**ENERGY 175. Well Test Analysis**

Lectures, problems. Application of solutions of unsteady flow in porous media to transient pressure analysis of oil, gas, water, and geothermal wells. Pressure buildup analysis and drawdown. Design of well tests. Computer-aided interpretation.

3 units, Spr (Horne, R)

**ENERGY 180. Oil and Gas Production Engineering**

(Same as ENERGY 280) Design and analysis of production systems for oil and gas reservoirs. Topics: well completion, single-phase and multi-phase flow in wells and gathering systems, artificial lift and field processing, well stimulation, inflow performance. Prerequisite: 120. GER:DB-EngrAppSci

3 units, not given this year

**ENERGY 191. OPTIMIZATION OF ENERGY SYSTEMS**

(Same as ENERGY 291) Introductory mathematical programming and optimization using examples from energy industries. Emphasis on problem formulation and solving, secondary coverage of algorithms. Problem topics include optimization of energy investment, production, and transportation; uncertain and intermittent energy resources; energy storage; efficient energy production and conversion. Methods include linear and nonlinear optimization, as well as multi-objective and goal programming. Tools include Microsoft Excel and AMPL mathematical programming language. Prerequisites: MATH 41, MATH 51, or consent of instructor. Programming experience helpful (e.g. CS 106A-B).

3 units, Win (Brandt, A)

**ENERGY 192. Undergraduate Teaching Experience**

Leading field trips, preparing lecture notes, quizzes under supervision of the instructor. May be repeated for credit.

1-3 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**ENERGY 193. Undergraduate Research Problems**

Original and guided research problems with comprehensive report. May be repeated for credit.

1-3 units, Aut (Staff), Win (Staff), Spr (Durllofsky, L; Gerritsen, M; Horne, R; Kavscek, A; Tchelepi, H), Sum (Staff)

**ENERGY 194. Special Topics in Energy and Mineral Fluids**

May be repeated for credit.

1-3 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**ENERGY 199. Senior Project and Seminar in Energy Resources**

Individual or group capstone project in Energy Resources Engineering. Emphasis is on report preparation. May be repeated for credit.

1-4 units, Spr (Kavscek, A; Horne, R; Sandler, J)

**GRADUATE COURSES IN ENERGY RESOURCES ENGINEERING**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**ENERGY 201. Laboratory Measurement of Reservoir Rock Properties**

In this course, students will learn methods for measuring reservoir rock properties. Techniques covered include core preservation and sample preparation; Rock petrography; Interfacial tension of fluids; Measurement of contact angles of fluids on reservoir media; Capillary pressure measurement and interpretation; Absolute and effective porosities; Absolute permeability; Multiphase flow including relative permeability and residual saturation. The class will be 1 3-hour lecture/lab per week, with readings and weekly assignments. A field trip to a professional core characterization lab may be included.

3 units, Win (Benson, S; Pini, R; Krevor, S)

**ENERGY 210. Energy Policy for Scientists and Engineers**

Graduate level seminar that addresses energy policy issues through discussion, invited talks and visits/field trips to policy making organizations and industry leaders.

1 unit, Spr (Staff)

**ENERGY 212. Introduction to Large-Scale Computing in Engineering**

(Same as CME 212) Advanced programming methodologies for solving fundamental engineering problems using algorithms with pervasive application across disciplines. Overview of computer systems from a programming perspective including processor architectures, memory hierarchies, machine arithmetic, performance tuning techniques. Algorithms include iterative, direct linear solvers, fft, and divide and conquer strategies for n-body problems. Software development; other practical UNIX tools including shell scripting, vi/emacs, gcc, make, gdb, gprof, version control systems and LaTeX. Prerequisites: CME 200/ME 300A, CME 211, and CS 106X or equivalent level of programming in C/C++.

3 units, Win (Henderson, N)

**ENERGY 221. Fundamentals of Multiphase Flow**

(Same as ENERGY 121) Multiphase flow in porous media. Wettability, capillary pressure, imbibition and drainage, Leverett J-function, transition zone, vertical equilibrium. Relative permeabilities, Darcy's law for multiphase flow, fractional flow equation, effects of gravity, Buckley-Leverett theory, recovery predictions, volumetric linear scaling, JBN and Jones-Rozelle determination of relative permeability. Frontal advance equation, Buckley-Leverett equation as frontal advance solution, tracers in multiphase flow, adsorption, three-phase relative permeabilities.

3 units, Win (Tchelepi, H)

**ENERGY 222. Advanced Reservoir Engineering**

Lectures, problems. General flow equations, tensor permeabilities, steady state radial flow, skin, and succession of steady states. Injectivity during fill-up of a depleted reservoir, injectivity for liquid-filled reservoirs. Flow potential and gravity forces, coning. Displacements in layered reservoirs. Transient radial flow equation, primary drainage of a cylindrical reservoir, line source solution, pseudo-steady state. May be repeated for credit. Prerequisite: 221.

3 units, Spr (Durllofsky, L)

**ENERGY 223. Reservoir Simulation**

Fundamentals of petroleum reservoir simulation. Equations for multicomponent, multiphase flow between gridblocks comprising a petroleum reservoir. Relationships between black-oil and compositional models. Techniques for developing black-oil, compositional, thermal, and dual-porosity models. Practical considerations in the use of simulators for predicting reservoir performance. Class project. Prerequisite: 221 and 246, or consent of instructor. Recommended: CME 206.

3-4 units, Win (Durllofsky, L; Tchelepi, H; Gerritsen, M)

**ENERGY 224. Advanced Reservoir Simulation**

Topics include modeling of complex wells, coupling of surface facilities, compositional modeling, dual porosity models, treatment of full tensor permeability and grid nonorthogonality, local grid refinement, higher order methods, streamline simulation,

upscaling, algebraic multigrid solvers, unstructured grid solvers, history matching, other selected topics. Prerequisite: 223 or consent of instructor. May be repeated for credit.

3 units, Aut (Durlafsky, L; Tchelepi, H; Aziz, K)

#### **ENERGY 225. Theory of Gas Injection Processes**

Lectures, problems. Theory of multicomponent, multiphase flow in porous media. Miscible displacement: diffusion and dispersion, convection-dispersion equations and its solutions. Method of characteristic calculations of chromatographic transport of multicomponent mixtures. Development of miscibility and interaction of phase behavior with heterogeneity. May be repeated for credit. Prerequisite: CME 200.

3 units, Spr (Orr, F; Voskov, D)

#### **ENERGY 226. Thermal Recovery Methods**

Theory and practice of thermal recovery methods: steam drive, cyclic steam injections, and in situ combustion. Models of combined mass and energy transport. Estimates of heated reservoir volume and oil recovery performance. Wellbore heat losses, recovery production, and field examples.

3 units, not given this year

#### **ENERGY 227. Enhanced Oil Recovery**

The physics, theories, and methods of evaluating chemical, miscible, and thermal enhanced oil recovery projects. Existing methods and screening techniques, and analytical and simulation based means of evaluating project effectiveness. Dispersion-convection-adsorption equations, coupled heat, and mass balances and phase behavior provide requisite building blocks for evaluation.

3 units, Spr (Castanier, L)

#### **ENERGY 230. Advanced Topics in Well Logging**

State of the art tools and analyses; the technology, rock physical basis, and applications of each measurement. Hands-on computer-based analyses illustrate instructional material. Guest speakers on formation evaluation topics. Prerequisites: 130 or equivalent; basic well logging; and standard practice and application of electric well logs.

3 units, Spr (Lindblom, R)

#### **ENERGY 240. Geostatistics for Spatial Phenomena**

(Same as GES 240) Probabilistic modeling of spatial and/or time dependent phenomena. Kriging and cokriging for gridding and spatial interpolation. Integration of heterogeneous sources of information. Multiple-point geostatistics and training image-based stochastic imaging of reservoir/field heterogeneities. Introduction to GSLIB and SGEMS software. Case studies from the oil and mining industry and environmental sciences. Prerequisites: introductory calculus and linear algebra, STATS 116, GES 161, or equivalent.

2-3 units, Win (Journal, A)

#### **ENERGY 241. Seismic Reservoir Characterization**

(Same as GEOPHYS 241A, ENERGY 141) (Same as GP241) Practical methods for quantitative characterization and uncertainty assessment of subsurface reservoir models integrating well-log and seismic data. Multidisciplinary combination of rock-physics, seismic attributes, sedimentological information and spatial statistical modeling techniques. Student teams build reservoir models using limited well data and seismic attributes typically available in practice, comparing alternative approaches. Software provided (SGEMS, Petrel, Matlab). Recommended: ERE240/260, or GP222/223, or GP260/262 or GES253/257; ERE246, GP112

3-4 units, Spr (Mukerji, T)

#### **ENERGY 242. Topics in Advanced Geostatistics**

(Same as EESS 263) Conditional expectation theory and projections in Hilbert spaces; parametric versus non-parametric geostatistics; Boolean, Gaussian, fractal, indicator, and annealing approaches to stochastic imaging; multiple point statistics inference and reproduction; neural net geostatistics; Bayesian methods for data integration; techniques for upscaling hydrodynamic properties. May be repeated for credit. Prerequisites: 240, advanced calculus, C++/Fortran.

3-4 units, not given this year

#### **ENERGY 246. Reservoir Characterization and Flow Modeling with Outcrop Data**

(Same as GES 246, ENERGY 146) Project addressing a reservoir management problem by studying an outcrop analog, constructing

geostatistical reservoir models, and performing flow simulation. How to use outcrop observations in quantitative geological modeling and flow simulation. Relationships between disciplines. Weekend field trip.

3 units, Aut (Graham, S; Tchelepi, H; Mukerji, T; Boucher, A)

#### **ENERGY 247. Stochastic Simulation**

Characterization and inference of statistical properties of spatial random function models; how they average over volumes, expected fluctuations, and implementation issues. Models include point processes (Cox, Poisson), random sets (Boolean, truncated Gaussian), and mixture of Gaussian random functions. Prerequisite: 240.

3 units, not given this year

#### **ENERGY 251. Thermodynamics of Equilibria**

Lectures, problems. The volumetric behavior of fluids at high pressure. Equation of state representation of volumetric behavior. Thermodynamic functions and conditions of equilibrium, Gibbs and Helmholtz energy, chemical potential, fugacity. Phase diagrams for binary and multicomponent systems. Calculation of phase compositions from volumetric behavior for multicomponent mixtures. Experimental techniques for phase-equilibrium measurements. May be repeated for credit.

3 units, Aut (Orr, F; Bazargan, M)

#### **ENERGY 252. Chemical Kinetics Modeling**

Fundamentals of chemical reaction kinetics in homogeneous and heterogeneous reaction systems from a molecular perspective. Development and application of the theory of chemical kinetics, including collision, transition state, and surface reactivity approaches. Relationships between thermodynamics and kinetics to overall mechanism predictions. Introduction to Gaussian 03. Lab involves chemical modeling including ab initio electronic structure calculations (Hartree-Fock, configuration interaction, coupled cluster, and many-body perturbation theory) and thermodynamic predictions.

3 units, Win (Wilcox, J)

#### **ENERGY 253. Carbon Capture and Sequestration**

(Same as ENERGY 153) CO<sub>2</sub> separation from syngas and flue gas for gasification and combustion processes. Transportation of CO<sub>2</sub> in pipelines and sequestration in deep underground geological formations. Pipeline specifications, monitoring, safety engineering, and costs for long distance transport of CO<sub>2</sub>. Comparison of options for geological sequestration in oil and gas reservoirs, deep unmineable coal beds, and saline aquifers. Life cycle analysis.

3-4 units, Aut (Wilcox, J; Benson, S)

#### **ENERGY 255. Master's Report on Energy Industry Training**

On-the-job training for master's degree students under the guidance of on-site supervisors. Students submit a report detailing work activities, problems, assignments, and key results. May be repeated for credit. Prerequisite: consent of adviser.

1-3 units, Sum (Staff)

#### **ENERGY 259. Presentation Skills**

For teaching assistants in Energy Resources Engineering. Five two-hour sessions in the first half of the quarter. Awareness of different learning styles, grading philosophies, fair and efficient grading, text design; presentation and teaching skills, PowerPoint slide design; presentation practice in small groups. Taught in collaboration with the Center for Teaching and Learning.

1 unit, not given this year

#### **ENERGY 260. Modeling Uncertainty in the Earth Sciences**

(Same as ENERGY 160) Whether Earth Science modeling is performed on a local, regional or global scale, for scientific or engineering purposes, uncertainty is inherently present due to lack of data and lack of understanding of the underlying phenomena. This course highlights the various issues, techniques and practical modeling tools available for modeling uncertainty of complex 3D/4D Earth systems. The course focuses on a practical breath rather than theoretical depth. Topics covered are: the process of building models, sources of uncertainty, probabilistic techniques, spatial data analysis and geostatistics, grid and scale, spatio-temporal uncertainty, visualizing uncertainty in large dimensions, Monte Carlo simulation, reducing uncertainty with data, value of information. Applications to both local (reservoir, aquifer) and global (climate) are covered through literature study. Extensive software use with SGEMS and Petrel. Project homework.



Prerequisites: algebra (CME 104 or equivalent), introductory stat  
3 units, Win (Caers, J)

**ENERGY 267. Engineering Valuation and Appraisal of Oil and Gas Wells, Facilities, and Properties**

(Same as ENERGY 167) Appraisal of development and remedial work on oil and gas wells; appraisal of producing properties; estimation of productive capacity, reserves; operating costs, depletion, and depreciation; value of future profits, taxation, fair market value; original or guided research problems on economic topics with report. Prerequisite: consent of instructor.

3 units, Win (Kourt, W; Pande, K)

**ENERGY 269. Geothermal Reservoir Engineering**

Conceptual models of heat and mass flows within geothermal reservoirs. The fundamentals of fluid/heat flow in porous media; convective/conductive regimes, dispersion of solutes, reactions in porous media, stability of fluid interfaces, liquid and vapor flows. Interpretation of geochemical, geological, and well data to determine reservoir properties/characteristics. Geothermal plants and the integrated geothermal system.

3 units, not given this year

**ENERGY 273. Special Topics in Petroleum Engineering**

1-3 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**ENERGY 280. Oil and Gas Production Engineering**

(Same as ENERGY 180) Design and analysis of production systems for oil and gas reservoirs. Topics: well completion, single-phase and multi-phase flow in wells and gathering systems, artificial lift and field processing, well stimulation, inflow performance. Prerequisite: 120.

3 units, not given this year

**ENERGY 281. Applied Mathematics in Reservoir Engineering**

The philosophy of the solution of engineering problems. Methods of solution of partial differential equations: Laplace transforms, Fourier transforms, wavelet transforms, Green's functions, and boundary element methods. Prerequisites: CME 204 or MATH 131, and consent of instructor.

3 units, alternate years, not given this year

**ENERGY 284. Optimization and Inverse Modeling**

Treatment of deterministic and stochastic optimization, gradient-based optimization, polytope method, generalized least squares, non-linear least squares and confidence intervals by numerical methods and bootstrap. Adjoint method for gradient calculation. Genetic algorithms and simulated annealing. Development of proxy functions using regression techniques and neural networks. Application of optimization methods to solving non-linear inverse problems. Bayesian method, rejection sampling, metropolis sampling, uncertainty quantification. Parameterization of high-dimensional problems through various expansion techniques. Examples of various Earth sciences inverse problems including flow and wave equations. Requirements: CME 106 and 200 (or equivalent courses)

3 units, Aut (Caers, J)

**ENERGY 285A. SUPRI-A Research Seminar: Enhanced Oil Recovery**

Focused study in research areas within the department. Graduate students may participate in advanced work in areas of particular interest prior to making a final decision on a thesis subject. Current research in the SUPRI-A group. May be repeated for credit. Prerequisite: consent of instructor.

1 unit, Aut (Staff)

**ENERGY 285B. SUPRI-B Research Seminar: Reservoir Simulation**

Focused study in research areas within the department. Graduate students may participate in advanced work in areas of particular interest prior to making a final decision on a thesis subject. Current research in SUPRI-B (reservoir simulation) program. May be repeated for credit. Prerequisite: consent of instructor.

1 unit, Aut (Staff), Win (Staff)

**ENERGY 285C. SUPRI-C Research Seminar: Gas Injection Processes**

Study in research areas within the department. Graduate students may participate in advanced work in areas of particular interest prior to making a final decision on a thesis subject. Current research in the SUPRI-D well test analysis group. May be repeated

for credit. Prerequisite: consent of instructor.

1 unit, Aut (Staff), Win (Staff)

**ENERGY 285D. SUPRI-D Research Seminar: Well Test Analysis**

Study in research areas within the department. Graduate students may participate in advanced work in areas of particular interest prior to making a final decision on a thesis subject. Current research in the SUPRI-D well test analysis group. May be repeated for credit. Prerequisite: consent of instructor. (Horne)

1 unit, Aut (Staff), Win (Staff)

**ENERGY 285F. SCRF Research Seminar: Geostatistics and Reservoir Forecasting**

Study in research areas within the department. Graduate students may participate in advanced work in areas of particular interest prior to making a final decision on a thesis subject. Current research in the SCRF (Stanford Center for Reservoir Forecasting) program. Prerequisite: consent of instructor.

1 unit, Aut (Staff), Win (Staff)

**ENERGY 285G. Geothermal Reservoir Engineering Research Seminar**

Study in research areas within the department. Graduate students may participate in advanced work in areas of particular interest prior to making a final decision on a thesis subject. Current research in the geothermal energy group. Presentation required for credit. Prerequisite: consent of instructor.

1 unit, Aut (Staff), Win (Staff)

**ENERGY 285H. SUPRI-HW Research Seminar: Horizontal Well Technology**

Study in research areas within the department. Graduate students may participate in advanced work in areas of particular interest prior to making a final decision on a thesis subject. Current research in SUPRI-HW (productivity and injectivity of horizontal wells) program. Prerequisite: consent of instructor.

1 unit, Aut (Staff), Win (Staff)

**ENERGY 290. Numerical Modeling of Fluid Flow in Heterogeneous Porous Media**

How to mathematically model and solve elliptic partial differential equations with variable and discontinuous coefficients describing flow in highly heterogeneous porous media. Topics include finite difference and finite volume approaches on structured grids, efficient solvers for the resulting system of equations, Krylov space methods, preconditioning, multi-grid solvers, grid adaptivity and adaptivity criteria, multiscale approaches, and effects of anisotropy on solver efficiency and accuracy. MATLAB programming and application of commercial or public domain simulation packages. Prerequisite: CME 200, 201, and 202, or equivalents with consent of instructor.

3 units, not given this year

**ENERGY 291. OPTIMIZATION OF ENERGY SYSTEMS**

(Same as ENERGY 191) Introductory mathematical programming and optimization using examples from energy industries. Emphasis on problem formulation and solving, secondary coverage of algorithms. Problem topics include optimization of energy investment, production, and transportation; uncertain and intermittent energy resources; energy storage; efficient energy production and conversion. Methods include linear and nonlinear optimization, as well as multi-objective and goal programming. Tools include Microsoft Excel and AMPL mathematical programming language. Prerequisites: MATH 41, MATH 51, or consent of instructor. Programming experience helpful (e.g., CS 106A-B).

3 units, Win (Brandt, A)

**ENERGY 293A. Fundamentals of Energy Processes**

(Same as EE 293A) For seniors and graduate students. Thermodynamics, heat engines, thermoelectrics, biomass. Recommended: MATH 41, 43; PHYSICS 41, 43, 45

3-4 units, Aut (Brandt, A; Horne, R; Krevor, S)

**ENERGY 293B. Fundamentals of Energy Processes**

(Same as EE 293B) For seniors and graduate students. Fuel cells. Production of hydrogen: electrolytic, chemical, thermolytic, photolytic. Hydrogen storage: hydrides. Photoelectric converters; photo-thermovoltaic converters. Wind turbines. Recommended: EE 293A; MATH 41; PHYSICS 41, 43, 45



3 units, Win (Brandt, A; Gerritsen, M; Wilcox, J)

### **ENERGY 301. The Energy Seminar**

(Same as CEE 301) Interdisciplinary exploration of current energy challenges and opportunities, with talks by faculty, visitors, and students. May be repeated for credit.

1 unit, Aut (Benson, S), Win (Benson, S), Spr (Benson, S)

### **ENERGY 355. Doctoral Report on Energy Industry Training**

On-the-job training for doctoral students under the guidance of on-site supervisors. Students submit a report on work activities, problems, assignments, and results. May be repeated for credit. Prerequisite: consent of adviser.

1-3 units, Sum (Staff)

### **ENERGY 359. Teaching Experience in Energy Resources Engineering**

For TAs in Energy Resources Engineering. Course and lecture design and preparation; lecturing practice in small groups. Classroom teaching practice in an Energy Resources Engineering course for which the participant is the TA (may be in a later quarter). Taught in collaboration with the Center for Teaching and Learning.

1 unit, Spr (Gerritsen, M)

### **ENERGY 360. Advanced Research Work in Energy Resources Engineering**

Graduate-level work in experimental, computational, or theoretical research. Special research not included in graduate degree program. May be repeated for credit.

1-10 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### **ENERGY 361. Master's Degree Research in Energy Resources Engineering**

Experimental, computational, or theoretical research. Advanced technical report writing. Limited to 6 units total. (Staff)

1-6 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### **ENERGY 362. Engineer's Degree Research in Energy Resources Engineering**

Graduate-level work in experimental, computational, or theoretical research for Engineer students. Advanced technical report writing. Limited to 15 units total, or 9 units total if 6 units of 361 were previously credited.

1-10 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### **ENERGY 363. Doctoral Degree Research in Energy Resources Engineering**

Graduate-level work in experimental, computational, or theoretical research for Ph.D. students. Advanced technical report writing.

1-10 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### **ENERGY 365. Special Research Topics in Energy Resources Engineering**

Graduate-level research work not related to report, thesis, or dissertation. May be repeated for credit.

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### **ENERGY 369. Practical Energy Studies**

Students work on realistic industrial reservoir engineering problems. Focus is on optimization of production scenarios using secondary or tertiary recovery techniques. When possible, projects are conducted in direct collaboration with industry. May be repeated for credit.

1-3 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### **ENERGY 801. TGR Project**

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### **ENERGY 802. TGR Dissertation**

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

## **ENGINEERING (ENGR) COURSES**

### **UNDERGRADUATE COURSES IN ENGINEERING**

Primarily for undergraduates; graduate students may enroll with consent of adviser.

#### **ENGR 10. Introduction to Engineering Analysis**

Integrated approach to the fundamental scientific principles that

are the cornerstones of engineering analysis: conservation of mass, atomic species, charge, momentum, angular momentum, energy, production of entropy expressed in the form of balance equations on carefully defined systems, and incorporating simple physical models. Emphasis is on setting up analysis problems arising in engineering. Topics: simple analytical solutions, numerical solutions of linear algebraic equations, and laboratory experiences. Provides the foundation and tools for subsequent engineering courses. GER:DB-EngrAppSci

4 units, Aut (Cappelli, M), Sum (Staff)

#### **ENGR 14. Intro to Solid Mechanics**

Introduction to engineering analysis using the principles of engineering solid mechanics. Builds on the math and physical reasoning concepts in Physics 41 to develop skills in evaluation of engineered systems across a variety of fields. Foundational ideas for more advanced solid mechanics courses such as ME80 or CEE101A. Interactive lecture sessions focused on mathematical application of key concepts, with weekly complementary lab session on testing and designing systems that embody these concepts. Limited enrollment, subject to instructor approval. GER:DB-EngrAppSci

4 units, Aut (Sheppard, S), Win (Sheppard, S), Spr (Mitiguy, P)

#### **ENGR 15. Dynamics**

The application of Newton's Laws to solve static and dynamic problems, particle and rigid body dynamics, freebody diagrams, and writing equations of motion. 2-D and 3-D cases including gyroscopes, spacecraft, and rotating machinery. Solution of equations of motion and dynamic response of simple mechanical systems. Prerequisites: Calculus (differentiation and integration), E14 (statics and strength), and a mechanics course in physics (e.g., Physics 41). GER:DB-EngrAppSci

3 units, Aut (Mitiguy, P), Spr (Lew, A)

#### **ENGR 20. Introduction to Chemical Engineering**

(Same as CHEMENG 20) Overview of chemical engineering through discussion and engineering analysis of physical and chemical processes. Topics: overall staged separations, material and energy balances, concepts of rate processes, energy and mass transport, and kinetics of chemical reactions. Applications of these concepts to areas of current technological importance: biotechnology, energy, production of chemicals, materials processing, and purification. Prerequisite: CHEM 31. GER:DB-EngrAppSci

3 units, Spr (Khosla, C)

#### **ENGR 25B. Biotechnology**

(Same as CHEMENG 25B) Biology and chemistry fundamentals, genetic engineering, cell culture, protein production, pharmaceuticals, genomics, viruses, gene therapy, evolution, immunology, antibodies, vaccines, transgenic animals, cloning, stem cells, intellectual property, governmental regulations, and ethics. Prerequisites: CHEM 31 and MATH 41 or equivalent course. GER:DB-EngrAppSci

3 units, Spr (Wang, C)

#### **ENGR 25E. Energy: Chemical Transformations for Production, Storage, and Use**

(Same as CHEMENG 25E) An introduction and overview to the challenges and opportunities of energy supply and consumption. Emphasis on energy technologies where chemistry and engineering play key roles. Review of energy fundamentals along with historical energy perspectives and current energy production technologies. In depth analyses of solar thermal systems, biofuels, photovoltaics and electrochemical devices (batteries and fuel cells). Prerequisites: high school chemistry or equivalent. GER:DB-EngrAppSci

3 units, Win (Robertson, C; Bent, S)

#### **ENGR 30. Engineering Thermodynamics**

The basic principles of thermodynamics are introduced in this course. Concepts of energy and entropy from elementary considerations of the microscopic nature of matter are discussed. The principles are applied in thermodynamic analyses directed towards understanding the performances of engineering systems. Methods and problems cover socially responsible economic generation and utilization of energy in central power generation plants, solar systems, refrigeration devices, and automobile, jet and gas-turbine engines. GER:DB-EngrAppSci

3 units, Aut (Zheng, X), Win (Mitchell, R), Sum (Staff)

### **ENGR 31. Chemical Principles with Application to Nanoscale Science and Technology**

Preparation for engineering disciplines emphasizing modern technological applications of solid state chemistry. Topics include: crystallography; chemical kinetics and equilibria; thermodynamics of phase changes and reaction; quantum mechanics of chemical bonding, molecular orbital theory, and electronic band structure of crystals; and the materials science of basic electronic and photonic devices. Prerequisite: high school or college chemistry background in stoichiometry, periodicity, Lewis and VSEPR structures, dissolution/precipitation and acid/base reactions, gas laws, and phase behavior. GER: DB-NatSci

4 units, Aut (McIntyre, P)

### **ENGR 40. Introductory Electronics**

Overview of electronic circuits and applications. Electrical quantities and their measurement, including operation of the oscilloscope. Basic models of electronic components including resistors, capacitors, inductors, and the operational amplifier. Frequency response of linear circuits, including basic filters, using phasor analysis. Digital logic fundamentals, logic gates, and basic combinatorial logic blocks. Lab assignments. Enrollment limited to 200. Lab. Prerequisite: PHYSICS 43. GER:DB-EngrAppSci

5 units, Aut (Howe, R), Spr (Wong, S)

### **ENGR 40N. Engineering Wireless Networks**

A hands on introduction to the design and implementation of modern wireless networks. Via a quarter long project on programmable radios, students will learn the fundamentals of wireless channels, encoding and decoding information, modeling of errors and error recovery algorithms, and the engineering of packet-switched networks. These concepts will be used to illustrate general themes in EE and CS: the role of abstraction and modularity in engineering design, building reliable systems using imperfect components, understanding the limits imposed by energy and noise, choosing effective representations for information, and engineering tradeoffs in complex systems.

5 units, Spr (Katti, S)

### **ENGR 40P. Physics of Electrical Engineering**

(Same as EE 41) How everything from electrostatics to quantum mechanics is used in common high-technology products. Electrostatics are critical in micro-mechanical systems used in many sensors and displays, and Electromagnetic waves are essential in all high-speed communication systems. How to propagate energy on transmission lines, optical fibers, and in free space. Which aspects of modern physics are needed to generate light for the operation of a DVD player or TV. Introduction to semiconductors, solid-state light bulbs, and laser pointers. Hands-on labs to connect physics to everyday experience. Prerequisites: Physics 43 GER:DB-EngrAppSci

5 units, Win (Solgaard, O)

### **ENGR 50. Introduction to Materials Science, Nanotechnology Emphasis**

The structure, bonding, and atomic arrangements in materials leading to their properties and applications. Topics include electronic and mechanical behavior, emphasizing nanotechnology, solid state devices, and advanced structural and composite materials. GER:DB-EngrAppSci

4 units, Spr (Sinclair, R)

### **ENGR 50E. Introduction to Materials Science - Energy Emphasis**

Materials structure, bonding and atomic arrangements leading to their properties and applications. Topics include electronic, thermal and mechanical behavior; emphasizing energy related materials and challenges.

4 units, Aut (Melosh, N)

### **ENGR 50M. Introduction to Materials Science, Biomaterials Emphasis**

Topics include: the relationship between atomic structure and macroscopic properties of man-made and natural materials; mechanical and thermodynamic behavior of surgical implants including alloys, ceramics, and polymers; and materials selection for biotechnology applications such as contact lenses, artificial joints, and cardiovascular stents. No prerequisite. GER:DB-EngrAppSci

4 units, Win (Heilshorn, S)

### **ENGR 60. Engineering Economy**

Fundamentals of economic analysis. Interest rates, present value, and internal rate of return. Applications to personal and corporate financial decisions. Mortgage evaluation, insurance decision, hedging/risk reduction, project selection, capital budgeting, and investment valuation. Decisions under uncertainty and utility theory. Prerequisite: MATH 41 or equivalent. Recommended: sophomore or higher class standing; knowledge of elementary probability. GER:DB-EngrAppSci

3 units, Aut (Primbs, J), Sum (Staff)

### **ENGR 62. Introduction to Optimization**

(Same as MS&E 111) Formulation and analysis of linear optimization problems. Solution using Excel solver. Polyhedral geometry and duality theory. Applications to contingent claims analysis, production scheduling, pattern recognition, two-player zero-sum games, and network flows. Prerequisite: MATH 51. GER:DB-EngrAppSci

4 units, Aut (Van Roy, B), Spr (Goel, A)

### **ENGR 70A. Programming Methodology**

(Same as CS 106A) Introduction to the engineering of computer applications emphasizing modern software engineering principles: object-oriented design, decomposition, encapsulation, abstraction, and testing. Uses the Java programming language. Emphasis is on good programming style and the built-in facilities of the Java language. No prior programming experience required. GER:DB-EngrAppSci

3-5 units, Aut (Sahami, M), Win (Schwarz, K), Spr (Cain, G), Sum (Staff)

### **ENGR 70B. Programming Abstractions**

(Same as CS 106B) Abstraction and its relation to programming. Software engineering principles of data abstraction and modularity. Object-oriented programming, fundamental data structures (such as stacks, queues, sets) and data-directed design. Recursion and recursive data structures (linked lists, trees, graphs). Introduction to time and space complexity analysis. Uses the programming language C++ covering its basic facilities. Prerequisite: 106A or equivalent. GER:DB-EngrAppSci

3-5 units, Aut (Cain, G), Win (Roberts, E), Spr (Schwarz, K), Sum (Staff)

### **ENGR 70X. Programming Abstractions (Accelerated)**

(Same as CS 106X) Intensive version of 106B for students with a strong programming background interested in a rigorous treatment of the topics at an accelerated pace. Additional advanced material and more challenging projects. Prerequisite: excellence in 106A or equivalent, or consent of instructor. GER:DB-EngrAppSci

3-5 units, Aut (Cain, G)

### **ENGR 80. Introduction to Bioengineering**

(Same as BIOE 80) Overview of bioengineering focused on engineering analysis and design of biological systems. Topics include chemical properties of biological components, rates and equilibrium properties of biological reactions, cellular structure and communication, genetic programming of biological systems, and engineering balances and systems analysis. Application of these concepts to engineering biological systems for diverse areas, including health and medicine, biomanufacturing, and sustainability, is emphasized. Includes an introduction to MATLAB as a problem-solving tool and a team-based project emphasizing the responsible development of technologies. 4 units, Spr (Smolke) GER:DB-EngrAppSci

4 units, Spr (Smolke, C)

### **ENGR 90. Environmental Science and Technology**

(Same as CEE 70) Introduction to environmental quality and the technical background necessary for understanding environmental issues, controlling environmental degradation, and preserving air and water quality. Material balance concepts for tracking substances in the environmental and engineering systems. GER:DB-EngrAppSci

3 units, Aut (Kopperud, R)

### **ENGR 100. Teaching Public Speaking**

The theory and practice of teaching public speaking and presentation development. Lectures/discussions on developing an instructional plan, using audiovisual equipment for instruction, devising tutoring techniques, and teaching delivery, organization,

audience analysis, visual aids, and unique speaking situations. Weekly practice speaking. Students serve as apprentice speech tutors. Those completing course may become paid speech instructors in the Technical Communications Program. Prerequisite: consent of instructor.

5 units, Aut (Vassar, M), Win (Vassar, M), Spr (Vassar, M)

#### **ENGR 102E. Technical/Professional Writing for Electrical Engineers**

Required of Electrical Engineering majors. The process of writing technical/professional documents. Lectures, writing assignments, individual conferences. Corequisite for WIM: EE 100X or 108A.

1 unit, Aut (Scully, J)

#### **ENGR 102M. Technical/Professional Writing for Mechanical Engineers**

Required of Mechanical Engineering majors. The process of writing technical/professional documents. Lecture, writing assignments, individual conferences. Corequisite for WIM: ME 203.

1 unit, Aut (McDevitt, M), Win (McDevitt, M)

#### **ENGR 103. Public Speaking**

Priority to Engineering students. Introduction to speaking activities, from impromptu talks to carefully rehearsed formal professional presentations. How to organize and write speeches, analyze audiences, create and use visual aids, combat nervousness, and deliver informative and persuasive speeches effectively. Weekly class practice, rehearsals in one-on-one tutorials, videotaped feedback. Limited enrollment.

3 units, Aut (Vassar, M), Win (Vassar, M), Spr (Vassar, M)

#### **ENGR 105. Feedback Control Design**

Design of linear feedback control systems for command-following error, stability, and dynamic response specifications. Root-locus and frequency response design techniques. Examples from a variety of fields. Some use of computer aided design with MATLAB. Prerequisite: EE 102, ME 161, or equivalent. GER:DB-EngrAppSci

3 units, Win (Okamura, A)

#### **ENGR 110. Perspectives in Assistive Technology**

(Same as ENGR 210) Seminar and student team project. Medical, social, psychological, and technical challenges surrounding the design, development, and use of assistive technologies to improve the lives of people with disabilities. Guest speakers include professionals, clinicians, and individuals with disabilities. 1 unit for seminar attendance only. 3 units for students who pursue a team-based assistive technology project. Projects can be continued in ME113 or CS194 or as independent study in Spring Quarter. See <http://www.stanford.edu/class/engr110>. Service Learning Course (certified by Haas Center).

1-3 units, Win (Jaffe, D; Nelson, D)

#### **ENGR 115. Design the Tech Challenge**

(Same as ENGR 215) Students work with Tech Museum of San Jose staff to design the Tech Challenge, a yearly engineering competition for 6-12th grade students. Brainstorming, field trips to the museum, prototyping, coaching, and presentations to the Tech Challenge advisory board. See at <http://techchallenge.thetech.org>. May be repeated for credit.

2 units, not given this year

#### **ENGR 120. Fundamentals of Petroleum Engineering**

(Same as ENERGY 120) Lectures, problems, field trip. Engineering topics in petroleum recovery; origin, discovery, and development of oil and gas. Chemical, physical, and thermodynamic properties of oil and natural gas. Material balance equations and reserve estimates using volumetric calculations. Gas laws. Single phase and multiphase flow through porous media. GER:DB-EngrAppSci

3 units, Aut (Horne, R; Wilcox, J)

#### **ENGR 130. Science, Technology, and Contemporary Society**

(Same as STS 101, STS 201) Key social, cultural, and values issues raised by contemporary scientific and technological developments; distinctive features of science and engineering as sociotechnical activities; major influences of scientific and technological developments on 20th-century society, including transformations and problems of work, leisure, human values, the fine arts, and international relations; ethical conflicts in scientific and engineering practice; and the social shaping and management

of contemporary science and technology. GER:DB-SocSci

4-5 units, Aut (McGinn, R)

#### **ENGR 131. Ethical Issues in Engineering**

(Same as STS 115) Moral rights and responsibilities of engineers in relation to society, employers, colleagues, and clients; cost-benefit-risk analysis, safety, and informed consent; the ethics of whistle blowing; ethical conflicts of engineers as expert witnesses, consultants, and managers; ethical issues in engineering design, manufacturing, and operations; ethical issues arising from engineering work in foreign countries; and ethical implications of the social and environmental contexts of contemporary engineering. Case studies, guest practitioners, and field research. Limited enrollment. GER:DB-Hum

4 units, Spr (McGinn, R)

#### **ENGR 140A. Leadership of Technology Ventures**

First of three-part sequence for students selected to the Mayfield Fellows Program. Management and leadership within high technology startups, focusing on entrepreneurial skills related to product and market strategy, venture financing and cash flow management, team recruiting and organizational development, and the challenges of managing growth and handling adversity in emerging ventures. Other engineering faculty, founders, and venture capitalists participate as appropriate. Recommended: accounting or finance course (MS&E 140, ECON 90, or ENGR 60).

3-4 units, Spr (Byers, T)

#### **ENGR 140B. Leadership of Technology Ventures**

Open to Mayfield Fellows only; taken during the summer internship at a technology startup. Students exchange experiences and continue the formal learning process. Activities journal. Credit given following quarter.

1-2 units, Aut (Seelig, T)

#### **ENGR 140C. Leadership of Technology Ventures**

Open to Mayfield Fellows only. Capstone to the 140 sequence. Students, faculty, employers, and venture capitalists share recent internship experiences and analytical frameworks. Students develop living case studies and integrative project reports.

2-3 units, Aut (Seelig, T)

#### **ENGR 145. Technology Entrepreneurship**

How do you create a successful start-up? What is entrepreneurial leadership in a large firm? What are the differences between an idea and true opportunity? How does an entrepreneur form a team and gather the resources necessary to create a great enterprise? This class mixes mentor-guided team projects, in-depth case studies, research on the entrepreneurial process, and the opportunity to network and ask questions of Silicon Valley's top entrepreneurs and venture capitalists. For undergraduates of all majors who seek to understand the formation and growth of high-impact start-ups in areas such as information, green/clean, medical and consumer technologies. No prerequisites. Limited enrollment. GER:DB-SocSci

4 units, Win (Eesley, C), Sum (Staff)

#### **ENGR 150. Social Innovation and Entrepreneurship**

(Same as ENGR 250) (Graduate students register for 250.) The art of innovation and entrepreneurship for social benefit. Project team develops, tests, and iteratively improves technology-based social innovation and business plan to deploy it. Feedback and coaching from domain experts, product designers, and successful social entrepreneurs. Limited enrollment; application required. See <http://sie.stanford.edu> for course information.

1-6 units, Aut (Behrman, W), Win (Behrman, W), Spr (Behrman, W)

#### **ENGR 154. Vector Calculus for Engineers**

(Same as CME 100) Computation and visualization using MATLAB. Differential vector calculus: analytic geometry in space, functions of several variables, partial derivatives, gradient, unconstrained maxima and minima, Lagrange multipliers. Integral vector calculus: multiple integrals in Cartesian, cylindrical, and spherical coordinates, line integrals, scalar potential, surface integrals, Green's, divergence, and Stokes' theorems. Examples and applications drawn from various engineering fields. Prerequisites: MATH 41 and 42, or 10 units AP credit. GER:DB-Math

5 units, Aut (Khayms, V)

**ENGR 155A. Ordinary Differential Equations for Engineers**  
(Same as CME 102) Analytical and numerical methods for solving ordinary differential equations arising in engineering applications: Solution of initial and boundary value problems, series solutions, Laplace transforms, and non-linear equations; numerical methods for solving ordinary differential equations, accuracy of numerical methods, linear stability theory, finite differences. Introduction to MATLAB programming as a basic tool kit for computations. Problems from various engineering fields. Prerequisite: CME 100/ENGR 154 or MATH 51. GER:DB-Math  
*5 units, Win (Darve, E)*

**ENGR 155B. Linear Algebra and Partial Differential Equations for Engineers**

(Same as CME 104) Linear algebra: matrix operations, systems of algebraic equations, Gaussian elimination, undetermined and overdetermined systems, coupled systems of ordinary differential equations, eigensystem analysis, normal modes. Fourier series with applications, partial differential equations arising in science and engineering, analytical solutions of partial differential equations. Numerical methods for solution of partial differential equations: iterative techniques, stability and convergence, time advancement, implicit methods, von Neumann stability analysis. Examples and applications from various engineering fields. Prerequisite: CME 102/ENGR 155A. GER:DB-Math  
*5 units, Spr (Khayms, V)*

**ENGR 155C. Introduction to Probability and Statistics for Engineers**

(Same as CME 106) Probability: random variables, independence, and conditional probability; discrete and continuous distributions, moments, distributions of several random variables. Topics in mathematical statistics: random sampling, point estimation, confidence intervals, hypothesis testing, non-parametric tests, regression and correlation analyses; applications in engineering, industrial manufacturing, medicine, biology, and other fields. Prerequisite: CME 100/ENGR154 or MATH 51. GER:DB-Math  
*3-4 units, Win (Khayms, V), Sum (Staff)*

**ENGR 159Q. Japanese Companies and Japanese Society**

(S,Sem) (Same as MATSCI 159Q) Stanford Introductory Seminar. Preference to sophomores. The structure of a Japanese company from the point of view of Japanese society. Visiting researchers from Japanese companies give presentations on their research enterprise. The Japanese research ethic. The home campus equivalent of a Kyoto SCTI course. GER:DB-SocSci  
*3 units, Spr (Sinclair, R)*

**ENGR 192. Engineering Public Service Project**

Volunteer work on a public service project with a technical engineering component. Project requires a faculty sponsor and a community partner such as a nonprofit organization, school, or individual. Required report. See <http://soe.stanford.edu/publicservice>. May be repeated for credit. Prerequisite: consent of instructor.  
*1-2 units, not given this year*

**ENGR 199. Special Studies in Engineering**

Special studies, lab work, or reading under the direction of a faculty member. Often research experience opportunities exist in ongoing research projects. Students make arrangements with individual faculty and enroll in the section number corresponding to the particular faculty member. May be repeated for credit. Prerequisite: consent of instructor.  
*1-15 units, Aut (Staff), Win (Staff), Spr (Staff)*

**ENGR 199W. Writing of Original Research for Engineers**

Technical writing in science and engineering. Students produce a substantial document describing their research, methods, and results. Prerequisite: completion of freshman writing requirements; prior or concurrent in 2 units of research in the major department; and consent of instructor. WIM for BioMedical Computation.  
*1-3 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**GRADUATE COURSES IN ENGINEERING**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**ENGR 202S. Writing: Special Projects**

Writing tutorial for students working on non-course projects such

as theses, journal articles, and conference papers. Weekly individual conferences.

*1 unit, Aut (Reichard, C), Win (Reichard, C), Spr (Reichard, C)*

**ENGR 202W. Technical Writing**

How to write clear, concise, and well-ordered technical prose. Principles of editing for structure and style. Applications to a variety of genres in engineering and science.

*3 units, Aut (Reichard, C), Win (Reichard, C), Spr (Reichard, C)*

**ENGR 204. Research Ethics for Engineers and Scientists**

Explores ethical responsibilities of engineering and science researchers in relation to laboratory safety, data acquisition and management, experiment and product design, collaborative research, authorship and peer review, mentorship, human subjects research, funding applications and funded research, media accounts of research, and new and emerging technologies (e.g., in nanotechnology and bioengineering). Responsibilities of researchers toward society at large, and Stanford and government policies regarding the conduct of engineering and science research will also be addressed. Lectures, discussion, guest researchers, and real case studies. Primarily for graduate students and post-doctoral researchers in engineering and science. Limited enrollment.

*1-2 units, Spr (McGinn, R)*

**ENGR 205. Introduction to Control Design Techniques**

Review of root-locus and frequency response techniques for control system analysis and synthesis. State-space techniques for modeling, full-state feedback regulator design, pole placement, and observer design. Combined observer and regulator design. Lab experiments on computers connected to mechanical systems. Prerequisites: 105, MATH 103, 113. Recommended: Matlab.

*3 units, Aut (Rock, S)*

**ENGR 206. Control System Design**

Design and construction of a control system and working plant. Topics include: linearity, actuator saturation, sensor placement, controller and model order; linearization by differential actuation and sensing; analog op-amp circuit implementation. Emphasis is on qualitative aspects of analysis and synthesis, generation of candidate design, and engineering tradeoffs in system selection. Large team-based project. Limited enrollment. Prerequisite: 105.

*3-4 units, not given this year*

**ENGR 207A. Linear Control Systems I**

Introduction to control of discrete-time linear systems. State-space models. Controllability and observability. The linear quadratic regulator. Prerequisite: 105 or 205.

*3 units, not given this year*

**ENGR 207B. Linear Control Systems II**

Probabilistic methods for control and estimation. Statistical inference for discrete and continuous random variables. Linear estimation with Gaussian noise. The Kalman filter. Prerequisite: EE 263.

*3 units, not given this year*

**ENGR 207C. Linear Control Systems III**

Continuation of 207B. Introduction to stochastic control. Markov decision processes and stochastic dynamic programming. Separation of control and estimator design. Stochastic optimal control. Prerequisite: 207B.

*3 units, not given this year*

**ENGR 209A. Analysis and Control of Nonlinear Systems**

Introduction to nonlinear phenomena: multiple equilibria, limit cycles, bifurcations, complex dynamical behavior. Planar dynamical systems, analysis using phase plane techniques. Describing functions. Lyapunov stability theory. SISO feedback linearization, sliding mode control. Design examples. Prerequisite: 205.

*3 units, Win (Rock, S)*

**ENGR 210. Perspectives in Assistive Technology**

(Same as ENGR 110) Seminar and student team project. Medical, social, psychological, and technical challenges surrounding the design, development, and use of assistive technologies to improve the lives of people with disabilities. Guest speakers include professionals, clinicians, and individuals with disabilities. 1 unit for seminar attendance only. 3 units for students who pursue a team-based assistive technology project. Projects can be continued in ME113 or CS194 or as independent study in Spring Quarter.

See <http://www.stanford.edu/class/engr110>. Service Learning Course (certified by Haas Center).

1-3 units, Win (Jaffe, D; Nelson, D)

### **ENGR 210A. Robust Control**

Analysis and design techniques for multivariable feedback systems. Stability and robustness of feedback loops, passivity, and the small-gain theorem. Prerequisite: 207A or EE 263.

3 units, not given this year

### **ENGR 210B. Advanced Topics in Computation for Control**

Recent developments in computational techniques for feedback control systems. The use of convex optimization to solve problems in control. Prerequisites: Background in convex optimization, such as EE 364, and background in control, such as ENGR 207B.

3 units, not given this year

### **ENGR 215. Design the Tech Challenge**

(Same as ENGR 115) Students work with Tech Museum of San Jose staff to design the Tech Challenge, a yearly engineering competition for 6-12th grade students. Brainstorming, field trips to the museum, prototyping, coaching, and presentations to the Tech Challenge advisory board. See at <http://techchallenge.thetech.org>. May be repeated for credit.

2 units, not given this year

### **ENGR 231. Transformative Design**

(Same as ANTHRO 332) Project-based. How interactive technologies can be designed to encourage behavioral transformation. Topics such as self-efficacy, social support, and mechanism of cultural change in domains such as weight-loss, energy conservation, or safe driving. Lab familiarizes students with hardware and software tools for interaction prototyping. Students teams create functional prototypes for self-selected problem domains. Prerequisite: consent of instructor. Design Institute class; see <http://dschool.stanford.edu>.

3-5 units, Win (Roth, B; Dryer, M; Shanks, M)

### **ENGR 240. Introduction to Micro and Nano Electromechanical Systems**

Miniaturization technologies now have important roles in materials, mechanical, and biomedical engineering practice, in addition to being the foundation for information technology. This course will target an audience of first-year engineering graduate students and motivated senior-level undergraduates, with the goal of providing an introduction to M/NEMS fabrication techniques, selected device applications, and the design tradeoffs in developing systems. The course has no specific prerequisites, other than graduate or senior standing in engineering; otherwise, students will require permission of the instructors.

3 units, Spr (Howe, R)

### **ENGR 245. Technology Entrepreneurship and Lean Startups**

Apply emerging entrepreneurship principles including the popular lean startups and customer development frameworks to prototype, test, and iterate your product while discovering if you have a profitable business model. Work and study in teams or, in rare cases, alone. Proposal required during first week of the quarter. Proposals can be software, physical good, or service of any kind. Projects are treated as real start-ups, so work will be intense. Prerequisite: interest and passion in exploring whether a technology idea can become a real company.

3-4 units, Win (Blank, S)

### **ENGR 250. Social Innovation and Entrepreneurship**

(Same as ENGR 150) (Graduate students register for 250.) The art of innovation and entrepreneurship for social benefit. Project team develops, tests, and iteratively improves technology-based social innovation and business plan to deploy it. Feedback and coaching from domain experts, product designers, and successful social entrepreneurs. Limited enrollment; application required. See <http://sie.stanford.edu> for course information.

1-6 units, Aut (Behrman, W), Win (Behrman, W), Spr (Behrman, W)

### **ENGR 251. Work Seminar**

Students participate in the Creating Research Examples Across the Teaching Enterprise (CREATE) writing program. Goal is for students to produce, through a peer reviewed process, 1,000 word statements describing their research in ways that are understandable and compelling to undergraduates and other novices in the field. Unit credit when the final approved statements

appear on the CREATE web site.

1 unit, not given this year

### **ENGR 280. From Play to Innovation**

Project-based and team-centered. Enhancing the innovation process with playfulness. The human state of play and its principal attributes and importance to creative thinking. Play behavior, and its development and biological basis. Students apply those principles through design thinking to promote innovation in the corporate world with real-world partners on design projects with widespread application.

2-4 units, Spr (Boyle, B; Brown, S; Thompson, S)

### **ENGR 290. Graduate Environment of Support**

For course assistants (CAs) and tutors in the School of Engineering tutorial and learning program. Interactive training for effective academic assistance. Pedagogy, developing course material, tutoring, and advising. Sources include video, readings, projects, and role playing.

1 unit, Aut (Osgood, B; Lozano, N)

### **ENGR 298. Seminar in Fluid Mechanics**

Interdepartmental. Problems in all branches of fluid mechanics, with talks by visitors, faculty, and students. Graduate students may register for 1 unit, without letter grade; a letter grade is given for talks. May be repeated for credit.

1 unit, Aut (Staff), Win (Staff), Spr (Staff)

### **ENGR 299. Special Studies in Engineering**

Special studies, lab work, or reading under the direction of a faculty member. Often research experience opportunities exist in ongoing research projects. Students make arrangements with individual faculty and enroll in the corresponding section. Prerequisite: consent of instructor.

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### **ENGR 311A. Women's Perspectives**

Master's and Ph.D. seminar series driven by student interests. Possible topics: time management, career choices, health and family, diversity, professional development, and personal values. Guest speakers from academia and industry, student presentations with an emphasis on group discussion. Graduate students share experiences and examine scientific research in these areas. May be repeated for credit.

1 unit, Win (Sheppard, S)

### **ENGR 311B. Designing the Professional**

Continuation of ENGR 311A.

1 unit, Spr (Sheppard, S; Evans, D)

### **ENGR 312. Science and Engineering Course Design**

(Same as CTL 312) For students interested in an academic career and who anticipate designing science courses at the undergraduate or graduate level. Goal is to apply research on science learning to the design of effective course materials. Topics include syllabus design, course content and format decisions, assessment planning and grading, and strategies for teaching improvement.

2-3 units, Win (Sheppard, S; Wright-Dunbar, R)

### **ENGR 313. Topics in Engineering Education**

Master's and Ph.D. seminar series focused on teaching engineering courses based on research. Weekly, student-led group discussions follow engineering education and education literature. Topics include: best practices in teaching, theories on how people learn, education research methods, assessing learning, and evaluating teaching, all in an engineering context. May be repeated for credit.

1 unit, Spr (Sheppard, S)

### **ENGR 341. Micro/Nano Systems Design and Fabrication**

Laboratory course in micro and nano fabrication technology that combines lectures on theory and fundamentals with hands-on training in the Stanford Nanofabrication Facility. Prerequisite: ENGR 240 or equivalent.

3-5 units, not given this year

### **ENGR 342. MEMS Laboratory II**

Emphasis is on implementation of fabricated N/MEMS-based solutions. Student teams collaborate to develop, fabricate and test N/MEMS solutions proposed in E341. Design alternatives fabricated and tested in SNF with emphasis on manufacturability, assembly, test, and design. Limited enrollment. Prerequisite: ENGR 341.

3-4 units, not given this year

# ENGLISH (ENGLISH) COURSES

## UNDERGRADUATE COURSES IN ENGLISH

Primarily for undergraduates; graduate students may enroll with consent of adviser.

### ENGLISH 10AX. Fiction Writing

Introduction to short stories by past and contemporary masters. Basic elements of fiction writing: story structure, point of view, dialogue, exposition. Summer pre-class assignments include reading and online blog participation. Short story writing and feedback sessions, short writing exercises, and field trip to San Francisco.

2 units, Aut (*Tanaka, S*)

### ENGLISH 11SI. Neil Gaiman: International Man of Mystery

Neil Gaiman is an author that transcends the boundaries of form, genre, and age. Add to that the fact he grew up in England and lives in America, and it becomes almost impossible to pin him down on any front. By examining his graphic novels, short stories, novels, children's literature, and film, we will try our best to approach this living author from different angles and make sense of how he breaks down traditional barriers of classification. Along the way, we will examine the themes and style of a literary author that has managed to remain relevant in the modern, digital age.

2 units, Aut (*Lunsford, A*)

### ENGLISH 21. Masterpieces of American Literature

(Same as AMSTUD 121, ENGLISH 121) (English majors and others taking 5 units, register for 121.) A survey of some of the definitive texts of American writing, such as *Leaves of Grass*, *Benito Cereno*, *Adventures of Huckleberry Finn*, *The Waste Land*, *The Sun Also Rises*, *The Golden Apples*, and *The Crying of Lot 49*. GER:DB-Hum

3-5 units, not given this year

### ENGLISH 32. Technologies of Reading and Writing: The Nineteenth Century versus the Digital Age

(Same as ENGLISH 132) The nineteenth century was a critical period for technological development that accelerated forms of communication. As the telegraph replaced the letter, daily gossip columns replaced word of mouth, and photographs replaced the painted illustration, theories of writing and reading changed dramatically. Through texts such as Keats's *Letters*, Shelley's *Frankenstein*, Carroll's *Alice in Wonderland*, and Stoker's *Dracula*, this course explores the effects of media on the creation, dissemination, and reception of literature. This course also facilitates comparative work by juxtaposing 19th-century media with contemporary technologies of writing and reading, such as emails, blogs, and wikis, and the impact of these technologies on the creation, dissemination, and reception of literature today.

3-4 units, Sum (*Staff*)

### ENGLISH 36N. Lord Byron: Mad, Bad, and Dangerous to Know

(F,Sem) Stanford Introductory Seminar. The poetry, literary legacy, and significance of Lord Byron, a towering figure of European Romanticism. Emphasis on formal, aesthetic, and stylistic elements of the poetry, with additional topics to include modern celebrity, literary marketplace, scandal, and romantic heroism. GER:DB-Hum

3 units, Aut (*Rovee, C*)

### ENGLISH 43. Introduction to African American Literature

(Same as AFRICAAM 43, AMSTUD 143, ENGLISH 143) (English majors and others taking 5 units, register for 143.) African American literature from its earliest manifestations in the spirituals, trickster tales, and slave narratives to recent developments such as black feminist theory, postmodern fiction, and hip hop lyricism. We will engage some of the defining debates and phenomena within African American cultural history, including the status of realist aesthetics in black writing; the contested role of literature in black political struggle; the question of diaspora; the problem of intra-racial racism; and the emergence of black internationalism. Attuned to the invariably hybrid nature of this tradition, we will also devote attention to the discourse of the Enlightenment, modernist aesthetics, and the role of Marxism

in black political and literary history. GER:DB-Hum, EC-AmerCul  
3-5 units, Aut (*Raspberry, G*)

### ENGLISH 43A. American Indian Mythology, Legend, and Lore

(Same as NATIVEAM 143A, ENGLISH 143A) (English majors and others taking 5 units, register for 143A.) Readings from American Indian literatures, old and new. Stories, songs, and rituals from the 19th century, including the Navajo Night Chant. Tricksters and trickster stories; war, healing, and hunting songs; Aztec songs from the 16th century. Readings from modern poets and novelists including N. Scott Momaday, Louise Erdrich, and Leslie Marmon Silko, and the classic autobiography, *Black Elk Speaks*. GER:DB-Hum

3-5 units, Aut (*Fields, K*)

### ENGLISH 45F. The Human Love of Mystery: A Journey Through Detective Fiction

(Same as ENGLISH 145F) Reading and discussion of mystery and detective fiction from Sherlock Holmes through the Golden Age of Agatha Christie, to the hard-boiled private eye in Ross Macdonald's *Lew Archer* novels. Topics include the independent female private eye and social changes that allowed her emergence; the definition of mystery and detective fiction to include Sophocles' *Oedipus Rex*, Morrison's *Song of Solomon*, and Freud's theories; the enduring hold this genre has on imaginations; the fundamental concerns with justice and fear; and stimulation of the deep human fascination with the apparently inexplicable and the intellectual satisfaction of arriving at understanding. GER:DB-Hum

3-4 units, Sum (*Staff*)

### ENGLISH 56N. Mixed Race in the New Millennium: Crossings of Kin, Faith & Culture

(F,Sem) (Same as AFRICAAM 56N, CSRE 56N) Stanford Introductory Seminar. Preference to freshmen. How literature, theater, graphic art and popular culture shape understandings of contemporary mixed race identity and other complex experiences of cultural hybridity. Course explores implications for racial identity, art, and politics for the new millennium. GER:DB-Hum

3 units, Win (*Elam, M*)

### ENGLISH 62N. Eros in Modern American Poetry

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Anne Carson, treating love from Sappho to Socrates, shows how the Greeks derived their philosophy from the erotic poetic tradition. Readings include: Carson's poetry which locates erotic desire in the larger context of the desire for knowledge; classic Japanese haiku masters such as Basho; and William Carlos Williams, Louise Bogan, and C.K. Williams. GER:DB-Hum

3 units, Win (*Fields, K*)

### ENGLISH 64N. Growing Up in America

(F,Sem) (Same as PSYCH 29N) Stanford Introductory Seminar. Preference to freshmen. To what extent is it possible to describe an American experience? How are different people included in or excluded from the imagined community that is America? How do a person's race, class, gender and sexuality affect his or her experience of belonging to this country? These are just some of the questions we will consider as we familiarize ourselves with the great diversity of childhood and young adult experiences of people who have grown up in America. We will read and discuss narratives written by men and women, by urban, suburban, and rural Americans, and by Asian Americans, African Americans, Syrian Americans, Native Americans, Latina/os, and European Americans. Throughout the course, we will explore how these writers write the self in literature. GER:DB-Hum, EC-AmerCul

3 units, Spr (*Markus, H; Moya, P*)

### ENGLISH 65N. Contemporary Women Fiction Writers

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Novels and story collections addressing childhood, coming of age, and maturity; love, sexuality, orientation; the experience of violence and the politics, domestic and global, of women's lives. Texts include Gordimer, Eisenberg, Latiolais, Munro, O'Brien, and others. GER:DB-Hum

3 units, Aut (*Tallent, E*)

### ENGLISH 68N. Mark Twain and American Culture

(F,Sem) (Same as AMSTUD 68N) Stanford Introductory Seminar. Preference to freshmen. Mark Twain has been called our Rabelais,

our Cervantes, our Homer, our Tolstoy, our Shakespeare. Ernest Hemingway maintained that all modern American literature comes from one book by Mark Twain called *The Adventures of Huckleberry Finn*. President Franklin D. Roosevelt got the phrase New Deal from A Connecticut Yankee in King Arthur's Court. Class discussions will focus on how Twain's work illuminates and complicates his society's responses to such issues as race, technology, heredity versus environment, religion, education, and what it means to be American. GER:DB-Hum

4 units, Aut (*Fishkin, S*)

**ENGLISH 74N. Race and Ethnicity in Contemporary American Fiction: Boundaries and Border Crossings**

(Same as ASNAMST 74N) The question of place and locality in studies of identity and racial formation. Goal is to engage and examine texts with a critical eye both toward the social contexts represented and to the imaginative aesthetic techniques that American writers of color offer to bring their fictional worlds to life. Theme of border hopping and boundary crossing in works by authors including Charles Johnson, Toni Morrison, Alejandro Morales, Julie Otsuka, Stephen Graham Jones, and Lan Samantha Chang. GER:DB-Hum

3 units, not given this year

**ENGLISH 77N. Living in the Past: Italy in the Anglo-American Imagination**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. A survey of the way in which British and American authors from Milton to Hellenga have portrayed Italian character and culture. Recommended as an ideal orientation course for students planning to attend the Bing Overseas Study Program in Florence. GER:DB-Hum

3 units, Aut (*Evans, M*)

**ENGLISH 80Q. All the World's a Stage: Dramatic Realism on the Threshold of the Modern World**

(S,Sem) Stanford Introductory Seminar. Witness the relationship between heightened dramatic realism ---or empiricism---and unprecedented historical, scientific, religious and cultural changes occurring in the Early Modern world, a defining moment in explorations of uncharted realms of the self, the world, the universe, and artistic form. Readings include Shakespeare's *Othello* and *As You Like It*; John Donne's dramatic poetry; Marlowe's *Doctor Faustus*; and Beckett's *Waiting for Godot*. We will examine how these and other texts---point their readers and viewers toward the modern world through cognitive innovations in the art of perspective. Selected art, film adaptations, and modern literature to be included.

4-5 units, Win (*Brooks, H*)

**ENGLISH 81. Philosophy and Literature**

(Same as CLASSGEN 81, COMPLIT 181, FRENGEN 181, ITALGEN 181, GERGEN 181) Required gateway course for Philosophical and Literary Thought; crosslisted in departments sponsoring the Philosophy and Literature track: majors should register in their home department; non-majors may register in any sponsoring department. Introduction to major problems at the intersection of philosophy and literature. Issues may include authorship, selfhood, truth and fiction, the importance of literary form to philosophical works, and the ethical significance of literary works. Texts include philosophical analyses of literature, works of imaginative literature, and works of both philosophical and literary significance. Authors may include Plato, Montaigne, Nietzsche, Borges, Beckett, Barthes, Foucault, Nussbaum, Walton, Nehamas, Pavel, and Pippin. GER:DB-Hum

4-5 units, Win (*Staff*)

**ENGLISH 87N. The Graphic Novel: Word, Image, Sound, Silence**

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Traces the history of graphic narrative from its beginnings to contemporary times. Students will read a number of graphic narratives, carry out research on some aspect of these narratives, and write an essay, which will then be reworked and remediated into an oral presentation with multimedia support. Fulfills the WRITE 2 requirement GER:DB-Hum

4-5 units, Aut (*Lunsford, A*)

**ENGLISH 90. Fiction Writing**

The elements of fiction writing: narration, description, and

dialogue. Students write complete stories and participate in story workshops. May be repeated for credit. Prerequisite: PWR 1 (waived in summer quarter).

5 units, Aut (*Soileau, S*), Win (*Quade, K*), Spr (*Clark, H*), Sum (*Staff*)

**ENGLISH 91. Creative Nonfiction**

(Formerly 94A.) Historical and contemporary as a broad genre including travel and nature writing, memoir, biography, journalism, and the personal essay. Students use creative means to express factual content.

5 units, Aut (*Antopol-Johnson, M*), Win (*Hummel, M*), Spr (*Perham, B*), Sum (*Staff*)

**ENGLISH 92. Reading and Writing Poetry**

Prerequisite: PWR 1. Issues of poetic craft. How elements of form, music, structure, and content work together to create meaning and experience in a poem. May be repeated for credit.

5 units, Aut (*Ekiss, K*), Win (*Perham, B*), Spr (*Edwards, J*)

**ENGLISH 94. Writing Across Genres**

For minors in creative writing. The forms and conventions of the contemporary short story and poem. How form, technique, and content combine to make stories and poems organic. Prerequisite: 90, 91, or 92.

5 units, Win (*Ekiss, K*), Spr (*Ekiss, K*)

**ENGLISH 100A. Literary History I**

First in a three quarter sequence. Team-taught, and ranging in subject matter across almost a millennium from the age of parchment to the age of Facebook, this required sequence of classes is the department's account of the major historical arc traced so far by literature in English. It maps changes and innovations as well as continuities, ideas, and aesthetic forms, providing a grid of knowledge and contexts for other, more specialized classes. GER:DB-Hum

5 units, Aut (*Greene, R*; *Summit, J*)

**ENGLISH 100B. Literary History II**

Second in a three quarter sequence. Team-taught, and ranging in subject matter across almost a millennium from the age of parchment to the age of Facebook, this required sequence of classes is the department's account of the major historical arc traced so far by literature in English. It maps changes and innovations as well as continuities, ideas as well as aesthetic forms, providing a grid of knowledge and contexts for other, more specialized classes. GER:DB-Hum

5 units, Win (*Castle, T*; *Hoxby, B*; *Richardson, J*)

**ENGLISH 100C. Literary History III**

Third in a three quarter sequence. Team-taught, and ranging in subject matter across almost a millennium from the age of parchment to the age of Facebook, this required sequence of classes is the department's account of the major historical arc traced so far by literature in English. It maps changes and innovations as well as continuities, ideas as well as aesthetic forms, providing a grid of knowledge and contexts for other, more specialized classes. GER:DB-Hum

5 units, Spr (*Saldivar, R*; *Jenkins, N*; *Moretti, F*)

**ENGLISH 102. Chaucer**

An introduction to Chaucer's writings, including *The Canterbury Tales*, *The Book of the Duchess*, and *The Parliament of Fowls*. Readings in Middle English. No prior knowledge of Middle English or medieval literature is expected. GER:DB-Hum

5 units, Aut (*Karnes, M*)

**ENGLISH 105. The Renaissance: English Literature from Sidney to Marvell**

A survey of English Renaissance literature from Sidney and Spenser to Milton and Marvell, and including Marlowe's *Doctor Faustus* and Shakespeare's *The Tempest*. The course gives training in the reading of early modern poetry and prose, and considers what kind of cultural, social and political institution literature was in Renaissance England: who wrote it and why and for whom, what the pressures were on it, what expectations it fulfilled (or on occasion defeated), whose interests it served. GER:DB-Hum

5 units, Aut (*Orgel, S*)

**ENGLISH 105H. Medievalism**

This course examines the medievalism of nineteenth-century British writers, their adoption of medieval subjects and themes,



within the context of medieval literature. Leading questions cluster around three topics: Romance, Nation, and Space. Readings may include Marie de France's *Lais*, Sir Gawain and the Green Knight, Malory's *Morte D'Arthur*, Chaucer's *House of Fame*, Spenser's *Faerie Queene*, Scott's *Ivanhoe*, poems by Morris, R. Browning, D. G. Rossetti, and Hopkins, criticism by Arnold and Ruskin, and selections from Tennyson's *Idylls of the Kings*. GER:DB-Hum

5 units, Aut (*Karnes, M; Jarvis, C*)

#### **ENGLISH 115A. Shakespeare and Modern Critical Developments**

Approaches include gender studies and feminism, race studies, Shakespeare's geographies in relation to the field of cultural geography, and the importance of religion in the period. GER:DB-Hum

5 units, Spr (*Parker, P*)

#### **ENGLISH 116A. The Poetry of John Milton**

A study of Milton's poetry from *On the Death of a Fair Infant and The Nativity Ode to Paradise Lost* and *Samson Agonistes*. Recommended: ENGLISH 160. Poetry and Poetics. GER:DB-Hum

5 units, Win (*Evans, M*)

#### **ENGLISH 121. Masterpieces of American Literature**

(Same as AMSTUD 121, ENGLISH 21) (English majors and others taking 5 units, register for 121.) A survey of some of the definitive texts of American writing, such as *Leaves of Grass*, *Benito Cereno*, *Adventures of Huckleberry Finn*, *The Waste Land*, *The Sun Also Rises*, *The Golden Apples*, and *The Crying of Lot 49*. GER:DB-Hum

3-5 units, not given this year

#### **ENGLISH 122A. Austen and Woolf**

Reading of three novels by Jane Austen—arguably the most influential and gifted of British female novelists—and three novels by Virginia Woolf, whose debt to Austen was immense. Topics include the relationship between women writers and the evolution of the English novel; the extraordinary predominance of the marriage plot in Austen's fiction (and the various transformations Woolf works on it); each novelist's relationship to the cultural and social milieu in which she wrote. GER:DB-Hum

5 units, not given this year

#### **ENGLISH 123. American Literature and Culture to 1855**

(Same as AMSTUD 150) A survey of early American writings, including sermons, poetry, captivity and slave narratives, essays, autobiography, and fiction, from the colonial era to the eve of the Civil War. GER:DB-Hum, EC-AmerCul

5 units, Spr (*Richardson, J*)

#### **ENGLISH 123D. American Literature, 1855 to World War I**

(Same as AMSTUD 123D) A survey of American writers from Whitman to T.S. Eliot, including Emily Dickinson, Mark Twain, Stephen Crane, Frank Norris, Kate Chopin, Theodore Dreiser, and Henry James. Topics include the tension between romance and realism, the impact of naturalism and modernism, as well as race, gender, and the literary evolution of the American language. GER:DB-Hum

5 units, not given this year

#### **ENGLISH 123G. Mark Twain: A Fresh Look at an Icon and Iconoclast, 100 Years after His Death**

(Same as AMSTUD 123G) The vitality and versatility of a writer who has been called America's Rabelais, Cervantes, Homer, Tolstoy, and Shakespeare. Journalism, travel books, fiction, drama, and sketches by Mark Twain; how Twain engaged such issues as personal and national identity, satire and social justice, imperialism, race and racism, gender, performance, travel, and technology. What are Twain's legacies in 2010, the centennial of his death, the 175th anniversary of his birth, and the 125th anniversary of his most celebrated novel? Guests include actor Hal Holbrook. GER:DB-Hum, EC-AmerCul

3-5 units, not given this year

#### **ENGLISH 125A. The Gothic Novel**

(Same as COMPLIT 125A) The Gothic novel and its relatives from its invention by Walpole in *The Castle of Otranto* of 1764. Readings include: *Northanger Abbey*, *The Italian*, *The Monk*, *Frankenstein*, *Jane Eyre*, *Great Expectations*, and *Dracula*. What defines the Gothic as it evolves from one specific novel to a mode that makes its way into a range of fictional types? GER:DB-Hum

5 units, not given this year

#### **ENGLISH 132. Technologies of Reading and Writing: The Nineteenth Century versus the Digital Age**

(Same as ENGLISH 32) The nineteenth century was a critical period for technological development that accelerated forms of communication. As the telegraph replaced the letter, daily gossip columns replaced word of mouth, and photographs replaced the painted illustration, theories of writing and reading changed dramatically. Through texts such as Keats's *Letters*, Shelley's *Frankenstein*, Carroll's *Alice in Wonderland*, and Stoker's *Dracula*, this course explores the effects of media on the creation, dissemination, and reception of literature. This course also facilitates comparative work by juxtaposing 19th-century media with contemporary technologies of writing and reading, such as emails, blogs, and wikis, and the impact of these technologies on the creation, dissemination, and reception of literature today.

3-4 units, Sum (*Staff*)

#### **ENGLISH 136E. Romantic Ruins**

The idea of the ruin. Romanticism in theory, literary treatments of ruins, fragments, remnants and remains, and the problem of post-romantic reception and a tradition in ruins. GER:DB-Hum

5 units, Spr (*Rovee, C*)

#### **ENGLISH 139A. Henry James**

Emphasis on the late style and issues related to gender and sexuality. Texts will include: *The Turn of the Screw*, *The Portrait of a Lady*, *The Beast in the Jungle*, *The Ambassadors*, *The Awkward Age*, and *The Golden Bowl*. GER:DB-Hum

5 units, Spr (*Ngai, S*)

#### **ENGLISH 139B. American Women Writers, 1850-1920**

(Same as AMSTUD 139B) The ways in which female writers negotiated a series of literary, social, and intellectual movements, from abolitionism and sentimentalism in the nineteenth century to Progressivism and avant-garde modernism in the twentieth. Authors include Harriet Beecher Stowe, Harriet Jacobs, Rebecca Harding Davis, Emily Dickinson, Kate Chopin, Edith Wharton, Gertrude Stein, Willa Cather, and Charlotte Perkins Gilman. GER:DB-Hum

5 units, Win (*Richardson, J*)

#### **ENGLISH 143. Introduction to African American Literature**

(Same as AFRICAAM 43, AMSTUD 143, ENGLISH 43) (English majors and others taking 5 units, register for 143.) African American literature from its earliest manifestations in the spirituals, trickster tales, and slave narratives to recent developments such as black feminist theory, postmodern fiction, and hip hop lyricism. We will engage some of the defining debates and phenomena within African American cultural history, including the status of realist aesthetics in black writing; the contested role of literature in black political struggle; the question of diaspora; the problem of intra-racial racism; and the emergence of black internationalism. Attuned to the invariably hybrid nature of this tradition, we will also devote attention to the discourse of the Enlightenment, modernist aesthetics, and the role of Marxism in black political and literary history. GER:DB-Hum, EC-AmerCul

3-5 units, Aut (*Raspberry, G*)

#### **ENGLISH 143A. American Indian Mythology, Legend, and Lore**

(Same as NATIVEAM 143A, ENGLISH 43A) (English majors and others taking 5 units, register for 143A.) Readings from American Indian literatures, old and new. Stories, songs, and rituals from the 19th century, including the Navajo Night Chant. Tricksters and trickster stories; war, healing, and hunting songs; Aztec songs from the 16th century. Readings from modern poets and novelists including N. Scott Momaday, Louise Erdrich, and Leslie Marmon Silko, and the classic autobiography, *Black Elk Speaks*. GER:DB-Hum

3-5 units, Aut (*Fields, K*)

#### **ENGLISH 145F. The Human Love of Mystery: A Journey Through Detective Fiction**

(Same as ENGLISH 45F) Reading and discussion of mystery and detective fiction from Sherlock Holmes through the Golden Age of Agatha Christie, to the hard-boiled private eye in Ross Macdonald's *Lew Archer* novels. Topics include the independent female private eye and social changes that allowed her emergence; the definition of mystery and detective fiction to include



Sophocles' Oedipus Rex, Morrison's Song of Solomon, and Freud's theories; the enduring hold this genre has on imaginations; the fundamental concerns with justice and fear; and stimulation of the deep human fascination with the apparently inexplicable and the intellectual satisfaction of arriving at understanding. GER:DB-Hum

3-4 units, Sum (Staff)

#### ENGLISH 145G. American Fiction since 1945

A survey of the American novel and short story since WWII focusing on themes of mass media and mass marketing, technology and information, poverty and prosperity, race and ethnicity. Included are works by Flannery O'Connor, Thomas Pynchon, Philip Roth, Raymond Carver, Maxine Hong Kingston, Sandra Cisneros and others. GER:DB-Hum

5 units, Win (McGurl, M)

#### ENGLISH 146. Development of the Short Story: Continuity and Innovation

Exploration of the short story form's ongoing evolution as diverse writers address love, death, desire. Maupassant, D.H. Lawrence, Woolf, Flannery O'Connor, Hurston, and others. Required for Creative Writing emphasis. All majors welcome. GER:DB-Hum

5 units, Spr (Tallent, E)

#### ENGLISH 146C. Hemingway, Hurston, Faulkner, and Fitzgerald

(Same as AMSTUD 146C) While Hemingway and Fitzgerald were flirting with the expatriate avant-garde in Europe, Hurston and Faulkner were performing anthropological field-work in the local cultures of the American South. Focus on the tremendous diversity of concerns and styles of four writers who marked America's coming-of-age as a literary nation with their multifarious experiments in representing the regional and the global, the racial and the cosmopolitan, the macho and the feminist, the decadent and the impoverished. GER:DB-Hum, EC-AmerCul

5 units, Spr (Jones, G)

#### ENGLISH 150D. Women Poets

The development of women's poetry from the 17th to the 20th century. How these poets challenge and enhance the canon, amending and expanding ideas of tone, voice and craft, while revising societal expectations of the poet's identity. Poets include Katharine Philips, Letitia Barbauld, Elizabeth Barrett Browning, Charlotte Mew, Sylvia Plath, and Adrienne Rich. GER:DB-Hum

5 units, Win (Boland, E)

#### ENGLISH 150P. Going Long on the Short Poem

Why do we instinctively think of poems as short? Homer, Virgil, Chaucer, Milton, Pope, Wordsworth and T. S. Eliot wrote poems that are incredibly long. Taking a long view of short poetic forms in the Western tradition (from Callimachus to Elizabeth Bishop), we will assess the historical and artistic grounds for our inaccurate yet ineradicable sense that poem = short. By investigating the smallest unit that can still be called poem, we will test the concept of poem as such, asking what only a poem can do, what the point of a poem is. Why have great artists long chosen to go long on to invest in short, small forms, when such artists could, just as well, make something impressively big. GER:DB-Hum

5 units, Aut (Putnam, P)

#### ENGLISH 151A. T. S. Eliot and 20th Century Poetry

An intensive introduction to the full range of Eliot's work in poetry, drama, and prose criticism. Through close study of the most influential poetic and critic of his period we will also start to sketch out the formal shifts and thematic preoccupations of English poetry in the twentieth century. Major topics include: tradition and innovation; allusion; free verse and its alternatives; the city; wit and seriousness; time present and time past. GER:DB-Hum

5 units, Aut (Sullivan, H)

#### ENGLISH 151B. John Berryman's Dream Songs and His Archive

When John Berryman published the first volume of this Dream Songs in 1964, readers were baffled and intrigued by this stylistically radical work. Even his friend Robert Lowell was angered by the difficulty of this powerful, eccentric book, which won the Pulitzer Prize that year. Readings include The Dream Songs and works of some of the writers that formed Berryman's archive: Shakespeare, Freud, Hopkins, Yeats, Rilke, Frost, Hemingway, Williams, Lowell, Plath. GER:DB-Hum

5 units, Win (Fields, K)

#### ENGLISH 151C. Wastelands

Beginning with a sustained examination of T.S. Eliot's The Waste Land, this class will explore the trope of ecological and/or spiritual devastation as it enters into other modernist (Hemingway, Cather, Faulkner, O'Neill) and postmodernist (Ballard, Atwood, McCarthy) projects, tracing this theme to its culmination in the contemporary zombie apocalypse. GER:DB-Hum

5 units, Spr (McGurl, M)

#### ENGLISH 152A. Mutually Assured Destruction: American Culture and the Cold War

(Same as AMSTUD 152A) The temperature of the early Cold War years via readings of Soviet and U.S. propaganda; documentary film and film noir; fiction by Bellow, Ellison, O'Connor, and Mailer; social theory by Arendt, the New York Intellectuals, and the Frankfurt School; and political texts such as Kennan's Sources of Soviet Conduct, the Truman Doctrine speech, and the National Security Council Report 68. Major themes include the discourse of totalitarianism, MacCarthyism, strategies of containment, the nuclear threat, the figure of the outsider and the counterculture, and the cultural shift from sociological to psychological idioms. GER:DB-Hum

5 units, not given this year

#### ENGLISH 152D. DuBois and American Culture

(Same as AFRICAAM 152, AMSTUD 152D) His life and career. Focus on first half of his life from his Harvard doctoral dissertation to the end of the Harlem Renaissance in which he played a crucial role. Sources include his books on history and sociology, scholarly essays, novels, and journals that he edited. AAAS WIM course. GER:DB-Hum, EC-AmerCul

5 units, Spr (Elam, M)

#### ENGLISH 152G. Global Harlem Renaissance

(Same as AFRICAAM 152G, AMSTUD 152G) Examination of the explosion of African American artistic expression during 1920s and 30s New York known as the Harlem Renaissance. Amiri Baraka once referred to the Renaissance as a kind of vicious Modernism, as a BangClash that impacted and was impacted by political, cultural and aesthetic changes not only in the U.S. but Europe, the Caribbean and Latin America. Focus on the literature, graphic arts, and the music of the era in this global context. GER:DB-Hum, EC-AmerCul

5 units, not given this year

#### ENGLISH 160. Poetry and Poetics

Introduction to the reading of poetry, with emphasis on how the sense of poems is shaped through diction, imagery, and technical elements of verse. GER:DB-Hum, WIM

5 units, Aut (Rovee, C), Spr (Gigante, D)

#### ENGLISH 161. Narrative and Narrative Theory

An introduction to stories and storytelling--that is, to narrative. What is narrative? When is narrative fictional and when non-fictional? How is it done, word by word, sentence by sentence? Must it be in prose? Can it be in pictures? How has storytelling changed over time? Focus on various forms, genres, structures, and characteristics of narrative. GER:DB-Hum

5 units, Aut (Johnson, A), Win (Bender, J)

#### ENGLISH 162. Critical Methods

Introduction to the different intellectual models which help us explain and interpret literary texts, genres, and movements.

5 units, Aut (Evans, M), Win (Elam, M), Spr (Jockers, M)

#### ENGLISH 163. Shakespeare

Reading and discussion of six plays of Shakespeare GER:DB-Hum

5 units, Aut (Orgel, S)

#### ENGLISH 164. Senior Seminar

Small-class format focused on the close reading of literary texts and analysis of literary criticism. This class answers the questions: How do literary critics do what they do? What styles and gambits make criticism vibrant and powerful? Goal is to examine how one goes about writing a lucid, intelligent, and convincing piece of literary criticism based on original research. WIM

5 units, Aut (Putnam, P), Win (Castle, T), Spr (Jarvis, C)

#### ENGLISH 170H. Textual Selves: Identity in Literature

A series of case studies, ranging from Augustine's Confessions and Dante's Divine Comedy to Graham Greene's Quiet American and

Brecht's Galileo illustrating the way human identity has been represented in literary texts. GER:DB-Hum

5 units, Win (Evans, M)

**ENGLISH 171. History of the English Language**

(Same as LINGUIST 163) This course traces the history of the English language from its roots through its earliest written records into the present. It will trace the fundamental changes that English has undergone in terms of morphology, phonology, syntax, semantics, and vocabulary. It will also explore some of the social, cultural, and historical forces that affect language. The course emphasizes the pre-modern history of English. GER:DB-Hum

5 units, Spr (Karnes, M)

**ENGLISH 172D. Introduction to Comparative Studies in Race and Ethnicity**

(Same as CSRE 196C, PSYCH 155, SOC 146) How different disciplines approach topics and issues central to the study of ethnic and race relations in the U.S. and elsewhere. Lectures by senior faculty affiliated with CSRE. Discussions led by CSRE teaching fellows. GER:DB-SocSci, EC-AmerCul

5 units, not given this year

**ENGLISH 172E. The Literature of the Americas**

(Same as AMSTUD 142, COMPLIT 142) This course offers a wide-ranging overview of the literatures of the Americas in comparative perspective, emphasizing continuities and crises that are common to North American, Central American, and South American literatures as well as the distinctive national and cultural elements of a diverse array of primary works. Topics include the definitions of such concepts as empire and colonialism, the encounters between worldviews of European and indigenous peoples, the emergence of creole and racially mixed populations, slavery, the New World voice, myths of America as paradise or utopia, the coming of modernism, twentieth-century avant-gardes, and distinctive modern episodes; the Harlem Renaissance, the Beats, magic realism, Noigandres; in unaccustomed conversation with each other. GER:DB-Hum, EC-AmerCul

5 units, Win (Greene, R; Saldivar, R)

**ENGLISH 174H. The Triumph of the Normal: The English Novel from Bunyan to Orwell**

Unlike French, Russian, North- and Latin-American novels, with their often oppositional or marginal heroes, the English novel has given a central role to the figure of the normal hero/ine, in the double sense of normative and widespread. We will try to uncover the social logic behind this choice, and follow the parallel evolution of novelistic style towards normal language. GER:DB-Hum

5 units, Spr (Moretti, F)

**ENGLISH 181C. Shakespeare and Dickens**

An exploration in the problems and stakes of reading two central but historically-separated authors through one another. How theatrical are Dickens's novels and how much can we understand the theatrical, in Dickens, as a working-through of Shakespeare? How do the elements of performance manifest themselves in both? What substitutes for the role of narrator in Shakespearean drama? How can we understand these two authors as both paradigms of national writing -- defining normative British culture -- and as fundamentally eccentric? GER:DB-Hum

5 units, Win (Orgel, S; Woloch, A)

**ENGLISH 183C. Feminism and American Literature**

(Same as AMSTUD 183C, JEWISHST 153C) Exploration of the ways in which an eclectic group of American writers from the 19th century to the 20th have endeavored to enlarge the canvas on which women can paint their lives. Readings include stories, novels, journalism, poetry and drama that engage the social cultural, and political forces that can shape the kinds of futures students can imagine for themselves--forces that are further inflected by issues of race, ethnicity and class. GER:DB-Hum, EC-Gender

5 units, Win (Fishkin, S)

**ENGLISH 183E. First Person: Autobiography and Memoir**

Study of classic literary autobiographies and memoirs, including Gertrude Stein's *Autobiography Of Alice B. Toklas*; Ernest Hemingway's *A Moveable Feast*; and J.R. Ackerley's *My Father And Myself*, plus various more recent autobiographical experiments--e.g., graphic memoirs (Art Spiegelman's *Maus* and

Alison Bechdel's *Fun Home*) as well as certain recent autobiographical films such as *Capturing The Friedmans*. GER:DB-Hum

5 units, not given this year

**ENGLISH 184B. Text and Context in Humanities: Oedipus and His Vicissitudes**

(Same as HUMNTIES 100) Tales of Modernity from Sophocles, Freud, Chekhov, Babel, and Woolf. Introduction to cross-disciplinary approach in humanities through foundational texts in the modern tradition. The main focus is on Sigmund Freud's *Totem and Taboo* (1913), alongside his ancillary writings. Contemporary social thought and historical scholarship provide the context (Georg Simmel, Norbert Elias, Karl Schorske, John Murray Cuddihy) while works of imaginative literature (Sophocles, Anton Chekhov, Isaac Babel, and Virginia Woolf) illuminate the significance of the Oedipus myth for understanding the inter-generational conflict in antiquity and modernity. GER:DB-Hum

3 units, not given this year

**ENGLISH 185. Sex, Sacrifice, and Civilization: Baroque Opera and Tragedy**

The revival of ancient tragedy in the Baroque opera house. The central mysteries of tragedy: knowledge of suffering, necessity of sacrifice, pleasure of pathos. How tragic drama and opera used poetry, dance, and music to sway the passions and prompt reflection. Greek myths of Medea, Iphigenia, Alceste, Idomeneo. Plays by Euripides and Racine; operas by Mozart, Gluck, and Charpentier. GER:DB-Hum

4-5 units, not given this year

**ENGLISH 185F. Graphic Non-Fiction**

Survey of the fusion of a new genre (creative non-fiction) and a revitalized medium (graphic storytelling.) By reading journalism, biography, history, literary essay and memoir in graphic formats, we'll examine the results when serious artists and writers, often in collaboration, visually reinvent a genre. Sourced from the real world, the narratives we'll examine will have a power of human experience and historical significance that no fantasy or superhero character could ever hope to convey.

5 units, Aut (Johnson, A)

**ENGLISH 186. Tales of Three Cities: New York, Chicago, Los Angeles**

(Same as AMSTUD 186) How urban form and experience shape literary texts and how literary texts participate in the creation of place, through the literature of three American cities as they ascended to cultural and iconographical prominence: New York in the early to mid 19th century; Chicago in the late 19th and early 20th centuries; and Los Angeles in the mid to late 20th century. GER:DB-Hum

5 units, not given this year

**ENGLISH 190. Intermediate Fiction Writing**

May be taken twice for credit. Lottery. Priority to last quarter/year in school, majors in English with Creative Writing emphasis, and Creative Writing minors. Prerequisite: 90 or 91.

5 units, Aut (Clark, H), Win (Soileau, S), Spr (Clark, H)

**ENGLISH 190F. Fiction into Film**

Workshop. For screenwriting students. Story craft, structure, and dialogue. Assignments include short scene creation, character development, and a long story. How fictional works are adapted to screenplays, and how each form uses elements of conflict, time, summary, and scene. Priority to seniors and Film Studies majors. Prerequisite: 90.

5 units, Win (Tanaka, S)

**ENGLISH 190G. The Graphic Novel**

Interdisciplinary. Evolution, subject matter, form, conventions, possibilities, and future of the graphic novel genre. Guest lectures. Collaborative creation of a graphic novel by a team of writers, illustrators, and designers. Prerequisite: consent of instructor.

5 units, Aut (Tanaka, S; Hutchins, S), Win (Tanaka, S; Hutchins, S)

**ENGLISH 190T. Special Topics in Intermediate Fiction Writing**

Focus on a particular topic or process. Work includes aspects of reading short stories and novels, writing at least 30-50 pages of fiction, and responding to peers' work in workshop. May be repeated for credit. Prerequisite: 91 or 90.

5 units, Aut (Kealey, T), Spr (Antopol-Johnson, M; Horack, B)

### ENGLISH 190V. Reading for Writers

Taught by the Stein Visiting Fiction Writer. Prerequisite: 90.  
5 units, Spr (Verghese, A)

### ENGLISH 191. Intermediate Creative Nonfiction

Continuation of 91. Workshop. The application of advanced storytelling techniques to fact-based personal narratives, emphasizing organic writing, discovering audience, and publication. Guest lecturers, collaborative writing, and publication of the final project in print, audio, or web formats. Prerequisite: 91 or 90.

5 units, Aut (Kline, P), Win (Frisch, S), Spr (Hummel, M)

### ENGLISH 191T. Special Topics in Intermediate Creative Nonfiction

Workshop. Continuation of 91. Focus is on forms of the essay. Works from across time and nationality for their craft and technique; experimentation with writing exercises. Students read and respond to each other's longer nonfiction projects. May be repeated for credit. Prerequisite: 91 or 90.

5 units, Spr (Hutchins, S; Tanaka, S)

### ENGLISH 192. Intermediate Poetry Writing

May be taken twice. Lottery. Priority to last quarter/year in school, majors in English with Creative Writing emphasis, and Creative Writing minors. Prerequisite: 92.

5 units, Aut (Evans, J), Win (Ekiss, K), Spr (Perham, B)

### ENGLISH 192V. The Occasions of Poetry

Taught by the Mohr Visiting Poet. Prerequisite: 92.

5 units, Win (Gluck, L)

### ENGLISH 194. Individual Research

See section above on Undergraduate Programs, Opportunities for Advanced Work, Individual Research.

5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### ENGLISH 195W. Writing Center Peer Tutor Seminar

(Same as PWR 195) For students selected to serve as peer writing tutors in the Stanford Writing Center and/or at other campus sites. Readings on and reflection about writing processes, the dynamics of writing and tutoring situations, tutoring techniques, learning styles, diversity, and ethics. Observation of tutoring sessions, written responses to readings, and other written work.

3 units, Spr (Bleakney, J)

### ENGLISH 196A. Honors Seminar: Critical Approaches to Literature

Overview of literary-critical methodologies, with a practical emphasis shaped by participants' current honors projects. Restricted to students in the English Honors Program. Offered in conjunction with ENGLISH 196B. Honors Writing Workshop.

3 units, Aut (Rovee, C)

### ENGLISH 196B. Honors Essay Workshop

Required of English honors students.

2 units, Aut (Obenzinger, H)

### ENGLISH 197. Seniors Honors Essay

In two quarters.

1-10 units, Aut (Staff), Win (Staff), Spr (Staff)

### ENGLISH 198. Individual Work

Undergraduates who wish to study a subject or area not covered by regular courses may, with consent, enroll for individual work under the supervision of a member of the department. 198 may not be used to fulfill departmental area or elective requirements without consent. Group seminars are not appropriate for 198.

1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### ENGLISH 198L. Individual Work: Levinthal Tutorial

Undergraduate writers work individually with visiting Stegner Fellows in poetry, fiction, and if available, nonfiction. Students design their own curriculum; Stegner Fellows act as writing mentors and advisers. Prerequisites: 90, 91, or 92; submitted manuscript.

5 units, Win (Staff), Spr (Staff)

### ENGLISH 199. Senior Independent Essay

Open, with department approval, to seniors majoring in non-Honors English who wish to work throughout the year on a 10,000 word critical or scholarly essay. Applicants submit a sample of their expository prose, proposed topic, and bibliography to the

Director of Undergraduate Studies before preregistration in May of the junior year. Each student accepted is responsible for finding a department faculty adviser. May be repeated for credit.

1-10 units, Aut (Staff), Win (Staff), Spr (Staff)

### ENGLISH 233. Baroque and Neobaroque

(Same as COMPLIT 233, SPANLIT 293E) The literary, cultural, and political implications of the 17th-century phenomenon formed in response to the conditions of the 16th century including humanism, absolutism, and early capitalism, and dispersed through Europe, the Americas, and Asia. If the Baroque is a universal code of this period, how do its vehicles, such as tragic drama, Ciceronian prose, and metaphysical poetry, converse with one another? The neobaroque as a complex reaction to the remains of the baroque in Latin American cultures, with attention to the mode in recent Brazilian literary theory and Mexican poetry.

5 units, not given this year

### ENGLISH 290. Advanced Fiction Writing

Workshop critique of original short stories or novel. Prerequisites: manuscript, consent of instructor, and 190-level fiction workshop.

5 units, Aut (Horack, B), Win (Tallent, E)

### ENGLISH 291. Advanced Creative Nonfiction

Continuation of 191. Workshop. The application of advanced storytelling techniques to fact-based personal narratives, emphasizing organic writing, discovering audience, and publication. Guest lecturers, collaborative writing, and publication of the final project in print, audio, or web formats. Prerequisite: ENGLISH 191.

5 units, Spr (Hummel, M)

### ENGLISH 292. Advanced Poetry Writing

Focus is on generation and discussion of student poems, and seeking published models for the work.

5 units, Spr (Evans, J)

### ENGLISH 299D. Tooling Up for Digital Humanities

(Same as ENGLISH 399D, HISTORY 299D, HISTORY 399D) What are the digital humanities? The twenty-first century presents new opportunities in the humanities, such as unprecedented access to millions upon millions of digitized sources along with powerful technological tools to study those sources. Yet it also raises new challenges, such as the responsible and effective use of technology, and defining the nature of digital scholarship and communication. This workshop offers an introduction to fundamental concepts, methods, and issues within the growing field of digital humanities, including managing your online identity, digitizing sources, managing databases, text mining, spatial analysis, visualization, and pedagogy.

1 unit, not given this year

## GRADUATE COURSES IN ENGLISH

Primarily for graduate students; undergraduates may enroll with consent of instructor.

### ENGLISH 201. The Bible and Literature

Differences in translations of the Bible into English. Recognizing and interpreting biblical allusion in texts from the medieval to modern periods. Readings from the Bible and from British, Canadian, American, and African American, and African literature in English.

5 units, Win (Parker, P)

### ENGLISH 209. Paleography of Medieval and Early Modern Manuscripts

(Same as RELIGST 204) Introductory course in the history of writing and of the book, from the late antique period until the advent of printing. Opportunity to learn to read and interpret medieval manuscripts through hands-on examination of original materials in Special Collections of Stanford Libraries as well as through digital images. Offers critical training in the reading of manuscripts for students from departments as diverse as Classics, History, Philosophy, Religious Studies, English, and the Division of Languages Cultures and Literatures.

3-5 units, Win (Brown, G)

### ENGLISH 218. Beyond the Blank Slate: Topics in Cognitive Science and Literature

A close look at the current field of cognitive approaches to literary study, using both literary texts and key debates in cognition and

culture. Topics include: the narrative construction of reality; fiction, imagination, and play; art as a human universal; and the symbolic unconscious; the blank slates.

*5 units, Aut (Vermeule, B)*

**ENGLISH 230A. The Novel in Europe: The Age of Compromise, 1800-1848**

(Same as COMPLIT 230A) The novel after the French revolution and the industrial take-off. Novelistic form and historical processes of nation-building and the marriage market, political conservatism and the advent of fashion, aristocracy and bourgeoisie and proletariat... focusing on how stylistic choices and plot structures offer imaginary resolutions to social and ideological conflicts. Authors will include Austen, Scott, Shelley, Stendhal, Puskin, Balzac, Bronte.

*5 units, not given this year*

**ENGLISH 240. Sex and Violence in Jacobean Tragedy**

The reign of James I saw one of the greatest flourishes of tragedy in history, yet it was a tragedy of a distinctive character: violent, macabre, melancholy, obsessed with sex and death. We will study this repertoire in all its aesthetic, performative and social dimensions. Plays by Shakespeare, Webster, Middleton, Beaumont and Fletcher, Ford, and Shirley. Film adaptations and opportunities for performance projects.

*5 units, Spr (Hoxby, B)*

**ENGLISH 257. Journalism and Imaginative Writing in America**

(Same as AMSTUD 257, COMM 278) Walt Whitman spent twenty-five years as a journalist before publishing his first book of poems. Mark Twain was a journalist for twenty years before publishing his first novel. Topics include examination of how writers' backgrounds in journalism shaped the poetry or fiction for which they are best known; study of recent controversies surrounding writers who blurred the line between journalism and fiction. Writers include Whitman, Fanny Fern, Twain, Pauline Hopkins, Theodore Dreiser, Charlotte Perkins Gilman, Ernest Hemingway, Meridel LeSueur.

*5 units, not given this year*

**ENGLISH 261A. Geography, Time, and Trauma in Asian American Literature**

(Same as AMSTUD 261A, ASNAMST 187) The notion that homes can be stable locations for cultural, racial, ethnic, and similarly situated identity categories. The possibility that there really is no place like home for Asian American subjects. How geography, landscape, and time situate traumas within fictional Asian American narratives.

*5 units, not given this year*

**ENGLISH 261E. Mixed Race Literature in the U.S. and South Africa**

(Same as AFRICAAM 261E, AMSTUD 261E) As scholar Werner Sollors recently suggested, novels, poems, stories about interracial contacts and mixed race constitute an orphan literature belonging to no clear ethnic or national tradition. Yet the theme of mixed race is at the center of many national self-definitions, even in our U.S. post-Civil Rights and South Africa's post-Apartheid era. This course examines aesthetic engagements with mixed race politics in these trans- and post-national dialogues, beginning in the 1700s and focusing on the 20th and 21st centuries.

*5 units, not given this year*

**ENGLISH 261F. Gender and Sexuality in Asian American Literature**

(Same as AMSTUD 261F, ASNAMST 188) How writers and representations dialogue, challenge, resist, and complicate such formative constructions of gendered/sexual identities. How queer Asian Americans face multiple negations that include potential expulsion from their own families and from various communities. Authors include Bharati Mukherjee, Russell Leong, Suki Kim, Shawn Wong, Louis Chu, Lawrence Chua, Catherine Liu, Jessica Hagedorn, Timothy Liu, Shani Mootoo, David Mura, among others. Secondary readings will include literary criticism, feminist and queer theory.

*5 units, not given this year*

**ENGLISH 262C. African American Literature and the Retreat of Jim Crow**

(Same as AMSTUD 262C) After the unprecedented carnage of

WWII, the postwar era witnessed the slow decline of the segregated Jim Crow order and the onset of landmark civil rights legislation. What role did African American literature and culture play in this historical process? What does this shift in racial theory and praxis mean for black literary production; a tradition constituted by the experience of slavery and racial oppression? Focus on these questions against the backdrop of contemporaneous developments: the onset of the Cold War, decolonization and the formation of the Third World, and the emergence of the new liberalism.

*5 units, not given this year*

**ENGLISH 262D. African American Poetics**

(Same as AFRICAAM 262D, AMSTUD 262D) Examination of African American poetic expressive forms from the 1700s to the 2000s, considering the central role of the genre—from sonnets to spoken word, from blues poetry to new media performance—in defining an evolving literary tradition and cultural identity.

*5 units, not given this year*

**ENGLISH 262G. Globalization, Literature and the Environment**

How does the study of world literatures help us to understand the globalization process? Globalization is often associated with recent social and economic shifts, but many scholars argue that its structures derive from the history of colonialism. Turning to the natural world seems to provide a model to dismantle colonial and national boundaries and to speak in terms of shared planetary concerns such as global warming. Or does it? To examine these relations between globalization, empire, and ecology, we will turn to postcolonial writers in English from Africa, the Caribbean, South Asia, and the Pacific Islands and examine how they inscribe threats to the world environment. We will draw from diverse genres such as short stories, poetry, film, and the novel. Topics to be considered include indigenous and diasporic relationships to the land, plantation agriculture, gardening, nuclear militarization, oil drilling, and human and environmental sustainability.

*5 units, Spr (Staff)*

**ENGLISH 283A. The Paranoid Imagination**

Focus on paranoia as both an aesthetic concept and as metaphor for a suspicious mode of reading and interpreting literature. In addition to recent debates on paranoid reading (Jameson) versus reparative reading (Sedgwick), surface reading (Best and Marcus) versus symptomatic reading (Althusser), we will examine conspiracy as a formal problem in a number of postwar American novels, poems, and films. Authors include Pynchon, DeLillo, Gibson, Tiptree Jr. (Alice Sheldon), and Spahr.

*5 units, Win (Ngai, S)*

**ENGLISH 301. Medieval Literature: Theory and Practice**

Focus on medieval theories of composition and their practical applications beginning with rhetorical treatises that show how students were taught to read and write literature in the period and then focusing on literary texts that experiment, in form or content, with such prescriptions. Readings include works by Geoffrey of Vinsauf, John of Salisbury, Chaucer, Julian of Norwich, the Pearl-poet, and Langland.

*5 units, Spr (Karnes, M)*

**ENGLISH 303. Experiment and the Novel**

(Same as COMPLIT 353A) A double exploration of experiment in the novel from 1750 into the 19th century. Taking off from Zola's *The Experimental Novel*, consideration of the novel's aspect as scientific instrument. Taking the idea of experimental fiction in the usual sense of departures from standard practice, consideration of works that seem to break away from techniques of realism devised prior to 1750. Possible texts by: Lennox, Sterne, Walpole, Goldsmith, Godwin, Lewis, Shelley, Hogg, Emily Bronte, and Diderot.

*5 units, not given this year*

**ENGLISH 303D. Thinking in Fiction**

(Same as COMPLIT 303D) Narrative and cognition in 18th-century fictional, philosophical, scientific, and cultural texts. Probable readings: Hobbes, Locke, Newton, Swift, Defoe, Hume, Lennox, Sterne, Adam Smith, Wollstonecraft, and Bentham.

*5 units, not given this year*

**ENGLISH 303F. Institutions of Enlightenment: The Invention of the Public Sphere**

(Same as COMPLIT 331C) This course treats the cultural foundations upon which the Enlightenment instituted a public sphere and constituted its relationship to the private (or intimate) sphere. The aim is to explore the invention and naturalization of some of the most fundamental institutions of the Enlightenment -- institutions such as the public, the private, the market, public opinion, literature, and even more basic categories such as the individual, society, culture, knowledge, and politics.

5 units, Aut (Bender, J)

**ENGLISH 305. 1900: Periodization and Literary History**

The decades around 1900 have been claimed as both a beginning and an end in literary history. For Frank Kermode, 1900 has the look of a year that ends a saeculum; for Yeats, it was the year that Victorianism had been defeated. By focusing on literature written between, roughly, 1880 and 1915, we will ask how important the century is to disciplinary practice, what it means to read a text as Victorian or modernist, and how period designations alter a critic's methods and concerns. Authors include Hopkins, James, Hardy.

5 units, Aut (Jarvis, C; Sullivan, H)

**ENGLISH 308B. Gilded Age American Literature**

Introduction to the creative innovations and the political tensions that stemmed from the formation of a multicultural society during the age of industrialization. We will attempt to place literary works in their historical and cultural contexts, while also surveying recent critical and theoretical developments in areas such as Realism, Naturalism, Regionalism, Minority and Race Studies, and so on.

5 units, Win (Jones, G)

**ENGLISH 310. The Transatlantic Renaissance**

(Same as COMPLIT 332) The emergence of a transatlantic culture in the early modern period. How is the Renaissance of Europe and England fashioned in a conversation with the cultural forms and material realities of the colonial Americas? And how do colonial writings expand and complicate the available understanding of the Renaissance? Readings in Columbus, More, Hakluyt, Spenser, Shakespeare, the Inca Garcilaso de la Vega.

5 units, Aut (Greene, R)

**ENGLISH 314. Epic and Empire**

(Same as COMPLIT 320A) Focus is on Virgil's Aeneid and its influence, tracing the European epic tradition (Ariosto, Tasso, Camoes, Spenser, and Milton) to New World discovery and mercantile expansion in the early modern period.

5 units, Spr (Parker, P)

**ENGLISH 334B. Concepts of Modernity 2: The Study of Culture in the Age of Globalization**

(Same as MTL 334B) A survey of 20th-century theory with focus on the concept of culture and methods of studying it from diverse disciplines including sociology, anthropology, history, literary and cultural studies. Discussions will emphasize modernization, postmodernization and globalization processes in their relations to culture broadly understood, cultures in their regional, national and diasporic manifestations, and cultures as internally differentiated (high and low culture, subcultures, media cultures).

5 units, Win (Moya, P)

**ENGLISH 344C. Shakespeare and Jonson from Stage to Book**

A comparative study of Shakespeare and Jonson from script and performance to book, from actors, playhouses and audiences to authors, editors and readers.

5-5 units, Win (Orgel, S)

**ENGLISH 345. Eighteenth-Century Satire**

A study of the masterpieces of satire from eighteenth-century Britain with some attention to classical sources and contemporary analogues. What role does satire play in contemporary American culture: when does speech become too hot to handle? Do we have a requirement that people mean what they say? What is the role of invective in public discourse? Authors include: Horace, Juvenal, Jonathan Swift, Alexander Pope, Samuel Johnson, Frances Burney, Voltaire, George Orwell.

5 units, Win (Vermeule, B)

**ENGLISH 356A. Emily Dickinson, American Artist**

Emily Dickinson (1830-1886) was not a lily-livered homebody, but rather one of the most daring, mischievous, and ambitious

artists that America has yet known. Aims of course are: with detailed attention to her poems and letters, investigation of the core themes and major artistic concerns of Dickinson's life-work, comparing them with those of her contemporaries, many of whom she read; assessment of the key phases of Dickinson's extensive influence on American poets and critics; and discovering why her work is currently at the heart of heated debates about right ways and wrong ways to read a poem.

5 units, Win (Putnam, P)

**ENGLISH 360C. Recuperative Criticism**

Consideration of a range of criticism which seeks to discover, rediscover or make the case for under-recognized, forgotten, out-of-fashion, peripheral, disorderly, too difficult, too popular, too old or too contemporary works of art. Is there a tradition or rules and patterns to such critical work, or should arguing for a new aesthetic object also entail new modes of argument itself? We will try to sketch out a genealogy and taxonomy for critical recuperation: its histories and chronology on the one hand; its forms, varieties and inner logic, on the other.

5 units, Spr (Woloch, A)

**ENGLISH 360D. Freud and Literary Criticism**

Examination of major writings by Freud with major ramifications for literary history and theory--The Interpretation of Dreams, The 'Dora' and other case histories; The Psychopathology of Everyday Life, The 'Uncanny,' and so on-- with an eye toward understanding his intellectual influence and his usefulness to practical criticism

5 units, Spr (Castle, T)

**ENGLISH 363. The Bourgeois**

(Same as COMPLIT 330) Goal is to define the ruling class of modern times. Social history (Weber, Hirschmann, Marx); literary texts (Defoe, Goethe, Gaskell); and Henrik Ibsen who produced an intransigent criticism of the bourgeois ethos.

5 units, not given this year

**ENGLISH 364. Style**

(Same as COMPLIT 364) The return of a term that was central in 20th-century criticism, and has all but disappeared in recent decades. Focus is on looking at concepts of style from various branches of linguistic and literary theory, and examination of some revealing examples in novels and films. Team taught with D.A. Miller from U.C. Berkeley.

5 units, not given this year

**ENGLISH 365C. American Literature and Fascism**

In 1928, Benito Mussolini, the rising fascist leader in Italy, published his Autobiography and arguably for the United States, where many observers regarded him and his political movement as an exciting new development. Why were Americans fascinated by Mussolini and fascism? How did the fascist phenomenon play out in the American context? Why were some prominent American modernist writers especially compelled by the promise of regeneration, spiritual renewal, and total commitment offered by fascism? And why, by contrast, did many American writers envision the prospect of a fascist Europe as a threat to global peace and freedom and as a struggle worth fighting for? This course will examine these and others questions via readings by Mussolini, T.S. Eliot, Ezra Pound, Ernest Hemingway, Hannah Arendt, Richard Wright, Roberto Bolaño, and Phillip Roth. Readings will also include a selection of historiographical and theoretical texts on fascism.

5 units, Aut (Rasberry, G)

**ENGLISH 366C. Literature At Scale**

The question of scale in literary and media-cultural analysis. What does it matter that poems and short stories are relatively small while novels are relatively big? Can we speak of the distribution of modern fiction along a quantitative stylistic continuum from minimalism (understatement) to miniaturism (condensation) to maximalism (elaboration)? Alongside these objective quantities of culture, we will also consider scale as a matter of critical perspective: given that the attention span of criticism is highly variable, what can a self-consciousness of the question of scale bring to our critical practice?

5 units, Win (McGurl, M)

**ENGLISH 372B. Milton and Blake**

Epic questions, epic books. Paradise Lost. The First Book of Urizen. Milton, a Prophecy. Some attention to the visual tradition

surrounding these works, with a focus on the materialization of vision.

5 units, *Spr (Gigante, D; Hoxby, B)*

**ENGLISH 373D. Shakespeare, Islam, and Others**

(Same as COMPLIT 311) Shakespeare and other early modern writers in relation to new work on Islam and the Ottoman Turk in early modern studies. *Othello*, *Twelfth Night*, *Titus Andronicus*, *The Merchant of Venice*, and other Shakespeare plays. Kyd's *Solyman and Perseda*, Daborne's *A Christian Turned Turk*, Massinger's *The Renegado*, Marlowe's *The Jew of Malta*, and literary and historical materials.

5 units, *not given this year*

**ENGLISH 384B. Romanticism and New Criticism**

20th Century New Criticism and its vexed attitude toward Romanticism. Methodologies, ideologies, and legacies of New Criticism. Its cohesiveness as a school of criticism and its relationship to the rise of English studies. Emphasis on New Critical treatments of Keats, Wordsworth, Coleridge, and Shelley.

5 units, *Spr (Rovee, C)*

**ENGLISH 390. Graduate Fiction Workshop**

For Stegner fellows in the writing program. May be repeated for credit. Prerequisite: consent of instructor.

3 units, *Aut (Tallent, E), Win (Wolff, T), Spr (Johnson, A)*

**ENGLISH 392. Graduate Poetry Workshop**

For Stegner fellows in the writing program. May be repeated for credit. Prerequisite: consent of instructor.

3 units, *Aut (Fields, K), Win (Boland, E), Spr (Di Piero, S)*

**ENGLISH 394. Independent Study**

Preparation for first-year Ph.D. qualifying examination.

1-10 units, *Sum (Staff)*

**ENGLISH 395. Ad Hoc Graduate Seminar**

Three or more graduate students who wish in the following quarter to study a subject or an area not covered by regular courses and seminars may plan an informal seminar and approach a member of the department to supervise it.

1-5 units, *Aut (Staff), Win (Staff), Spr (Staff)*

**ENGLISH 396. Introduction to Graduate Study for Ph.D.**

**Students**

Required for first-year graduate students in English. The major historical, professional, and methodological approaches to the study of literature in English.

5 units, *Aut (Saldivar, R)*

**ENGLISH 396L. Pedagogy Seminar I**

(Same as COMPLIT 396L) Required for first-year Ph.D students in English, Modern Thought and Literature, and Comparative Literature. Preparation for surviving as teaching assistants in undergraduate literature courses. Focus is on leading discussions and grading papers.

2 units, *Aut (Woloch, A)*

**ENGLISH 397A. Pedagogy Seminar II**

Apprenticeship for second-year graduate students in English, Modern Thought and Literature, and Comparative Literature who teach in the Program in Writing and Rhetoric. Each student is assigned as an apprentice to an experienced teacher and sits in on classes, conferences, and tutorials, with eventual responsibility for conducting a class, grading papers, and holding conferences. Meetings explore rhetoric, theories and philosophies of composition, and the teaching of writing. Each student designs a syllabus in preparation for teaching PWR 1.

1 unit, *Aut (Diogenes, M; Hunt, J; Bilsky, B)*

**ENGLISH 397W. What is the Future of English Studies?**

Course begins by tracing the rise of English as a university discipline and then considers what the future holds. We will attempt to answer a series of deceptively simple questions: what is reading? what is writing? what should be our objects of study? what methods should we use to study them? and how do we teach these texts most effectively?

3-5 units, *Aut (Lunsford, A)*

**ENGLISH 397X. The Teaching of Literature: How We Teach & Why**

(Same as EDUC 405X) This course is designed for graduate students in English and English Education who are interested in questions surrounding the teaching of literature at both the

secondary and collegiate level. The course weaves together theoretical considerations of the purposes for teaching literature, including assumptions about the kinds of readings and readers literature teachers are trying to create, with investigation of pedagogical practices.

2-4 units, *not given this year*

**ENGLISH 398. Research Course**

A special subject of investigation under supervision of a member of the department. Thesis work is not registered under this number.

1-18 units, *Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**ENGLISH 398L. Literary Lab**

Gathering and analyzing data, constructing hypotheses and designing experiments to test them, writing programs [if needed], preparing visuals and texts for articles or conferences. Requires a year-long participation in the activities of the Lab.

5 units, *Aut (Moretti, F; Jockers, M), Win (Moretti, F; Jockers, M), Spr (Moretti, F; Jockers, M)*

**ENGLISH 398R. Revision and Development of a Paper**

Students revise and develop a paper under the supervision of a faculty member with a view to possible publication.

4-5 units, *Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**ENGLISH 398W. Orals, Publication and Dissertation Workshop**

For third- and fourth-year graduate students in English. Strategies for studying for and passing the oral examination, publishing articles, and for writing and researching dissertations and dissertation proposals. May be repeated for credit.

2 units, *Aut (Woloch, A), Win (Woloch, A), Spr (Woloch, A)*

**ENGLISH 399. Thesis**

For M.A. students only. Regular meetings with thesis advisers required.

1-10 units, *Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**ENGLISH 399D. Tooling Up for Digital Humanities**

(Same as ENGLISH 299D, HISTORY 299D, HISTORY 399D) What are the digital humanities? The twenty-first century presents new opportunities in the humanities, such as unprecedented access to millions upon millions of digitized sources along with powerful technological tools to study those sources. Yet it also raises new challenges, such as the responsible and effective use of technology, and defining the nature of digital scholarship and communication. This workshop offers an introduction to fundamental concepts, methods, and issues within the growing field of digital humanities, including managing your online identity, digitizing sources, managing databases, text mining, spatial analysis, visualization, and pedagogy.

1 unit, *not given this year*

**ENGLISH 802. TGR Dissertation**

0 units, *Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

## ENGLISH FOR FOREIGN STUDENTS (EFLSLANG) COURSES

### UNDERGRADUATE COURSES IN ENGLISH FOR FOREIGN STUDENTS

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**EFLSLANG 197. Directed Study**

1-3 units, *Aut (Hubbard, P), Win (Staff), Spr (Staff), Sum (Staff)*

**EFLSLANG 683P. Workshop in Pronunciation for International Students**

(1-2 units). Provides support in the development of clear, comprehensible English pronunciation. Includes attention to individual sounds as well as stress, rhythm, and intonation. Students taking the course for 2 units will have additional individual assignments and a 30-minute tutorial each week. Limited to visiting undergraduates and students in the High School Summer College program.

1-2 units, *Sum (Staff)*

**EFLSLANG 683R. Workshop in Reading and Vocabulary for**

**International Students**

(1-2 units). Provides support in the development of English reading skills for academic purposes, including work on comprehension, speed, and critical interpretation, along with strategies for improving vocabulary. Students taking the course for 2 units will have additional individual assignments and a 30-minute tutorial each week. Limited to visiting undergraduates and students in the High School Summer College program.

*1-2 units, Sum (Staff)*

**EFSLANG 683S. Workshop in Oral Communication for International Students**

(1-2 units) Provides support in the development of listening and speaking skills in English, including academic listening, small group discussion, oral presentation, and intercultural communication. Students taking the course for 2 units will have additional individual assignments and a 30-minute tutorial each week. Limited to visiting undergraduates and students in the High School Summer College program.

*1-2 units, Sum (Staff)*

**EFSLANG 683W. Workshop in Written Communication for International Students**

(1-2 units). Provides support in the development of English writing skills for non-natives. Writing assignments are negotiated with the instructor and may include practice in composition, SAT or TOEFL writing, and writing university application essays and statements of purpose. Students taking the course for 2 units will have additional individual assignments and a 30-minute tutorial each week. Limited to visiting undergraduates and students in the High School Summer College program.

*1-2 units, Sum (Staff)*

**GRADUATE COURSES IN ENGLISH FOR FOREIGN STUDENTS**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**EFSLANG 397. Directed Study**

*1-3 units, Aut (Hubbard, P), Win (Staff), Spr (Staff), Sum (Staff)*

**EFSLANG 688V. Intensive English and Academic Orientation for Stanford Visiting Scholars**

Goal is to improve English proficiency and introduce the university environment. Writing, pronunciation, listening, discussion, oral presentation, and spoken usage. Enrollment limited to 14.

*5 units, Sum (Staff)*

**EFSLANG 689E. Learning English on Your Own**

Independent English language learning. Learning strategies and objectives, setting and maintaining practice schedules, and evaluating progress. Focus is on exploiting web-based resources. Individual meetings.

*1 unit, Sum (Staff)*

**EFSLANG 689H. American Humor**

Analysis of jokes, humorous stories, and situations through modern media. Practice in advanced listening comprehension and English idioms.

*1 unit, Sum (Staff)*

**EFSLANG 689L. Living in the USA**

Life and relationships outside the University classroom. Goal is to familiarize international students with the cultural expectations and forms of language use in a variety of situations in the University community and in other social situations. Enrollment limited to 14.

*1 unit, Sum (Staff)*

**EFSLANG 689P. Pronunciation**

The sounds of English, and stress, intonation, and rhythm patterns important to natural-sounding speech. Enrollment limited to 14.

*2 units, Sum (Staff)*

**EFSLANG 689T. Interacting in California's Vineyard Culture**

Focuses on communicative skills in the context of California's renowned wine culture. Emphasis on the language of wine using appropriate terminology, and interacting knowledgeably with restaurant and retail wine staff. Topics include learning the fundamentals of vineyard techniques, varietal characteristics, tasting techniques, drinking and ordering etiquette. Course is co-

taught by a wine expert and an ESL instructor. Class consists of a short interactive lecture, a communicative activity such as role playing, and a tasting of four specially selected wines. Participants must be at least 21 years old. Fee.

*1 unit, Sum (Staff)*

**EFSLANG 689V. Vocabulary and Idiom**

Building vocabulary for academic success. Idiomatic language, and what idioms and metaphors reflect about American culture. Enrollment limited to 14.

*1 unit, Sum (Staff)*

**EFSLANG 689W. Working in the USA**

The language and culture of the workplace. Goal is to familiarize international students with the cultural expectations of situations in the business setting and in social situations related to business.

*1 unit, Sum (Staff)*

**EFSLANG 690A. Interacting in English**

Strategies for communicating effectively in social and academic settings. Informal and formal language used in campus settings, including starting and maintaining conversations, asking questions, making complaints, and contributing ideas and opinions. Simulations and discussions, with feedback on pronunciation, grammar, and usage. Enrollment limited to 14.

*1-3 units, Aut (Streichler, S), Win (Lockwood, R), Spr (Lockwood, R)*

**EFSLANG 690B. Academic Discussion**

Skills for effective participation in classroom settings, seminars, and research group meetings. Pronunciation, grammar, and appropriateness for specific tasks. Feedback on language and communication style. Enrollment limited to 14. May be repeated once for credit. Prerequisite: 690A or consent of instructor.

*1-3 units, Aut (Streichler, S), Win (Rylance, C), Spr (Lockwood, R)*

**EFSLANG 690C. Advanced Interacting in English**

Communication skills for extended discourse such as storytelling and presenting supported arguments. Development of interactive listening facility and overall intelligibility and accuracy. Goal is advanced fluency in classroom, professional and social settings. Identification of and attention to individual patterned errors. May be repeated once for credit. Prerequisite: 690B or consent of instructor. Enrollment limited to 14.

*1-3 units, Win (Lockwood, R)*

**EFSLANG 691. Oral Presentation**

For advanced graduate students. Practice in academic presentation skills; strategy, design, organization, and use of visual aids. Focus is on improving fluency and delivery style, with videotaping for feedback on language accuracy and usage. Enrollment limited to 14. May be repeated once for credit.

*1-3 units, Aut (Rylance, C), Win (Hubbard, P), Spr (Oman, A), Sum (Staff)*

**EFSLANG 692. Speaking and Teaching in English**

For non-native speakers who must teach in English. Focus is on developing clarity, intelligibility, and effectiveness through weekly presentations simulating actual teaching assistant responsibilities. Enrollment limited to 14. May be repeated once for credit.

*1-3 units, Aut (Mawson, C), Win (Streichler, S), Spr (Rylance, C)*

**EFSLANG 693A. Listening Comprehension**

Strategies for effective listening in an academic setting, focusing on identifying key ideas in lectures. Practice in understanding words and phrases commonly encountered in classroom settings. Computer-based exercises for comprehension of rapid, natural speech. Enrollment limited to 14.

*1-3 units, Aut (Lockwood, R)*

**EFSLANG 693B. Advanced Listening Comprehension, and Vocabulary Development**

Listening strategies and vocabulary for understanding English in academic and non-academic contexts. Discussion and interpretation of communicative intent. Computer-based and video exercises across a range of genres; individual project. May be repeated once for credit. Prerequisite: 693A or consent of instructor.

*1-3 units, Aut (Hubbard, P), Win (Hubbard, P), Spr (Hubbard, P)*



**EFSLANG 694. Communication Strategies in Professional Life**  
For advanced graduate students. Task-based practice of language appropriate for professional settings in industry and related teamwork. Simulation of the roles of manager, applicant, subordinate, and coworker. Prerequisite: 693A, or consent of instructor. Enrollment limited to 14.

*1-3 units, Aut (Rylance, C), Spr (Rylance, C)*

**EFSLANG 695A. Pronunciation and Intonation**

Recognition and practice of American English sounds, stress, and intonation patterns for greater comprehension and intelligibility. Analysis of problem areas. Biweekly tape assignments and tutorials. May be repeated once for credit. Enrollment limited to 14.

*1-3 units, Aut (Mawson, C), Win (Mawson, C), Spr (Mawson, C), Sum (Staff)*

**EFSLANG 695B. Advanced Pronunciation and Intonation**

Continuation of 695A, focusing on American English sounds, stress, rhythm, and intonation patterns. Emphasis is on self-monitoring, integrated with short presentations. Biweekly tape assignments and tutorials. Enrollment limited to 14. May be repeated for credit three times. Prerequisite: 695A.

*1-3 units, Aut (Oman, A), Win (Oman, A), Spr (Mawson, C)*

**EFSLANG 696. Understanding American Humor**

Recognizing rhetorical devices, jokes, and character types common to spoken humor in film and television programs. Crosscultural discussion. Prerequisites: 690B, 693B or consent of the instructor. Enrollment limited to 14.

*1-3 units, Spr (Streichler, S)*

**EFSLANG 697. Writing Fundamentals**

Focus is on improving grammatical accuracy and vocabulary, building fluency, and learning the structure and conventions of English correspondence, reports, and short academic papers. Enrollment limited to 14.

*1-3 units, Aut (Rylance, C), Win (Lockwood, R), Spr (Lockwood, R)*

**EFSLANG 698A. Writing Academic English**

Strategies and conventions for graduate writing. Emphasis is on fluency, organization, documentation, and appropriateness for writing tasks required in course work. Enrollment limited to 14. May be repeated once for credit.

*1-3 units, Aut (Kevech, A), Win (Lockwood, R), Spr (Rylance, C), Sum (Staff)*

**EFSLANG 698B. Advanced Graduate Writing**

Focus on clarity, accuracy, and appropriate style. For graduate students experienced in English writing and currently required to write for courses and research. Class meetings and individual conferences. Prerequisite: 698A. Enrollment limited to 14. May be repeated once for credit.

*1-3 units, Aut (Streichler, S), Win (Rylance, C), Spr (Streichler, S), Sum (Staff)*

**EFSLANG 698C. Writing and Presenting Research**

For advanced graduate students completing major research projects. Revising and editing strategies for preparing papers, conference abstracts, and poster presentations. Adapting content and style to different audiences. Students present their research with participant feedback. Enrollment limited to 14. May be repeated once for credit. Prerequisite: 698B and 691 or consent of instructor.

*1-3 units, Aut (Hubbard, P)*

## ENVIRONMENT AND RESOURCES (ENVRES) COURSES

### GRADUATE COURSES IN ENVIRONMENT AND RESOURCES

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**ENVRES 200. Sustaining Action: Research, Analysis and Writing for the Public**

(Same as EARTHSYS 200) Preference to graduate students and senior undergraduates in environmental, natural and social

sciences, engineering, journalism. Students help produce and publish SAGE, an eco advice column, by choosing, researching, and answering questions about sustainable living submitted by Stanford alumni and the general public. Prerequisite: admission by application, available from instructor, thayden@stanford.edu, and due 9/21/11 (Aut) or 3/28/12 (Spr). (Meets Earth Systems WIM requirement).

*3 units, Aut (Hayden, T), Spr (Hayden, T)*

**ENVRES 210. Communication and Leadership Skills**

(Same as BIO 388) Focus is on delivering information to policy makers and the lay public. How to speak to the media, Congress, and the general public; how to write op-eds and articles; how to package ideas including titles, abstracts, and CVs; how to survive peer review, the promotion process, and give a job talk; and how to be a responsible science advocate.

*2 units, not given this year*

**ENVRES 215. Digital Storytelling for Researchers**

A starting point in multimedia storytelling for graduate students who are actively involved in research. Students gain project-based experience in still photography, audio podcasting, online slideshows and web video production and editing, enabling them to record and report their own research stories from the lab and field. Enrollment limited, consent of the instructor required.

*1-3 units, Win (Hayden, T)*

**ENVRES 220. Our Coastal Society: An interdisciplinary seminar on ocean/coastal themes**

Utilizing guest speaker presentations from various academic and non-academic organizations, this seminar will explore marine science and policy for the Pacific Coast that informs natural resource as well as conservation decision-making and future challenges. Topics to be covered may include tuna and shark research along the California coast, kelp forest ecosystems, fisheries management, marine spatial planning, legislative advances such as the Marine Life Protection Act (MLPA), climate change threats to our coast, the importance of the US west coast in the context of Pacific Ocean ecosystem health, and others. Students enrolled in the course will be expected to attend all classes, actively participate in discussion following the guest lecture, and submit a short summary of each presentation.

*1 unit, Win (Caldwell, M; Becker, A; Teneva, L)*

**ENVRES 225. E-IPER Current Topics Seminar**

For E-IPER Ph.D and Joint M.S. students only. Weekly presentations of E-IPER students' research and other program-related projects. Occasional guest speakers. Active participation including individual or team presentation and attendance required for credit. May be repeated once for credit.

*1 unit, Aut (Doyle, H), Win (Doyle, H), Spr (Doyle, H)*

**ENVRES 260. Global Water: Challenges and Opportunities**

Explores challenges in the global supply, quality, and accessibility of freshwater. Speakers from Stanford and outside organizations on key topics such as threats due to climate change, agriculture demands, challenges of urbanization, water and sanitation, as well as discussion of policy, market, technology, and other potential solutions. Weekly readings in advance of speaker. Active participation expected of all enrolled students; those enrolled for 2-3 units will have one or more additional written assignments and will facilitate one or more discussions.

*1-3 units, Spr (Staff)*

**ENVRES 270. Graduate Practicum in Environment and Resources**

Opportunity for E-IPER students to pursue areas of specialization in an institutional setting such as a laboratory, clinic, research institute, governmental agency, non-governmental organization, or multilateral organization. Meets US CIS requirements for off-campus employment with endorsement from designated school official.

*1-9 units, Aut (Vitousek, P), Win (Vitousek, P), Spr (Vitousek, P), Sum (Staff)*

**ENVRES 277C. Specialized Writing and Reporting: Environmental Journalism**

(Same as COMM 177C, COMM 277C) (Graduate students register for COMM / ENVRES 277C.) Practical, collaborative, writing-intensive course in science-based environmental journalism. Science and journalism students learn how to identify and write



engaging stories about environmental issues and science, how to assess the quality and relevance of environmental news, how to cover the environment and science beats effectively, and how to build bridges between the worlds of journalism and science. Limited enrollment: preference to journalism students and students in the natural and environmental sciences. Prerequisite: COMM 104, ENVRES 200 or consent of instructor. Admissions by application only, available from [thayden@stanford.edu](mailto:thayden@stanford.edu) and due 3/28/12.

4-5 units, *Spr* (Hayden, T)

#### **ENVRES 290. Capstone Project Seminar in Environment and Resources**

Required for E-IPER Joint M.S. students; optional for E-IPER Ph.D. students. Propose, conduct and publicly present final individual or team projects demonstrating the integration of professional (M.B.A., J.D., or M.D.) and M.S. in Environment and Resources degrees. Presentation and submission of final product required.

1-3 units, *Aut* (Vitousek, P; Standridge, N), *Spr* (Vitousek, P; Standridge, N)

#### **ENVRES 310. Environmental Forum Seminar**

Required core course for first year E-IPER Ph.D. students and all Joint M.S. students, other than Joint M.B.A./M.S. students; optional for joint M.B.A./M.S. students and other graduate students with consent of instructor. Conceptual frameworks, analytical approaches, validity of conclusions from an interdisciplinary perspective. Participants attend various environmentally-focused seminars on campus selected by faculty and students, followed by student-facilitated discussions.

1-2 units, *Aut* (Root, T; Curran, L)

#### **ENVRES 315. Environmental Research Design Seminar**

Required core course for first year E-IPER Ph.D. students; optional for Joint M.S. students; other graduate students with instructor's permission. Series of faculty presentations and student-led discussions on interdisciplinary research design as exemplars of the research design theories discussed in ENVRES 320. Designing Environmental Research. Topics parallel the ENVRES 320 syllabus. Corequisite: ENVRES 320.

1-2 units, *Win* (Staff)

#### **ENVRES 320. Designing Environmental Research**

Required core course restricted to first year E-IPER Ph.D. students. Research design options for causal inference in environmentally related research. Major philosophies of knowledge and how they relate to research objectives and design choices. Identification of critical elements within a broad range of research designs. Evaluation of the types of research questions for which different designs are suited, emphasizing fit between objectives, design, methods, and argument. Development of individual research design proposals, including description and justification understandable to a non-specialist.

3-4 units, *Win* (Davis, J)

#### **ENVRES 330. Research Approaches for Environmental Problem Solving**

Required core course for first year E-IPER Ph.D. students. How to develop and implement interdisciplinary research in environment and resources. Assignments include development of research questions, a preliminary literature review, and a summer funding proposal. Course is structured on peer critique and student presentations of work in progress. Corequisite: ENVRES 398 with a faculty member chosen to explore a possible dissertation topic.

3 units, *Spr* (Vitousek, P; Ardoin, N)

#### **ENVRES 380. Collaborating with the Future: Launching Large Scale Sustainable Transformations**

(Same as ME 380) This project-based d.school class combines Design Thinking Processes, Behavioral Sciences, and elements of Diffusion Theory. Tools and theories introduced in class will be used to structure large-scale transformations that simultaneously create value on environmental, societal, and economic fronts. We encourage students to use this class as a launching pad for real initiatives. Primarily meant for Graduate Students. (Especially qualified/motivated Seniors will be considered). Admission to the class is through an application process which ends on March 3. Please find instructions and applications at <https://dschool.stanford.edu/groups/largetransformations/>.

3-4 units, *Spr* (Banerjee, S; Staff, 1)

#### **ENVRES 398. Directed Individual Study in Environment and Resources**

Under supervision of an E-IPER affiliated faculty member on a subject of mutual interest. Joint M.S. students must submit an Independent Study Agreement for approval.

1-9 units, *Aut* (Staff), *Win* (Staff), *Spr* (Staff), *Sum* (Staff)

#### **ENVRES 399. Directed Research in Environment and Resources**

For advanced graduate students. Under supervision of an E-IPER affiliated faculty member. Joint M.S. students must submit an Independent Study Agreement for approval.

1-9 units, *Aut* (Staff), *Win* (Staff), *Spr* (Staff), *Sum* (Staff)

#### **ENVRES 410. Ph.D. Qualifying Tutorial**

For Ph.D. students only. Under supervision of an E-IPER affiliated faculty member.

1 unit, *Aut* (Staff), *Win* (Staff), *Spr* (Staff), *Sum* (Staff)

#### **ENVRES 538. Environmental Science for Managers and Policy Makers**

(Same as LAW 608, OIT 538.) Fundamental science of ecosystems, climate and energy systems by building decision-support models for managing these systems, development of widely-applicable skills in model representation in a spreadsheet, optimization, and Monte Carlo simulation. This course is open only to students in the E-IPER PhD program or Joint M.S. in Environment and Resources program and is required for Joint M.B.A. with M.S. in Environment and Resources students. ENVRES 538 does not assume knowledge of environment science or proficiency in quantitative analysis beyond admission requirements for the MBA program. GSB students should register under OIT 538. GSB students planning to apply to the E-IPER joint M.S. program should take either OIT 538 or 539 in their first year.

4 units, *Win* (Plambeck, E)

#### **ENVRES 539. Advanced Environmental Science for Managers and Policy Makers**

(Same as LAW 619 and OIT 539.) Fundamental science of ecosystems, climate and energy. Spreadsheet modeling, optimization, and Monte Carlo simulation applied to resource management and environmental policy. Accelerated version of ENVRES 538 for students with background in modeling. Allocates more class time to environmental/energy science and implications for management and policy, and less class time to fundamentals of modeling/optimization/simulation. This course is open only to students in the E-IPER Ph.D. program or Joint M.S. in Environment and Resources program. ENVRES 539 does not assume knowledge of environmental science or proficiency in quantitative analysis beyond admission requirements for the MBA program. GSB students should register under OIT 539. GSB students planning to apply to the E-IPER joint M.S. program should take either OIT 538 or 539 in their first year.

4 units, *Win* (Plambeck, E)

#### **ENVRES 540. Environmental Science for Managers II**

Introduction to renewable sources of electricity and fuel, and is required for Joint M.B.A. with M.S. in Environment and Resources students. GSB students should register under OIT 540. Students are strongly encouraged, but not required, to take OIT/ENVRES 538 or OIT/ENVRES 539 prior to taking this course.

1 unit, *Win* (Plambeck, E)

#### **ENVRES 801. TGR Project**

0 units, *Aut* (Staff), *Win* (Staff), *Spr* (Staff), *Sum* (Staff)

#### **ENVRES 802. TGR Dissertation**

0 units, *Aut* (Staff), *Win* (Staff), *Spr* (Staff), *Sum* (Staff)

# ENVIRONMENTAL EARTH SYSTEM SCIENCE (EESS) COURSES

## UNDERGRADUATE COURSES IN ENVIRONMENTAL EARTH SYSTEM SCIENCE

Primarily for undergraduates; graduate students may enroll with consent of adviser.

### EESS 2. Earth System History

(Same as EARTHSYS 2) The evolution of Earth's systems from formation to the present. Couplings and relationships among biosphere, lithosphere, hydrosphere, and atmosphere. Topics include the evolution of life, origin of the oceans, atmosphere and continents, and changes in climate. Modern climate change and anthropogenic effects. GER: DB-NatSci

3 units, Win (Chamberlain, P)

### EESS 8. The Oceans: An Introduction to the Marine Environment

(Same as EARTHSYS 8) For non-majors and majors in earth science or environmental science. Students will learn about the major ocean ecosystems and how they function both naturally and under the influence of human activities. Emphasis will be placed on the dominant organisms of each ecosystem and how they interact with each other and their physical and chemical environment. The types of ecosystems discussed will include coral reefs, deep-sea hydrothermal vents, coastal upwelling systems, blue-water oceans, estuaries, near-shore dead zones, etc. The course will incorporate a mix of lectures, multi-media presentations, and group activities.

3 units, Spr (Arrigo, K)

### EESS 37N. Energy and the Environment on the Back of an Envelope

(Same as EARTHSYS 37N) Preference to freshmen. How quantitative understanding of the Earth helps inform decisions about energy supply. How can enough energy be provided to support future growth and development throughout the world without damaging the natural environment? Focus is on simple quantitative observations and calculations that facilitate evaluation of potential solutions to this problem; algebra only, no calculus. GER: DB-NatSci

3 units, not given this year

### EESS 38N. The Worst Journey in the World: The Science, Literature, and History of Polar Exploration

(Same as EARTHSYS 38N, GES 38N) Preference to freshmen. The isolation of polar explorers under the harshest conditions on Earth, and the chronicles of their explorations and hardships dating to the 1500s for the Arctic and the 1700s for the Antarctic. Focus is on scientific and geographic achievements. Sources include *The Worst Journey in the World* by Apsley Cherry-Garrard who in 1911 participated in a midwinter Antarctic sledging trip to recover emperor penguin eggs. Class jointly authors essay on themes from such literature. Optional field trip into the high Sierra in December. (Dunbar) GER: DB-NatSci

3 units, NEXTYEAR

### EESS 39N. The Carbon Cycle: Reducing Your Impact

(Same as EARTHSYS 39N) Preference to freshmen. Changes in the long- and short-term carbon cycle and global climate through the burning of fossil fuels since the Industrial Revolution. How people can shrink their carbon footprints. Long-term sources and sinks of carbon and how they are controlled by tectonics and short-term sources and sinks and the interaction between the biosphere and ocean. How people can shrink their carbon footprints. Held at the Stanford Community Farm. GER: DB-NatSci

3 units, not given this year

### EESS 41N. The Global Warming Paradox

(F,Sem) (Same as EARTHSYS 41N) Stanford Introductory Seminar. Preference to freshman. Focus is on the complex climate

challenges posed by the substantial benefits of energy consumption, including the critical tension between the enormous global demand for increased human well-being and the negative climate consequences of large-scale emissions of carbon dioxide. Topics include: Earth's energy balance; detection and attribution of climate change; the climate response to enhanced greenhouse forcing; impacts of climate change on natural and human systems; and proposed methods for curbing further climate change. Sources include peer-reviewed scientific papers, current research results, and portrayal of scientific findings by the mass media and social networks.

3 units, Aut (Diffenbaugh, N)

### EESS 46N. Exploring the Critical Interface between the Land and Monterey Bay: Elkhorn Slough

(Same as EARTHSYS 46N) Preference to freshmen. Field trips to sites in the Elkhorn Slough, a small agriculturally impacted estuary that opens into Monterey Bay, a model ecosystem for understanding the complexity of estuaries, and one of California's last remaining coastal wetlands. Readings include Jane Caffrey's *Changes in a California Estuary: A Profile of Elkhorn Slough*. Basics of biogeochemistry, microbiology, oceanography, ecology, pollution, and environmental management.

3 units, alternate years, not given this year

### EESS 49N. Multi-Disciplinary Perspectives on a Large Urban Estuary: San Francisco Bay

(F,Sem) (Same as EARTHSYS 49N) Stanford Introductory Seminar. This course will be focused around San Francisco Bay, the largest estuary on the Pacific coasts of both North and South America as a model ecosystem for understanding the critical importance and complexity of estuaries. Despite its uniquely urban and industrial character, the Bay is of immense ecological value and encompasses over 90% of California's remaining coastal wetlands. Students will be exposed to the basics of estuarine biogeochemistry, microbiology, ecology, hydrodynamics, pollution, and ecosystem management/restoration issues through lectures, interactive discussions, and field trips. Knowledge of introductory biology and chemistry is recommended.

3 units, Spr (Francis, C)

### EESS 56Q. Changes in the Coastal Ocean: The View From Monterey and San Francisco Bays

(S,Sem) (Same as EARTHSYS 56Q) Stanford Introductory Seminar. Preference to sophomores. Recent changes in the California current, using Monterey Bay as an example. Current literature introduces principles of oceanography. Visits from researchers from MBARI, Hopkins, and UCSC. Optional field trip to MBARI and Monterey Bay. GER: DB-NatSci

3 units, Spr (Dunbar, R)

### EESS 57Q. Climate Change from the Past to the Future

(S,Sem) (Same as EARTHSYS 57Q) Stanford Introductory Seminar. Preference to sophomores. Numeric models to predict how climate responds to increase of greenhouse gases. Paleoclimate during times in Earth's history when greenhouse gas concentrations were elevated with respect to current concentrations. Predicted scenarios of climate models and how these models compare to known hyperthermal events in Earth history. Interactions and feedbacks among biosphere, hydrosphere, atmosphere, and lithosphere. Topics include long- and short-term carbon cycle, coupled biogeochemical cycles affected by and controlling climate change, and how the biosphere responds to climate change. Possible remediation strategies.

3 units, Win (Chamberlain, P)

### EESS 61Q. Food and security

(S,Sem) (Same as EARTHSYS 61Q, INTNLREL 61Q) Stanford Introductory Seminar. The course will provide a broad overview of key policy issues concerning agricultural development and food security, and will assess how global governance is addressing the problem of food security. At the same time the course will provide an overview of the field of international security, and examine how governments and international institutions are beginning to include food in discussions of security.

5 units, Aut (Naylor, R; Stedman, S)

### EESS 101. Environmental and Geological Field Studies in the Rocky Mountains

(Same as EARTHSYS 100, GES 101) Three-week, field-based

program in the Greater Yellowstone/Teton and Wind River Mountains of Wyoming. Field-based exercises covering topics including: basics of structural geology and petrology; glacial geology; western cordillera geology; paleoclimatology; chemical weathering; aqueous geochemistry; and environmental issues such as acid mine drainage and changing land-use patterns.

3 units, Aut (Chamberlain, P)

**EESS 105. Food and Community: New Visions for a Sustainable Future**

(Same as EARTHSYS 105) Service and research focused on providing healthy and environmentally friendly food for the under served in our community. Hands-on collaboration with the Stanford Glean student group, the Stanford Community Garden, and San Francisco nonprofits. Coverage of the broad spectrum from garden development to food dispersal to the needy. Design and implementation of projects that address an aspect of food and social justice, such as urban farming in low-income communities and sustainable food networks for the elderly. Service Learning Course (certified by Haas Center).

3-5 units, Aut (Chamberlain, P), Spr (Chamberlain, P)

**EESS 106. World Food Economy**

(Same as EARTHSYS 106, ECON 106) The interrelationships among food, populations, resources, and economic development. The role of agricultural and rural development in achieving economic and social progress in low-income nations. Emphasis is on public sector decision making as it relates to food policy.

5 units, Win (Naylor, R; Falcon, W)

**EESS 111. Biology and Global Change**

(Same as BIO 117, EARTHSYS 111) The biological causes and consequences of anthropogenic and natural changes in the atmosphere, oceans, and terrestrial and freshwater ecosystems. Topics: glacial cycles and marine circulation, greenhouse gases and climate change, tropical deforestation and species extinctions, and human population growth and resource use. Prerequisite: Biology or Human Biology core or graduate standing. GER: DB-NatSci

4 units, Win (Vitousek, P; Arrigo, K)

**EESS 112. Human Society and Environmental Change**

(Same as EARTHSYS 112, HISTORY 103D) Interdisciplinary approaches to understanding human-environment interactions with a focus on economics, policy, culture, history, and the role of the state. Prerequisite: ECON 1A

4 units, Aut (Naylor, R; Frank, Z; Pizarro Gariazzo, R)

**EESS 117. Earth Sciences of the Hawaiian Islands**

(Same as EARTHSCI 117, EARTHSYS 117) Progression from volcanic processes through rock weathering and soil-ecosystem development to landscape evolution. The course starts with an investigation of volcanic processes, including the volcano structure, origin of magmas, physical-chemical factors of eruptions. Factors controlling rock weathering and soil development, including depth and nutrient levels impacting plant ecosystems, are explored next. Geomorphic processes of landscape evolution including erosion rates, tectonic/volcanic activity, and hillslope stability conclude the course. Methods for monitoring and predicting eruptions, defining spatial changes in landform, landform stability, soil production rates, and measuring biogeochemical processes are covered throughout the course. This course is restricted to students accepted into the Earth Systems of Hawaii Program.

4 units, alternate years, not given this year

**EESS 131. Communicating Environmental Research Using Narratives and Stories**

(Same as EESS 231, EARTHSYS 131, EARTHSYS 231) Creative strategies by which earth scientists can overcome impediments to scientific literacy. Construction of stories and narratives out of research. The role of imagination and cognitive perception in environmental issues. Barriers and problems that arise in risk and science awareness. Connections between environmentalism and environmental science. Environmental issues in fictional narratives. The responsible function for earth scientists in public debates. Reflections on the role of science in current and future issues likely to involve members outside of science. Priority given to students seeking degrees in the School of Earth Sciences.

1 unit, not given this year

**EESS 134. Stable Isotopes in Biogeochemistry**

(Same as EARTHSYS 134, EARTHSYS 234, EESS 234) Light stable isotopes and their application to geological, ecological, and environmental problems. Isotopic systematics of hydrogen, carbon, nitrogen, oxygen, and sulfur; chemical and biogenic fractionation of light isotopes in the atmosphere, hydrosphere, and rocks and minerals. GER: DB-NatSci

3 units, not given this year

**EESS 141. Remote Sensing of the Oceans**

(Same as EARTHSYS 141, EARTHSYS 241, EESS 241) How to observe and interpret physical and biological changes in the oceans using satellite technologies. Topics: principles of satellite remote sensing, classes of satellite remote sensors, converting radiometric data into biological and physical quantities, sensor calibration and validation, interpreting large-scale oceanographic features. GER: DB-NatSci

3-4 units, alternate years, not given this year

**EESS 143. Marine Biogeochemistry**

(Same as EARTHSYS 143, EARTHSYS 243, EESS 243) (Graduate students register for 243.) Processes that control the mean concentration and distribution of biologically utilized elements and compounds in the ocean. Processes at the air-sea interface, production of organic matter in the upper ocean, remineralization of organic matter in the water column, and processing of organic matter in the sediments. Cycles of carbon, oxygen, and nutrients; the role of the ocean carbon cycle in interannual to decadal variability, paleoclimatology, and the anthropogenic carbon budget. GER: DB-NatSci

3-4 units, Win (Arrigo, K)

**EESS 146A. Atmosphere, Ocean, and Climate Dynamics: The Atmospheric Circulation**

(Same as EARTHSYS 146A, EARTHSYS 246A, EESS 246A, GEOPHYS 146A, GEOPHYS 246A) Introduction to the physics governing the circulation of the atmosphere and ocean and their control on climate with emphasis on the atmospheric circulation. Topics include the global energy balance, the greenhouse effect, the vertical and meridional structure of the atmosphere, dry and moist convection, the equations of motion for the atmosphere and ocean, including the effects of rotation, and the poleward transport of heat by the large-scale atmospheric circulation and storm systems. Prerequisites: MATH 51 or CME100 and PHYSICS 41.

3 units, Win (Thomas, L; Diffenbaugh, N; Skinner, C), alternate years, not given next year

**EESS 146B. Atmosphere, Ocean, and Climate Dynamics: the Ocean Circulation**

(Same as EARTHSYS 146B, EARTHSYS 246B, EESS 246B, GEOPHYS 146B, GEOPHYS 246B) Introduction to the physics governing the circulation of the atmosphere and ocean and their control on climate with emphasis on the large-scale ocean circulation. This course will give an overview of the structure and dynamics of the major ocean current systems that contribute to the meridional overturning circulation, the transport of heat, salt, and biogeochemical tracers, and the regulation of climate. Topics include the tropical ocean circulation, the wind-driven gyres and western boundary currents, the thermohaline circulation, the Antarctic Circumpolar Current, water mass formation, atmosphere-ocean coupling, and climate variability. Prerequisites: EESS 146A/246A or CEE 164/262D or consent of instructor.

3 units, Spr (Thomas, L; Diffenbaugh, N), alternate years, not given next year

**EESS 148. Introduction to Physical Oceanography**

(Same as CEE 164, CEE 262D) The dynamic basis of oceanography. Topics: physical environment; conservation equations for salt, heat, and momentum; geostrophic flows; wind-driven flows; the Gulf Stream; equatorial dynamics and ENSO; thermohaline circulation of the deep oceans; and tides. Prerequisite: PHYSICS 41 (formerly 53). GER: DB-NatSci

4 units, Win (Fong, D)

**EESS 153. Soils and Nutrient Cycling in the Amazon Rainforest**

(Same as EARTHSYS 153, EARTHSYS 253, EESS 253) Focus is on Amazon soils as dynamic but also as a non-renewable natural resource, especially in the impoverished soils. Course will cover the importance of the soils in the Amazon region rain forest

ecosystem sustainability and the geographic distribution of the main soils classes in the Amazon region. Additional topics include the chemical and mineralogical characteristics of these soils classes and the factors influencing elemental cycling within the terrestrial Amazon rain forest ecosystem.

3 units, Win (Staff)

#### **EESS 155. Science of Soils**

(Same as EARTHSYS 155) Physical, chemical, and biological processes within soil systems. Emphasis is on factors governing nutrient availability, plant growth and production, land-resource management, and pollution within soils. How to classify soils and assess nutrient cycling and contaminant fate. Recommended: introductory chemistry and biology. GER: DB-NatSci

4 units, Spr (Fendorf, S)

#### **EESS 156. Soil and Water Chemistry**

(Same as EARTHSYS 156, EARTHSYS 256, EESS 256) (Graduate students register for 256.) Practical and quantitative treatment of soil processes affecting chemical reactivity, transformation, retention, and bioavailability. Principles of primary areas of soil chemistry: inorganic and organic soil components, complex equilibria in soil solutions, and adsorption phenomena at the solid-water interface. Processes and remediation of acid, saline, and wetland soils. Recommended: soil science and introductory chemistry and microbiology. GER: DB-NatSci

1-4 units, Win (Fendorf, S)

#### **EESS 160. Statistical Methods for Earth and Environmental Sciences: General Introduction**

(Same as EARTHSYS 160) Extracting information from data using statistical summaries and graphical visualization, statistical measures of association and correlation, distribution models, sampling, error estimation and confidence intervals, linear models and regression analysis, introduction to time-series and spatial data with geostatistics, applications including environmental monitoring, natural hazards, and experimental design. GER:DB-Math

3 units, not given this year

#### **EESS 161. Statistical Methods for the Earth and Environmental Sciences: Geostatistics**

(Same as EARTHSYS 161, ENERGY 161) Statistical analysis and graphical display of data, common distribution models, sampling, and regression. The variogram as a tool for modeling spatial correlation; variogram estimation and modeling; introduction to spatial mapping and prediction with kriging; integration of remote sensing and other ancillary information using co-kriging models; spatial uncertainty; introduction to geostatistical software applied to large environmental, climatological, and reservoir engineering databases; emphasis is on practical use of geostatistical tools. GER: DB-NatSci

3-4 units, not given this year

#### **EESS 162. Remote Sensing of Land**

(Same as EARTHSYS 142, EARTHSYS 242, EESS 262) The use of satellite remote sensing to monitor land use and land cover, with emphasis on terrestrial changes. Topics include pre-processing data, biophysical properties of vegetation observable by satellite, accuracy assessment of maps derived from remote sensing, and methodologies to detect changes such as urbanization, deforestation, vegetation health, and wildfires.

4 units, Win (Lambin, E)

#### **EESS 164. Fundamentals of Geographic Information Science (GIS)**

(Same as EARTHSYS 144) Survey of geographic information including maps, satellite imagery, and census data, approaches to spatial data, and tools for integrating and examining spatially-explicit data. Emphasis is on fundamental concepts of geographic information science and associated technologies. Topics include geographic data structure, cartography, remotely sensed data, statistical analysis of geographic data, spatial analysis, map design, and geographic information system software. Computer lab assignments. GER: DB-NatSci

4 units, Aut (Thomas, N; Carbajales, P)

#### **EESS 173. Aquaculture and the Environment: Science, History, and Policy**

(Same as EARTHSYS 173, EARTHSYS 273, EESS 273) Can aquaculture feed billions of people without degrading aquatic

ecosystems or adversely impacting local communities? Interdisciplinary focus on aquaculture science and management, international seafood markets, historical case studies (salmon farming in Chile, tuna ranching in the Mediterranean, shrimp farming in Vietnam), current federal/state legislation. Field trip to aquaculture farm and guest lectures.

3 units, Spr (Staff), alternate years, not given next year

#### **EESS 180B. Principles and Practices of Sustainable Agriculture**

(Same as EARTHSYS 180B) Field-based training in ecologically sound agricultural practices at the Stanford Community Farm. Weekly lessons, field work, and group projects. Field trips to educational farms in the area. Topics include: soils, composting, irrigation techniques, IPM, basic plant anatomy and physiology, weeds, greenhouse management, and marketing.

3-4 units, Aut (Archie, J), Spr (Archie, J)

#### **EESS 181. Concepts of Urban Agriculture**

(Same as EARTHSYS 181, EARTHSYS 281, EESS 281) For advanced undergraduates and graduate students from all fields. Seminar. Current status of and potential for global urban agriculture. Topics include: environmental and economic dimensions of urban food production and sourcing; city policy and land-use planning; and an ecosystem services approach to urban agriculture. Developed and developing world contexts. Two field trips to nearby cities; guest lectures; case studies; group projects. Attendance at first class is mandatory. Enrollment is limited. Enrollment permissions will be determined after first class meeting.

3 units, Win (Matson, P)

#### **EESS 182. Current Issues in Sustainable Agriculture**

(Same as EARTHSYS 182, EARTHSYS 282, EESS 282) Sustainability and ethics of animal production in the U.S. Demystification of the marketing of agricultural products. The past, present, and future of small family farms. Farm labor issues. Students lead discussions and write response papers.

2 units, not given this year

#### **EESS 183. Food Matters: Agriculture in Film**

(Same as EARTHSYS 183, EARTHSYS 283, EESS 283) Film series presenting historical and contemporary issues dealing with food and agriculture across the globe. Students discuss reactions and thoughts in a round table format. May be repeated for credit.

1 unit, Win (Staff)

#### **EESS 184. Climate and Agriculture**

(Same as EARTHSYS 184, EARTHSYS 284, EESS 284) The effects of climate change on global food and agricultural systems. Climate assessment and socioeconomic modeling approaches to quantify the impacts of climate on agro-ecosystems and society. Enrollment limited to 25; priority to graduate students, seniors, and juniors. Prerequisites: ECON 106/206.

3-4 units, Spr (Lobell, D)

#### **EESS 241. Remote Sensing of the Oceans**

(Same as EARTHSYS 141, EARTHSYS 241, EESS 141) How to observe and interpret physical and biological changes in the oceans using satellite technologies. Topics: principles of satellite remote sensing, classes of satellite remote sensors, converting radiometric data into biological and physical quantities, sensor calibration and validation, interpreting large-scale oceanographic features. GER: DB-NatSci

3-4 units, alternate years, not given this year

## **GRADUATE COURSES IN ENVIRONMENTAL EARTH SYSTEM SCIENCE**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

#### **EESS 158. Geomicrobiology**

(Same as EESS 258, EARTHSYS 158, EARTHSYS 258) How microorganisms shape the geochemistry of the Earth's crust including oceans, lakes, estuaries, subsurface environments, sediments, soils, mineral deposits, and rocks. Topics include mineral formation and dissolution; biogeochemical cycling of elements (carbon, nitrogen, sulfur, and metals); geochemical and mineralogical controls on microbial activity, diversity, and

evolution; life in extreme environments; and the application of new techniques to geomicrobial systems. Recommended: introductory chemistry and microbiology such as CEE 274A.

3 units, Win (Francis, C)

### **EESS 201. Climate Change and the IPCC**

(Same as EARTHSYS 201) The Intergovernmental Panel on Climate Change has begun work on its 5th Assessment Report, due in 2014. The Working Group II (WGII) contribution to the AR5 will have an increased focus on assessing vulnerability, impacts, and adaptation in the context of multiple stresses, assessing a broader range of impacts, including impacts on oceans systems, approaches for effectively managing the risks of climate change in the context of multiple stresses, and providing more information on the costs of climate change for different sectors and regions. Examination of the IPCC assessment process, as well as the current research on the range of issues that will be covered in the WGII report presented by Stanford faculty and Bay Area scientists involved in WGII.

1-2 units, Aut (Matson, P)

### **EESS 208. Topics in Geobiology**

(Same as GES 208) Reading and discussion of classic and recent papers in the field of Geobiology. Co-evolution of Earth and life; critical intervals of environmental and biological change; geomicrobiology; paleobiology; global biogeochemical cycles; scaling of geobiological processes in space and time.

1 unit, Aut (Payne, J; Francis, C)

### **EESS 211. Fundamentals of Modeling**

(Same as EARTHSYS 211) Simulation models are a powerful tool for environmental research, if used properly. The major concepts and techniques for building and evaluating models. Topics include model calibration, model selection, uncertainty and sensitivity analysis, and Monte Carlo and bootstrap methods. Emphasis is on gaining hands-on experience using the R programming language. Prerequisite: asic knowledge of statistics.

3 units, Aut (Lobell, D)

### **EESS 215. Earth System Dynamics**

This is a graduate level course that examines the dynamics of the Earth System from an integrated perspective. Lectures introduce the physical, biogeochemical, ecological, and human dimensions of the Earth System, with emphasis on feedbacks, thresholds and tipping points. Human interactions with climate and land systems are emphasized in order to enable in-depth exploration of Earth System dynamics. Lab projects focus on a region of the globe for which rich coordinated data sources exist and complex Earth System dynamics dominate the environment

4 units, Spr (Difffenbaugh, N; Lambin, E; Field, C)

### **EESS 216. Terrestrial Biogeochemistry**

(Same as BIO 216) Nutrient cycling and the regulation of primary and secondary production in terrestrial, freshwater, and marine ecosystems; land-water and biosphere-atmosphere interactions; global element cycles and their regulation; human effects on biogeochemical cycles. Prerequisite: graduate standing in science or engineering; consent of instructor for undergraduates or coterminial students.

3 units, not given this year

### **EESS 217. Climate of the Cenozoic**

For upper-division undergraduate and graduate students. The paleoclimate of the Cenozoic and how climate changes in the past link to the carbon cycle. Topics include long- and short-term records of climate on continents and oceans, evidence for and causes of hyperthermal events, how the Earth's climate has responded in increased carbon dioxide in the atmosphere. Guest speakers, student presentations.

3 units, not given this year

### **EESS 220. Physical Hydrogeology**

(Same as CEE 260A) (Formerly GES 230.) Theory of underground water occurrence and flow, analysis of field data and aquifer tests, geologic groundwater environments, solution of field problems, and groundwater modeling. Introduction to groundwater contaminant transport and unsaturated flow. Lab. Prerequisite: elementary calculus.

4 units, Aut (Gorelick, S)

### **EESS 221. Contaminant Hydrogeology**

(Same as CEE 260C) (Formerly GES 231.) For earth scientists and

engineers. Environmental and water resource problems involving contaminated groundwater. The processes affecting contaminant migration through porous media including interactions between dissolved substances and solid media. Conceptual and quantitative treatment of advective-dispersive transport with reacting solutes. Predictive models of contaminant behavior controlled by local equilibrium and kinetics. Modern methods of contaminant transport simulation and optimal aquifer remediation. Prerequisite: GES 230 or CEE 260A or equivalent.

4 units, Win (Gorelick, S)

### **EESS 231. Communicating Environmental Research Using Narratives and Stories**

(Same as EESS 131, EARTHSYS 131, EARTHSYS 231) Creative strategies by which earth scientists can overcome impediments to scientific literacy. Construction of stories and narratives out of research. The role of imagination and cognitive perception in environmental issues. Barriers and problems that arise in risk and science awareness. Connections between environmentalism and environmental science. Environmental issues in fictional narratives. The responsible function for earth scientists in public debates. Reflections on the role of science in current and future issues likely to involve members outside of science. Priority given to students seeking degrees in the School of Earth Sciences.

1 unit, not given this year

### **EESS 234. Stable Isotopes in Biogeochemistry**

(Same as EARTHSYS 134, EARTHSYS 234, EESS 134) Light stable isotopes and their application to geological, ecological, and environmental problems. Isotopic systematics of hydrogen, carbon, nitrogen, oxygen, and sulfur; chemical and biogenic fractionation of light isotopes in the atmosphere, hydrosphere, and rocks and minerals.

3 units, not given this year

### **EESS 240. Advanced Oceanography**

For upper-division undergraduates and graduate students in the earth, biologic, and environmental sciences. Topical issues in marine science/oceanography. Topics vary each year following or anticipating research trends in oceanographic research. Focus is on links between the circulation and physics of the ocean with climate in the N. Pacific region, and marine ecologic responses. Participation by marine scientists from research groups and organizations including the Monterey Bay Aquarium Research Institute.

3 units, not given this year

### **EESS 242. Antarctic Marine Geology**

(Same as EARTHSYS 272) For upper-division undergraduates and graduate students. Intermediate and advanced topics in marine geology and geophysics, focusing on examples from the Antarctic continental margin and adjacent Southern Ocean. Topics: glaciers, icebergs, and sea ice as geologic agents (glacial and glacial marine sedimentology, Southern Ocean current systems and deep ocean sedimentation), Antarctic biostratigraphy and chronostratigraphy (continental margin evolution). Students interpret seismic lines and sediment core/well log data. Examples from a recent scientific drilling expedition to Prydz Bay, Antarctica. Up to two students may have an opportunity to study at sea in Antarctica during Winter Quarter.

3 units, NEXTYEAR

### **EESS 243. Marine Biogeochemistry**

(Same as EARTHSYS 143, EARTHSYS 243, EESS 143) (Graduate students register for 243.) Processes that control the mean concentration and distribution of biologically utilized elements and compounds in the ocean. Processes at the air-sea interface, production of organic matter in the upper ocean, remineralization of organic matter in the water column, and processing of organic matter in the sediments. Cycles of carbon, oxygen, and nutrients; the role of the ocean carbon cycle in interannual to decadal variability, paleoclimatology, and the anthropogenic carbon budget.

3-4 units, Win (Arrigo, K)

### **EESS 244. Marine Ecosystem Modeling**

Practical background necessary to construct and implement a 2-dimensional (space and time) numerical model of a simple marine ecosystem. Computer programming, model design and parameterization, and model evaluation. Students develop and

refine their own multi-component marine ecosystem model.

*3 units, alternate years, not given this year*

### **EESS 245. Advanced Biological Oceanography**

For upper-division undergraduates and graduate students. Themes vary annually but include topics such as marine bio-optics, marine ecological modeling, and phytoplankton primary production. Hands-on laboratory and computer activities, and field trips into local waters. May be repeated for credit.

*3-4 units, Aut (Arrigo, K)*

### **EESS 246A. Atmosphere, Ocean, and Climate Dynamics: The Atmospheric Circulation**

(Same as EARTHSYS 146A, EARTHSYS 246A, EESS 146A, GEOPHYS 146A, GEOPHYS 246A) Introduction to the physics governing the circulation of the atmosphere and ocean and their control on climate with emphasis on the atmospheric circulation. Topics include the global energy balance, the greenhouse effect, the vertical and meridional structure of the atmosphere, dry and moist convection, the equations of motion for the atmosphere and ocean, including the effects of rotation, and the poleward transport of heat by the large-scale atmospheric circulation and storm systems. Prerequisites: MATH 51 or CME100 and PHYSICS 41.

*3 units, Win (Thomas, L; Diffenbaugh, N; Skinner, C), alternate years, not given next year*

### **EESS 246B. Atmosphere, Ocean, and Climate Dynamics: the Ocean Circulation**

(Same as EARTHSYS 146B, EARTHSYS 246B, EESS 146B, GEOPHYS 146B, GEOPHYS 246B) Introduction to the physics governing the circulation of the atmosphere and ocean and their control on climate with emphasis on the large-scale ocean circulation. This course will give an overview of the structure and dynamics of the major ocean current systems that contribute to the meridional overturning circulation, the transport of heat, salt, and biogeochemical tracers, and the regulation of climate. Topics include the tropical ocean circulation, the wind-driven gyres and western boundary currents, the thermohaline circulation, the Antarctic Circumpolar Current, water mass formation, atmosphere-ocean coupling, and climate variability. Prerequisites: EESS 146A/246A or CEE 164/262D or consent of instructor.

*3 units, Spr (Thomas, L; Diffenbaugh, N), alternate years, not given next year*

### **EESS 250. Elkhorn Slough Microbiology**

(Formerly GES 270.) The microbial ecology and biogeochemistry of Elkhorn Slough, an agriculturally-impacted coastal estuary draining into Monterey Bay. The diversity of microbial lifestyles associated with estuarine physical/chemical gradients, and the influence of microbial activity on the geochemistry of the Slough, including the cycling of carbon, nitrogen, sulfur, and metals. Labs and field work. Location: Hopkins Marine Station.

*3 units, Sum (Staff)*

### **EESS 253. Soils and Nutrient Cycling in the Amazon Rainforest**

(Same as EARTHSYS 153, EARTHSYS 253, EESS 153) Focus is on Amazon soils as dynamic but also as a non-renewable natural resource, especially in the impoverished soils. Course will cover the importance of the soils in the Amazon region rain forest ecosystem sustainability and the geographic distribution of the main soils classes in the Amazon region. Additional topics include the chemical and mineralogical characteristics of these soils classes and the factors influencing elemental cycling within the terrestrial Amazon rain forest ecosystem.

*3 units, Win (Staff)*

### **EESS 253S. Hopkins Microbiology Course**

(Same as BIO 274S, BIOHOPK 274, CEE 274S) (Formerly GES 274S.) Four-week, intensive. The interplay between molecular, physiological, ecological, evolutionary, and geochemical processes that constitute, cause, and maintain microbial diversity. How to isolate key microorganisms driving marine biological and geochemical diversity, interpret culture-independent molecular characterization of microbial species, and predict causes and consequences. Laboratory component: what constitutes physiological and metabolic microbial diversity; how evolutionary and ecological processes diversify individual cells into physiologically heterogeneous populations; and the principles of interactions between individuals, their population, and other

biological entities in a dynamically changing microbial ecosystem. Prerequisites: CEE 274A,B, or equivalents.

*9-12 units, Sum (Staff)*

### **EESS 256. Soil and Water Chemistry**

(Same as EARTHSYS 156, EARTHSYS 256, EESS 156) (Graduate students register for 256.) Practical and quantitative treatment of soil processes affecting chemical reactivity, transformation, retention, and bioavailability. Principles of primary areas of soil chemistry: inorganic and organic soil components, complex equilibria in soil solutions, and adsorption phenomena at the solid-water interface. Processes and remediation of acid, saline, and wetland soils. Recommended: soil science and introductory chemistry and microbiology.

*1-4 units, Win (Fendorf, S)*

### **EESS 258. Geomicrobiology**

(Same as EESS 158, EARTHSYS 158, EARTHSYS 258) How microorganisms shape the geochemistry of the Earth's crust including oceans, lakes, estuaries, subsurface environments, sediments, soils, mineral deposits, and rocks. Topics include mineral formation and dissolution; biogeochemical cycling of elements (carbon, nitrogen, sulfur, and metals); geochemical and mineralogical controls on microbial activity, diversity, and evolution; life in extreme environments; and the application of new techniques to geomicrobial systems. Recommended: introductory chemistry and microbiology such as CEE 274A.

*3 units, Win (Francis, C)*

### **EESS 259. Environmental Microbial Genomics**

The application of molecular and environmental genomic approaches to the study of biogeochemically-important microorganisms in the environment without the need for cultivation. Emphasis is on genomic analysis of microorganisms by direct extraction and cloning of DNA from natural microbial assemblages. Topics include microbial energy generation and nutrient cycling, genome structure, gene function, physiology, phylogenetic and functional diversity, evolution, and population dynamics of uncultured communities.

*1-3 units, alternate years, not given this year*

### **EESS 260. Advanced statistical methods for earth system analysis**

Introduction for graduate students to important issues in data analysis relevant to earth system studies. Emphasis on concepts and implementation (in R), rather than formal proofs. Likely topics include the bootstrap, non-parametric methods, regression in the presence of spatial and temporal correlation, measurement errors, extreme value distributions, and high-dimensional regressions. Topics subject to change each year. Prerequisites: Stats 110 or equivalent, EESS 211

*3 units, Win (Rajaratnam, B; Lobell, D)*

### **EESS 262. Remote Sensing of Land**

(Same as EARTHSYS 142, EARTHSYS 242, EESS 162) The use of satellite remote sensing to monitor land use and land cover, with emphasis on terrestrial changes. Topics include pre-processing data, biophysical properties of vegetation observable by satellite, accuracy assessment of maps derived from remote sensing, and methodologies to detect changes such as urbanization, deforestation, vegetation health, and wildfires.

*4 units, Win (Lambin, E)*

### **EESS 263. Topics in Advanced Geostatistics**

(Same as ENERGY 242) Conditional expectation theory and projections in Hilbert spaces; parametric versus non-parametric geostatistics; Boolean, Gaussian, fractal, indicator, and annealing approaches to stochastic imaging; multiple point statistics inference and reproduction; neural net geostatistics; Bayesian methods for data integration; techniques for upscaling hydrodynamic properties. May be repeated for credit. Prerequisites: 240, advanced calculus, C++/Fortran.

*3-4 units, not given this year*

### **EESS 273. Aquaculture and the Environment: Science, History, and Policy**

(Same as EARTHSYS 173, EARTHSYS 273, EESS 173) Can aquaculture feed billions of people without degrading aquatic ecosystems or adversely impacting local communities? Interdisciplinary focus on aquaculture science and management, international seafood markets, historical case studies (salmon

farming in Chile, tuna ranching in the Mediterranean, shrimp farming in Vietnam), current federal/state legislation. Field trip to aquaculture farm and guest lectures.

3 units, Spr (Staff), alternate years, not given next year

#### **EESS 281. Concepts of Urban Agriculture**

(Same as EARTHSYS 181, EARTHSYS 281, EESS 181) For advanced undergraduates and graduate students from all fields. Seminar. Current status of and potential for global urban agriculture. Topics include: environmental and economic dimensions of urban food production and sourcing; city policy and land-use planning; and an ecosystem services approach to urban agriculture. Developed and developing world contexts. Two field trips to nearby cities; guest lectures; case studies; group projects. Attendance at first class is mandatory. Enrollment is limited. Enrollment permissions will be determined after first class meeting.

3 units, Win (Matson, P)

#### **EESS 282. Current Issues in Sustainable Agriculture**

(Same as EARTHSYS 182, EARTHSYS 282, EESS 182) Sustainability and ethics of animal production in the U.S. Demystification of the marketing of agricultural products. The past, present, and future of small family farms. Farm labor issues. Students lead discussions and write response papers.

2 units, not given this year

#### **EESS 283. Food Matters: Agriculture in Film**

(Same as EARTHSYS 183, EARTHSYS 283, EESS 183) Film series presenting historical and contemporary issues dealing with food and agriculture across the globe. Students discuss reactions and thoughts in a round table format. May be repeated for credit.

1 unit, Win (Staff)

#### **EESS 284. Climate and Agriculture**

(Same as EARTHSYS 184, EARTHSYS 284, EESS 184) The effects of climate change on global food and agricultural systems. Climate assessment and socioeconomic modeling approaches to quantify the impacts of climate on agro-ecosystems and society. Enrollment limited to 25; priority to graduate students, seniors, and juniors. Prerequisites: ECON 106/206.

3-4 units, Spr (Lobell, D)

#### **EESS 301. Topics in Environmental Earth System Science**

Current topics, issues, and research related to interactions that link the oceans, atmosphere, land surfaces and freshwater systems. May be repeated for credit.

1 unit, Aut (Francis, C), Win (Chamberlain, P), Spr (Dunbar, R)

#### **EESS 318. Global Land Use Change to 2050**

An exploration of the fundamental drivers behind long term shifts in the demand for, and supply of, land for agriculture, forestry and environmental uses over the next four decades. Topics include trends in food and bioenergy demand, crop productivity on existing and potential croplands, water and climate constraints, non-extractive uses such as carbon sequestration, and the role of global trade and public policies. Students will lead discussions of weekly readings and perform simple numerical experiments to explore the role of individual drivers of long run global land use.

2 units, Win (Lobell, D)

#### **EESS 322A. Seminar in Hydrogeology**

Current topics. May be repeated for credit. Autumn Quarter has open enrollment, For Winter Quarter, consent of instructor is required.

1 unit, not given this year

#### **EESS 322B. Seminar in Hydrogeology**

Current topics. May be repeated for credit. Prerequisite: consent of instructor.

1 unit, Win (Gorelick, S)

#### **EESS 323. Stanford at Sea**

(Same as BIOHOPK 182H, BIOHOPK 323H, EARTHSYS 323) (Graduate students register for 323H.) Five weeks of marine science including oceanography, marine physiology, policy, maritime studies, conservation, and nautical science at Hopkins Marine Station, followed by five weeks at sea aboard a sailing research vessel in the Pacific Ocean. Shore component comprised of three multidisciplinary courses meeting daily and continuing aboard ship. Students develop an independent research project plan while ashore, and carry out the research at sea. In collaboration

with the Sea Education Association of Woods Hole, MA. Only 6 units may count towards the Biology major.

16 units, alternate years, not given this year

#### **EESS 330. Advanced Topics in Hydrogeology**

Topics: questioning classic explanations of physical processes; coupled physical, chemical, and biological processes affecting heat and solute transport. May be repeated for credit.

1-2 units, Win (Staff)

#### **EESS 342. Geostatistics**

Classic results and current research. Topics based on interest and timeliness. May be repeated for credit.

1-2 units, not given this year

#### **EESS 342B. Geostatistics**

Classic results and current research. Topics based on interest and timeliness. May be repeated for credit.

1-2 units, not given this year

#### **EESS 342C. Geostatistics**

Classic results and current research. Topics based on interest and timeliness. May be repeated for credit.

1-2 units, not given this year

#### **EESS 363F. Oceanic Fluid Dynamics**

(Same as CEE 363F) Dynamics of rotating stratified fluids with application to oceanic flows. Topics include: inertia-gravity waves; geostrophic and cyclogeostrophic balance; vorticity and potential vorticity dynamics; quasi-geostrophic motions; planetary and topographic Rossby waves; inertial, symmetric, barotropic and baroclinic instability; Ekman layers; and the frictional spin-down of geostrophic flows. Prerequisite: CEE 262A or a graduate class in fluid mechanics.

3 units, Spr (Thomas, L)

#### **EESS 385. Practical Experience in the Geosciences**

On-the-job training, that may include summer internship, in applied aspects of the geosciences, and technical, organizational, and communication dimensions. Meets USCIS requirements for F-1 curricular practical training. May be repeated for credit.

1 unit, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

#### **EESS 398. Current Topics in Ecosystem Modeling**

1-2 units, not given this year

#### **EESS 400. Graduate Research**

May be repeated for credit. Prerequisite: consent of instructor.

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

#### **EESS 801. TGR Project**

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

#### **EESS 802. TGR Dissertation**

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

## ETHICS IN SOCIETY (ETHICSOC) COURSES

### UNDERGRADUATE COURSES IN ETHICS IN SOCIETY

Primarily for undergraduates; graduate students may enroll with consent of adviser.

#### **ETHICSOC 8SI. What Are They Thinking?**

How ethical is networking? Is there a difference between being a good Facebook friend and being a good friend? What should dating look like at Stanford? Is there really a hook-up culture on campus? How should parents fit in my life? Is it important to go into the lockstep march to adulthood immediately after college? Are you David Brooks' quintessential Organization Kid? Personal growth questions through discussion and dialogue. Student-initiated course. (AU)

1 unit, Aut (Sockness, B), Win (Sockness, B), Spr (Sockness, B)

#### **ETHICSOC 9SI. Civil Liberties and Critical Issues in American Society**

This class is a lecture series featuring guest speakers from various academic departments, the Stanford Law School, and public interest organizations from around the Bay Area. Issues that will



be addressed include prison reform, capital punishment, education reform, and other issues. Some of the speakers will include Professors Larry Marshall and Richard Ford of the Stanford Law School, as well as Richard Lee (Prop 19 advocate).

*1 unit, not given this year*

### **ETHICSOC 10. Ethics in Theory and Practice**

(Same as PHIL 22) Weekly talks by Stanford faculty on important questions of ethics that arise in private and public life. These questions arise in all disciplines and are central to many of the main problems confronting humanity today. Such questions include: what is our obligation to future generations? are there any human rights? what is the appropriate role of religion in politics? is capital punishment ever justified? what are the ethical obligations of a researcher? should the university teach moral values? what principles of justice should govern the distribution of K-12 education? Class meets Fridays from noon to 1:05. Format is an informal talk of about 35- 40 minutes, followed by discussion.

*1 unit, Aut (Sockness, B), Win (Sockness, B), Spr (Sockness, B)*

### **ETHICSOC 10SC. The Meaning of Life: Moral and Spiritual Inquiry through Literature**

Short novels and plays will provide the basis for reflection on ethical values and the purpose of life. Some of the works to be studied are F. Scott Fitzgerald's *The Great Gatsby*, George Bernard Shaw's *Major Barbara*, Hermann Hesse's *Siddhartha*, Jane Smiley's *Good Will*, Robert Bolt's *A Man for All Seasons*, and John Steinbeck's *Of Mice and Men*. We will read for plot, setting, character, and theme using a two-text method- looking at the narrative of the literary work and students' own lives-rather than either deconstructing the literature or relating it to the author's biography and psychology. The questions we will ask have many answers. Why are we here? How do we find meaningful work? What can death teach us about life? What is the meaning of success? What is the nature of true love? How can one find balance between work and personal life? How free are we to seek our own destiny? What obligations do we have to others? We will draw from literature set in the United States and elsewhere.

*2 units, not given this year*

### **ETHICSOC 20. Introduction to Moral Philosophy**

(Same as PHIL 2) What is the basis of moral judgment? What makes right actions right and wrong actions wrong? What makes a state of affairs good or worth promoting? What is it to have a good or virtuous character? Answers to classic questions in ethics through the works of traditional and contemporary authors. Fulfills the Philosophy ethical reasoning requirement. GER:DB-Hum, EC-EthicReas

*5 units, Win (Dannenberg, J)*

### **ETHICSOC 133. Ethics and Politics of Public Service**

(Same as CSRE 178, HUMBIO 178, PHIL 175A, PHIL 275A, POLISCI 133) Ethical and political questions in public service work, including volunteering, service learning, humanitarian assistance, and public service professions such as medicine and teaching. Motives and outcomes in service work. Connections between service work and justice. Is mandatory service an oxymoron? History of public service in the U.S. Issues in crosscultural service work. Integration with the Haas Center for Public Service to connect service activities and public service aspirations with academic experiences at Stanford. GER:DB-SocSci

*5 units, Win (Mitchell, T)*

### **ETHICSOC 136R. Introduction to Global Justice**

(Same as INTNLREL 136R, PHIL 76, POLISCI 136R, POLISCI 336) Recent work in political theory on global justice. Topics include global poverty, human rights, fair trade, immigration, climate change. Do developed countries have a duty to aid developing countries? Do rich countries have the right to close their borders to economic immigrants? When is humanitarian intervention justified? Readings include Charles Beitz, Thomas Pogge, John Rawls.

*5 units, Spr (Satz, D)*

### **ETHICSOC 157. Moral Foundations of Capitalism**

(Same as ETHICSOC 257) Preference to sophomores and juniors. An interdisciplinary examination of alternative and largely incompatible twentieth-century defenses of the morality of capitalism, with a concentration on economic, Objectivist, and

Christian arguments, considered historically, economically, politically, and philosophically. Readings from Adam Smith, Karl Marx, authors for and against slavery, John Maynard Keynes, Theodore Roosevelt, Herbert Hoover, Austrian School economists, Milton Friedman, Dinesh D'Souza, and George Gilder. A reading of Ayn Rand's *Atlas Shrugged*. A concluding application of studied theories to a few recent public policy issues. GER:DB-Hum

*5 units, Win (McCaskey, J)*

### **ETHICSOC 170. Ethical Theory**

(Same as PHIL 170, PHIL 270) Major strands in contemporary ethical theory. Readings include Bentham, Mill, Kant, and contemporary authors. GER:DB-Hum, EC-EthicReas

*4 units, Spr (Dannenberg, J)*

### **ETHICSOC 171. Justice**

(Same as IPS 208, PHIL 171, PHIL 271, POLISCI 3P, POLISCI 136S) Focus is on the ideal of a just society, and the place of liberty and equality in it, in light of contemporary theories of justice and political controversies. Topics include protecting religious liberty, financing schools and elections, regulating markets, assuring access to health care, and providing affirmative action and group rights. Issues of global justice including human rights and global inequality. GER:DB-Hum, EC-EthicReas

*4-5 units, Aut (Dougherty, T)*

### **ETHICSOC 174A. Moral Limits of the Market**

(Same as PHIL 174A, PHIL 274A) Morally controversial uses of markets and market reasoning in areas such as organ sales, procreation, education, and child labor. Would a market for organ donation make saving lives more efficient; if it did, would it thereby be justified? Should a nation be permitted to buy the right to pollute? Readings include Walzer, Arrow, Rawls, Sen, Frey, Titmuss, and empirical cases. GER:DB-Hum

*4 units, not given this year*

### **ETHICSOC 174L. Betrayal and Loyalty, Treason and Trust**

(Same as ETHICSOC 274L, PHIL 174L, PHIL 274L) The main topic of the seminar is Betrayal : its meaning as well as its moral, legal and political implications. We shall discuss various notions of betrayal: Political (military) betrayal such as treason, Religious betrayal with Judas as its emblem, but also apostasy (converting one's religion) which is regarded both as a basic human right and also as an act of betrayal, social betrayal - betraying class solidarity as well as Ideological betrayal - betraying a cause. On top of political betrayal we shall deal with personal betrayal, especially in the form of infidelity and in the form of financial betrayal of the kind performed by Madoff. The contrasting notions to betrayal, especially loyalty and trust, will get special consideration so as to shed light or cast shadow, as the case may be, on the idea of betrayal. The seminar will focus not only on the normative aspect of betrayal - moral or legal, but also on the psychological motivations for betraying others. The seminar will revolve

*2 units, Win (Staff)*

### **ETHICSOC 175M. The Ethics of War**

(Same as PHIL 90B) Issues both in contemporary just war theory and political philosophy. Relevant questions include: Can conscription ever be justified? If not, is there anything wrong with targeting poor people as part of efforts to recruit a 'volunteer' military? If, during war itself, combatants act in ways prohibited by the moral requirements governing war's conduct, then does it make any moral difference whether they were acting as ordered? And how do we identify these moral requirements in the first place? For example, what distinguishes a legitimate target from an illegitimate one? What determines whether military action is disproportionate? What, if anything, is morally distinctive about terrorism? Explores the complexities behind these questions and others, with a view to evaluating the potential answers to them.

*4 units, not given this year*

### **ETHICSOC 176M. Equality and its Critics**

Ours is a deeply unequal society. What, if anything, is wrong with that? Focus is on contemporary theories of distributive justice, and in particular, egalitarian distributive theories. Questions include: What is the point of equality? How should we weigh the pursuit of equality against other values, like freedom, personal attachments, or utility? In what respect should people be equal? Do egalitarian



norms span the globe, or stop at water's edge? Readings include Rawls, Scanlon, G.A. Cohen, Nagel, and Elizabeth Anderson.

*4 units, not given this year*

**ETHICSOC 177M. Human Rights and Moral Question**

(Same as ETHICSOC 277M, PHIL 177M, PHIL 277M) The proliferation of human rights in the discourse of international justice has raised a number of important questions in both moral and legal theory. What are human rights? How should they be conceptualized? Who ought to bear the duties associated with them? Can their protection justify military interventions into sovereign states? This course will cover topics in moral and legal theory surrounding human rights. The course has three main focuses. The first concerns the question of what these rights are. The second focus is on the various substantive moral justifications for the protection of human rights. The third is on the moral issues raised by the dominance of human rights in international law and relations: can any rights be universal? How are these rights to be framed in the light of cross-cultural values and claims about cultural dominance? A theme throughout will be the connections between these questions. The way we answer the question of what human rights are, and how they c GER:EC-EthicReas

*4-5 units, Spr (Thomas, J)*

**ETHICSOC 178M. Justice and the Environment**

(Same as ETHICSOC 278M, PHIL 178M, PHIL 278M, POLISCI 134L) Explores the normative questions that arise in environmental policy debates, including arguments over pollution permit markets, conservation regulations, and global warming mitigation efforts. What are the morally relevant ways in which the environment is different from other economic resources? How should the environment be valued? What are our obligations to conserve for future generations? How should the burdens of conservation be distributed? Engages with a variety of philosophical traditions including utilitarianism, deep ecology, liberalism, and communitarianism. GER:EC-EthicReas

*5 units, Win (Mazor, J)*

**ETHICSOC 185M. Contemporary Moral Problems**

(Same as PHIL 72) As individuals and as members of societies, we make choices that can be assessed from the moral point of view. What choices should we make, and how should we make them? Is it ok to buy iThings when others lack basic nutrition? Does a preference for the taste of meat justify killing animals? When is deceptive seduction seriously wrong and when is it just sketchy? Topics include exploitation, poverty, sexual and reproductive autonomy, commercialization, homelessness, citizenship, education, stereotypes, affirmative action, and social responsibility. GER:EC-EthicReas

*4 units, Aut (Dougherty, T)*

**ETHICSOC 190. Ethics in Society Honors Seminar**

(Same as PHIL 178) For students planning honors in Ethics in Society. Methods of research. Students present issues of public and personal morality; topics chosen with advice of instructor.

*3 units, Win (Sockness, B)*

**ETHICSOC 198. Community Engagement Internship**

Restricted to Ethics in Society minors with the citizenship option. Opportunities for students to engage in community work via the Haas Center for Public Service. Students work with Haas Center staff to design an internship involving community-based research or supported by a Haas Center fellowship or community service work/study, or to serve for an academic year as a tutor in one of the Haas Center's several K-12 programs in East Palo Alto. May be repeated for credit.

*3-5 units, not given this year*

**ETHICSOC 199. Independent Studies in Ethics in Society**

May be repeated for credit.

*1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**ETHICSOC 200A. Ethics in Society Honors Thesis**

Limited to Ethics in Society honors students, who must enroll once in A and once in B.

*1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**ETHICSOC 200B. Ethics in Society Honors Thesis**

Limited to Ethics in Society honors students, who must enroll once in A and once in B.

*1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**ETHICSOC 232T. Theories of Civil Society, Philanthropy, and the Nonprofit Sector**

(Same as POLISCI 236) What is the basis of private action for the public good? How are charitable dollars distributed and what role do nonprofit organizations and philanthropic dollars play in a modern democracy? How do nongovernmental organizations operate domestically and globally? The historical development and modern structure of civil society emphasizing philanthropy and the nonprofit sector. Readings in political philosophy, political sociology, and public policy.

*5 units, Spr (Staff)*

**GRADUATE COURSES IN ETHICS IN SOCIETY**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**ETHICSOC 257. Moral Foundations of Capitalism**

(Same as ETHICSOC 157) Preference to sophomores and juniors. An interdisciplinary examination of alternative and largely incompatible twentieth-century defenses of the morality of capitalism, with a concentration on economic, Objectivist, and Christian arguments, considered historically, economically, politically, and philosophically. Readings from Adam Smith, Karl Marx, authors for and against slavery, John Maynard Keynes, Theodore Roosevelt, Herbert Hoover, Austrian School economists, Milton Friedman, Dinesh D'Souza, and George Gilder. A reading of Ayn Rand's Atlas Shrugged. A concluding application of studied theories to a few recent public policy issues.

*5 units, Win (McCaskey, J)*

**ETHICSOC 274L. Betrayal and Loyalty, Treason and Trust**

(Same as ETHICSOC 174L, PHIL 174L, PHIL 274L) The main topic of the seminar is Betrayal. : its meaning as well as its moral, legal and political implications. We shall discuss various notions of betrayal: Political (military) betrayal such as treason, Religious betrayal with Judas as its emblem, but also apostasy (converting one's religion) which is regarded both as a basic human right and also as an act of betrayal, social betrayal - betraying class solidarity as well as Ideological betrayal - betraying a cause. On top of political betrayal we shall deal with personal betrayal, especially in the form of infidelity and in the form of financial betrayal of the kind performed by Madoff. The contrasting notions to betrayal, especially loyalty and trust, will get special consideration so as to shed light or cast shadow, as the case may be, on the idea of betrayal. The seminar will focus not only on the normative aspect of betrayal - moral or legal, but also on the psychological motivations for betraying others. The seminar will revolve

*2 units, Win (Staff)*

**ETHICSOC 277M. Human Rights and Moral Question**

(Same as ETHICSOC 177M, PHIL 177M, PHIL 277M) The proliferation of human rights in the discourse of international justice has raised a number of important questions in both moral and legal theory. What are human rights? How should they be conceptualized? Who ought to bear the duties associated with them? Can their protection justify military interventions into sovereign states? This course will cover topics in moral and legal theory surrounding human rights. The course has three main focuses. The first concerns the question of what these rights are. The second focus is on the various substantive moral justifications for the protection of human rights. The third is on the moral issues raised by the dominance of human rights in international law and relations: can any rights be universal? How are these rights to be framed in the light of cross-cultural values and claims about cultural dominance? A theme throughout will be the connections between these questions. The way we answer the question of what human rights are, and how they c

*4-5 units, Spr (Thomas, J)*

**ETHICSOC 278M. Justice and the Environment**

(Same as ETHICSOC 178M, PHIL 178M, PHIL 278M, POLISCI 134L) Explores the normative questions that arise in environmental policy debates, including arguments over pollution permit markets, conservation regulations, and global warming mitigation efforts. What are the morally relevant ways in which the environment is different from other economic resources? How

should the environment be valued? What are our obligations to conserve for future generations? How should the burdens of conservation be distributed? Engages with a variety of philosophical traditions including utilitarianism, deep ecology, liberalism, and communitarianism.

*5 units, Win (Mazor, J)*

### **ETHICSOC 280. Transitional Justice, International Criminal Tribunals, and the International Criminal Court**

(Same as IPS 280) Historical backdrop of the Nuremberg and Tokyo Tribunals. The creation and operation of the Yugoslav and Rwanda Tribunals (ICTY and ICTR). The development of hybrid tribunals in East Timor, Sierra Leone, and Cambodia, including evaluation of their success in addressing perceived shortcomings of the ICTY and ICTR. Examination of the role of the International Criminal Court and the extent to which it will succeed in supplanting all other ad hoc international justice mechanisms and fulfill its goals. Analysis focuses on the politics of creating such courts, their interaction with the states in which the conflicts took place, the process of establishing prosecutorial priorities, the body of law they have produced, and their effectiveness in addressing the needs of victims in post-conflict societies.

*3-5 units, Spr (Cohen, D)*

## FAMILY MEDICINE (FAMMED) COURSES

### **UNDERGRADUATE COURSES IN FAMILY MEDICINE**

Primarily for undergraduates; graduate students may enroll with consent of adviser.

#### **FAMMED 199. Undergraduate Directed Reading and Research in Family and Community Medicine**

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

*1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

### **GRADUATE COURSES IN FAMILY MEDICINE**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

#### **FAMMED 210. The Healer's Art**

Explores the human dimensions of medicine, creating a firm foundation for meeting the challenging demands of medical training and practice. A unique curriculum developed by Dr. Rachel Naomi Remen at UCSF and now offered at 70 U.S. medical schools and worldwide. (For details/evaluations see [http://ishiprograms.org/programs-medical\\_educators.html](http://ishiprograms.org/programs-medical_educators.html)).

Medical students and faculty participate together in an innovative discovery model process that enables an in-depth sharing of experience, beliefs, aspirations and personal truths. Topics include deep listening, presence, acceptance, loss, grief, healing, relationship, encounters with awe and mystery, finding meaning, service, and self-care practices. No papers/exams. May be repeated for credit.

*1 unit, Aut (Feldstein, B; Schillinger, E)*

#### **FAMMED 213. Medical Tai Chi**

Tai chi as a recognized form of complimentary and alternative medicine. Intended to promote student health and well-being and to decrease stress, depression, and anxiety through the practice of tai chi. Weekly practices under the instruction of world-renowned 20th generation tai chi expert, Master Shu Dong Li. Includes analysis of the literature/research regarding health benefits of tai chi.

*1 unit, Aut (Schillinger, E; Subrahmanian, K), Win (Schillinger, E; Subrahmanian, K), Spr (Staff)*

#### **FAMMED 219. Mind-Body Medicine**

A small group experiential exploration of the interconnections among human capacities such as thought, emotion, belief, attitudes, and physical health. Review and practice of specific

skills (including mindfulness exercises, meditation, imagery, visualization, body awareness, autogenics, and biofeedback) to enhance self-awareness, self-expression, and stress management. Readings relevant to mind-body medicine made available. Anticipated benefits to class participants include discovering and mobilizing their capacity to participate in valuable and proven methods of self knowledge and stress reduction, while dealing with the frustrations and alienation that many students experience in medical school and beyond.

*1 unit, Win (Weinlander, E; Jones, E)*

#### **FAMMED 241. Assistantship in Family and Community Medicine**

An in-depth experience with a family physician preceptor following the first year of the pre-clinical curriculum. The student applies during the first year to participate in the summer following completion. Application is through the Center for Family and Community Medicine ([avjohn@stanford.edu](mailto:avjohn@stanford.edu)). Placements with family physicians' practices throughout California.

*6-12 units, Aut (Grudzen, M; Schillinger, E)*

#### **FAMMED 243. Introduction to Integrative Medicine**

(Same as ANES 243) Presentations by local, national, and international experts in various modalities of integrative medicine commonly used by patients in the US, including mind-body medicine (biofeedback, clinical hypnosis, meditation, yoga); traditional whole systems of medicine (traditional Chinese medicine, Ayurveda); biological therapies (botanical medicine, supplements, herbal medicine); manipulative therapies (chiropractic, massage); and acupuncture. Lectures focus on evidence supporting the potential value of various treatment modalities and explanations of both the traditional and proposed scientific mechanisms of actions. Most classes include an experiential portion.

*1 unit, NEXTYEAR*

#### **FAMMED 244. Ethnicity and Medicine**

(Same as HUMBIO 121E) Weekly lecture series. Linguistic, social class, and cultural factors that impact patient care. Culturally sensitive health care services and contemporary research issues involving minority and underserved populations. Topics include health care inequities and medical practices of African Americans, Asians, Latinos, Native Americans, immigrants, and refugees in both urban and rural settings. Only students taking the course for 3 units may earn a letter grade.

*1-3 units, Spr (Garcia, R)*

#### **FAMMED 245. Women and Health Care**

Lecture series. Topics of interest to women as health care consumers and providers. The historical role of women in health care; current and future changes.

*1 unit, Aut (Grudzen, M; Schillinger, E)*

#### **FAMMED 252. Medicine & Horsemanship: An Outdoor, Equine Assisted Learning Course for Doctor-Patient Relationship**

An outdoor experience working with horses to develop interpersonal skills for the clinician-patient and peer-peer relationship. A challenge throughout a clinical career is to conduct relationships with patients and colleagues in a manner that is professional, perceptive, confident, and authentic. Horses mirror and magnify our intentions and behaviors. Working with horses requires sensitivity to nonverbal cues, discrimination in the quality and amount of physical contact, and an awareness of one's emotional state, all important skills for relating to patients. Horses give non-judgmental feedback about our personal communication and leadership styles and our ability to operate from a place empathy and kindness. The course also teaches how to recognize subjectivity in judgment and how to overcome fear and immobility in the face of uncertainty. No riding is required and no previous horse experience is assumed. Open to anyone with direct patient care responsibility, space permitting. Limit

*1 unit, Aut (Kane, B; Schillinger, E)*

#### **FAMMED 280. Early Clinical Experience in Family and Community Medicine**

Provides an observational experience for pre-clinical students as determined by the instructor and student. Prerequisite: consent of instructor.

*1-3 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**FAMMED 299. Directed Reading in Family and Community Medicine**

Students organize an individualized study program in family and community medicine. Prerequisite: consent of instructor.

1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**FAMMED 370. Medical Scholars Research**

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

4-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**FAMMED 399. Graduate Research**

Students interested in conducting research in a specific area of family and community medicine undertake investigations sponsored by the faculty instructor. Prerequisite: consent of instructor.

1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

## FEMINIST STUDIES (FEMST) COURSES

### UNDERGRADUATE COURSES IN FEMINIST STUDIES

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**FEMST 101. Introduction to Feminist Studies**

(Same as AMSTUD 107, CSRE 108, HISTORY 107) Introduction to interdisciplinary feminist scholarship, which seeks to understand the creation, perpetuation, and critiques of gender inequalities. Topics include the historical emergence of feminist politics and contemporary analyses of work and family, health and sexuality, creativity, and politics. Close attention to the intersections of race, gender, ethnicity, and sexuality and to international, as well as U.S., perspectives. Students learn to think critically about gender in the past, present, and future. GER:DB-SocSci, EC-Gender

4-5 units, Aut (Freedman, E)

**FEMST 102. Contemporary Topics in Feminist & Queer Theories**

(Same as FEMST 202) Introduction to the points of overlap and departure in the development of feminist and queer theories. Interdisciplinary perspectives on gender and sexuality in relation to current discussions of race, class, ethnicity, citizenship, and ability. Topics include the production of femininity and masculinity, human-animal divisions, transgender subjectivities, diasporic sexualities, disability and sexuality, same-sex marriage. Course materials include theoretical texts as well as film, visual art, and literature. Preference to Feminist Studies majors.

4-5 units, not given this year

**FEMST 103. Feminist Theories and Methods Across the Disciplines**

(Same as FEMST 203, PHIL 153, PHIL 253) The interdisciplinary foundations of feminist thought. The nature of disciplines and of interdisciplinary work. Challenges of feminism for scholarship and research. GER:EC-Gender

4-5 units, Win (Longino, H)

**FEMST 104A. Junior Seminar and Practicum**

Preference to and required of Feminist Studies majors; others require consent of instructor. Feminist experiential learning projects related to critical studies in gender and sexuality. Identifying goals, grant proposal writing, and negotiating ethical issues in feminist praxis. Developing the relationship between potential projects and their academic focus in the major.

1 unit, Win (Coll, K)

**FEMST 104B. Senior Seminar and Practicum**

Required for Feminist Studies majors. Non-majors enrolled with consent of instructor. Students develop oral reports on their practicum and its relationship to their academic work, submit a report draft and revised written analysis of the practicum, and discuss applications of feminist scholarship. May be repeated once for credit.

2 units, Aut (Coll, K)

**FEMST 105. Honors Work**

(Staff)

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**FEMST 108. Internship in Feminist Studies**

For non-majors. Supervised field, community, or lab experience in law offices, medical research and labs, social service agencies, legislative and other public offices, or local and national organizations that address issues related to gender and/or sexuality. One unit represents approximately three hours work per week. Required paper. May be repeated for credit. Service Learning Course (certified by Haas Center). Prerequisites: course in Feminist Studies, consent of program office, written consent of faculty sponsor, application.

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**FEMST 120. Introduction to Queer Studies**

A historical overview of key theoretical developments in queer studies. Multidisciplinary perspective from a social constructionist approach to gender and sexual identity, which not only affects understandings of queer people, but straight as well. Examines how queer theory has been influential across disciplines and in popular culture, refining not only an understanding of gender and sexuality but also providing new critical perspectives for social theory more broadly. Engagement with contemporary debates and controversies in the public domain. GER:EC-Gender

4-5 units, NEXTYEAR

**FEMST 120. QUEER RAZA**

(Same as ILAC 287) Examination of cultural representations by U.S. Latin@s that explore the following questions: How is the mutual constitution of race/sex/class/gender theorized and represented? How is desire racialized? How is racial difference produced through sex acts and what is the function of sex in racial (self)formation? How to reconcile pleasure and desire with histories of imperialism and (neo)colonialism and other structures of power? How do these texts reinforce or contest stereotypes and the ideal bodies of national identity? How do these texts produce queerness as a web of social relations?

3-5 units, Win (Yarbro-Bejarano, Y)

**FEMST 138. Violence Against Women: Theory, Issues, and Prevention**

(Same as FEMST 238) Course offers an interdisciplinary feminist perspectives on the causes of gender violence, addresses multi-level approaches to ending gender violence and explores the relationship between violence against women and other forms of oppression such as racism, economic exploitation, heterosexism, and social class. Framework addresses institutional barriers maintaining this violence in our culture and how solutions must also be multidimensional. All students, women and men, are encouraged to become allies in this effort and will apply theoretical perspectives to campus service-learning projects. Limited enrollment. Prerequisite: consent of instructor. GER:EC-Gender

3-4 units, Aut (Baran, N)

**FEMST 139. Rereading Judaism in Light of Feminism**

(Same as JEWISHST 139) During the past three decades, Jewish feminists have asked new questions of traditional rabbinic texts, Jewish law, history, and religious life and thought. Analysis of the legal and narrative texts, rituals, theology, and community to better understand contemporary Jewish life as influenced by feminism. GER:EC-Gender

4-5 units, NEXTYEAR

**FEMST 140A. Destroying Dichotomies: Exploring Multiple Sex, Gender & Sexual Identities**

Examination of sex, gender, sexual identities & expressions through studying the LGBTQI (lesbian, gay, bisexual, transgender, queer, intersex) community using a sociological lens. Readings in feminist and queer theory, films, class presentations, and discussion. Thematic focus in valuing the diversity of human experience. Students will develop their skills in critical reading, writing and thinking about gender and sexuality.

3-5 units, Aut (Fogarty, A)

**FEMST 140C. Gender Transgression**

Exploration of gender as a category and (compulsory) identification. What happens when people challenge or refuse

gender categories and stereotypes? Participating in conversations initiated in queer and feminist theory, anthropology, history, science, and popular culture, we will examine how gender works and consider the experiences, writing, and art of people who challenge it. Course culminates in an ethnographic research project. GER:EC-Gender

4-5 units, OCCASIONAL

#### **FEMST 140D. LGBT History in the United States**

(Same as HISTORY 257C) An introductory course on LGBT social, cultural, and political history in the United States. This course explores how categories of sexuality have changed over time, with particular emphasis on the relationship among homosexuality, heterosexuality, and transgenderism. Students will analyze how the intersections of race, class, and sexuality influenced the constitution of these categories and the politics of social relations. Historical and literary sources will be used to examine changes in LGBT experiences and identities, primarily in the twentieth century.

4-5 units, Spr (Davies Henderson, A)

#### **FEMST 140H. New Citizenship: Grassroots Movements for Social Justice in the U.S.**

(Same as ANTHRO 169A, CHICANST 168, CSRE 168) Focus is on the contributions of immigrants and communities of color to the meaning of citizenship in the U.S. Citizenship, more than only a legal status, is a dynamic cultural field in which people claim equal rights while demanding respect for differences. Academic studies of citizenship examined in dialogue with the theory and practice of activists and movements. Engagement with immigrant organizing and community-based research is a central emphasis.

5 units, Win (Coll, K)

#### **FEMST 140M. Queer Popular Culture**

Major identity issues of our time are played out in popular culture. This course investigates topics of queer gender and sexuality, and intersecting identity issues, in mainstream and 'underground' American popular culture and its reception over the last fifty years. Using critical theory texts on capitalism and identity to analyze examples drawn from popular music, film, tv, journalism, fashion, advertising, and online culture, we will consider queer culture, political debates, and Americans' changing views on identity and life. Midterm and final project.

4-5 units, Spr (Goldin-Perschbacher, S)

#### **FEMST 140S. Sisterhood and Identity: The Histories, Stories & Rhetoric of Sororities**

Explore the history, development, critique and praise of sororities. How are they advertised? Who joins them? What are the advertised benefits? How are sorority members discussed by outsiders? How do stereotypes of sororities impact perceptions of individuals and particular sororities? To consider these questions, we'll look at historical documents and analyze how groups described themselves as they were establishing; to consider current views, we'll also analyze recent documents (websites, books, etc.). We'll use both to consider how the rhetorical messages created by and about sororities shape public perceptions as well as individuals' experiences.

1-2 units, Win (Hanlon-Baker, P)

#### **FEMST 140W. Black Women Playwrights, 1900-the present**

(Same as AFRICAAM 176H, DRAMA 176H, DRAMA 336) From the rave reviews garnered by Angelina Weld Grimke's lynching play, Rachel to recent work by Lynn Nottage on Rwanda, black women playwrights have addressed key issues in modern culture and politics. We will analyze and perform work written by black women in the U.S., Britain and the Caribbean in the 20th and 21st centuries. Topics include: sexuality, surrealism, colonialism, freedom, violence, colorism, love, history, community and more. Playwrights include: Angelina Grimke, Lorraine Hansberry, Winsome Pinnock, Adrienne Kennedy, Suzan-Lori Parks, Ntozake Shange, Pearl Cleage, Sarah Jones, Anna DeVeare Smith, Alice Childress, Lydia Diamond and Zora Neale Hurston.

4 units, Aut (Brody, J)

#### **FEMST 153. Women and the Creative Imagination**

(Same as FEMST 253) Examines the nature of artistic imagination, considering the relationship among muses, mentors and models for women engaged painting, music, theatre, film, creative writing, dance, etc We will study how gender relations and sexual identity

have affected women's art across various cultures, lands and times. We will critically examine gender roles in music, visual art and literature. Active student participation (in writing, discussion as well as in attendance at performances, exhibits and readings) is the heart of the class. GER:DB-Hum, EC-Gender, WIM

4-5 units, Aut (Miner, V)

#### **FEMST 166. Feminist Theories of Knowledge**

(Same as PHIL 184F, PHIL 284F) Feminist critique of traditional approaches in epistemology and alternative feminist approaches to such topics as reason and rationality, objectivity, experience, truth, the knowing subject, knowledge and values, knowledge and power. GER:DB-Hum, EC-Gender

4 units, not given this year

#### **FEMST 188N. Imagining Women: Writers in Print and in Person**

(S,Sem) Stanford Introductory Seminar. Gender roles, gender relations and sexual identity explored in contemporary literature and conversation with guest authors. Weekly meetings designated for book discussion and meeting with authors. Interest in writing and a curiosity about diverse women's lives would be helpful to students. Students will use such tools as close reading, research, analysis and imagination. Seminar requires strong voice of all participants. Oral presentations, discussion papers, final projects. GER:DB-Hum, EC-Gender

4-5 units, Win (Miner, V)

#### **FEMST 191Q. Writing Women's Lives**

(F,Dial) Stanford Introductory Dialogue. Creative writing through dialogue focusing on prose about the lives of women in different cultures and generations. Novels, short stories, and micro-narrative including fiction and memoir. Students produce work using research, memory, imagination, and metaphor.

2 units, Aut (Miner, V)

#### **FEMST 195. Directed Reading**

May be repeated for credit. (Staff)

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

#### **FEMST 260. Seminar in Women's Health: Women and Disabilities**

(Same as FEMST 360) Explores visible and invisible disabilities, women's psychological as well as physical health, issues of access, caretaking, self-definition and the diversity of disabled women's identities. Disabilities covered include blindness, multiple sclerosis, diabetes, arthritis, emotional and learning disabilities, and conditions requiring wheelchairs and other forms of physical assistance. Prerequisite: consent of instructor. GER:DB-SocSci, EC-Gender

5 units, Spr (Krieger, S)

## **GRADUATE COURSES IN FEMINIST STUDIES**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

#### **FEMST 202. Contemporary Topics in Feminist & Queer Theories**

(Same as FEMST 102) Introduction to the points of overlap and departure in the development of feminist and queer theories. Interdisciplinary perspectives on gender and sexuality in relation to current discussions of race, class, ethnicity, citizenship, and ability. Topics include the production of femininity and masculinity, human-animal divisions, transgender subjectivities, diasporic sexualities, disability and sexuality, same-sex marriage. Course materials include theoretical texts as well as film, visual art, and literature. Preference to Feminist Studies majors.

4-5 units, not given this year

#### **FEMST 203. Feminist Theories and Methods Across the Disciplines**

(Same as FEMST 103, PHIL 153, PHIL 253) The interdisciplinary foundations of feminist thought. The nature of disciplines and of interdisciplinary work. Challenges of feminism for scholarship and research.

4-5 units, Win (Longino, H)

#### **FEMST 238. Violence Against Women: Theory, Issues, and Prevention**

(Same as FEMST 138) Course offers an interdisciplinary feminist

perspectives on the causes of gender violence, addresses multi-leveled approaches to ending gender violence and explores the relationship between violence against women and other forms of oppression such as racism, economic exploitation, heterosexism, and social class. Framework addresses institutional barriers maintaining this violence in our culture and how solutions must also be multidimensional. All students, women and men, are encouraged to become allies in this effort and will apply theoretical perspectives to campus service-learning projects. Limited enrollment. Prerequisite: consent of instructor.

*3-4 units, Aut (Baran, N)*

**FEMST 253. Women and the Creative Imagination**

(Same as FEMST 153) Examines the nature of artistic imagination, considering the relationship among muses, mentors and models for women engaged painting, music, theatre, film, creative writing, dance, etc We will study how gender relations and sexual identity have affected women's art across various cultures, lands and times. We will critically examine gender roles in music, visual art and literature. Active student participation (in writing, discussion as well as in attendance at performances, exhibits and readings) is the heart of the class.

*4-5 units, Aut (Miner, V)*

**FEMST 360. Seminar in Women's Health: Women and Disabilities**

(Same as FEMST 260) Explores visible and invisible disabilities, women's psychological as well as physical health, issues of access, caretaking, self-definition and the diversity of disabled women's identities. Disabilities covered include blindness, multiple sclerosis, diabetes, arthritis, emotional and learning disabilities, and conditions requiring wheelchairs and other forms of physical assistance. Prerequisite: consent of instructor.

*5 units, Spr (Krieger, S)*

## FILM STUDIES (FILMSTUD) COURSES

### UNDERGRADUATE COURSES IN FILM STUDIES

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**FILMSTUD 4. Introduction to Film Study**

Formal, historical, and cultural issues in the study of film. Classical narrative cinema compared with alternative narrative structures, documentary films, and experimental cinematic forms. Issues of cinematic language and visual perception, and representations of gender, ethnicity, and sexuality. Aesthetic and conceptual analytic skills with relevance to cinema. GER:DB-Hum

*5 units, Win (Levi, P)*

**FILMSTUD 6. Introduction to Digital Media**

Media beyond the horizon of cinema and television present unique problems of definition and analysis. Taking the digital - information represented as discrete values - as a reasonable approximation of the mechanics and fantasies of computation, course surveys theoretical approaches to code, networks, and cyberculture. Taking familiar formations like web sites and video games as objects by which to learn how thinkers have understood and envisioned emerging media from the mid-20th century to the present. Students to develop own methodological tools for becoming more critical users of digital media.

*5 units, not given this year*

**FILMSTUD 7. Introduction to Television Studies**

Television is arguably the most influential and ubiquitous mass medium of the last half century. Because of its familiarity and popularity, it is also often the medium most overlooked, dismissed, and maligned. Drawing from the history of television and of television scholarship, this course builds a theoretical framework for understanding this pivotal cultural form. Course covers interdisciplinary approaches to studying TV texts, TV audiences, and TV industries, including questions of the boundaries of television (from independent and avant-garde video to convergence). In the process students develop methodological

tools as critical television viewers.

*5 units, not given this year*

**FILMSTUD 100A. History of World Cinema I, 1895-1929**

(Same as FILMSTUD 300A) From cinema's precursors to the advent of synchronized sound. GER:DB-Hum

*4 units, alternate years, not given this year*

**FILMSTUD 100B. History of World Cinema II, 1930-1959**

(Same as FILMSTUD 300B) The impact of sound to the dissolution of Hollywood's studio system. GER:DB-Hum

*4 units, Aut (Laderman, D)*

**FILMSTUD 100C. History of World Cinema III, 1960-Present**

(Same as FILMSTUD 300C) From the rise of the French New Wave to the present. GER:DB-Hum

*4 units, Spr (Ma, J)*

**FILMSTUD 101. Fundamentals of Cinematic Analysis**

(Same as FILMSTUD 301) The close analysis of film. Emphasis is on formal and narrative techniques in structure and style, and detailed readings of brief sequences. Elements such as cinematography, mise-en-scène, composition, sound, and performance. Films from various historical periods, national cinemas, directors, and genres. Prerequisite: FILMSTUD 4 or equivalent. Recommended: ARTHIST 1 or FILMSTUD 102. GER:DB-Hum, WIM

*4 units, Win (Ma, J)*

**FILMSTUD 102. Theories of the Moving Image**

(Same as FILMSTUD 302) Major theoretical arguments and debates about cinema: realism, formalism, poststructuralism, feminism, postmodernism, and phenomenology. Prerequisites: ARTHIST 1, FILMSTUD 4. GER:DB-Hum

*4 units, Spr (Levi, P)*

**FILMSTUD 113. Queer Film and Media**

(Same as FILMSTUD 313) According to identity politics, visibility is a key tactic in the fight for societal acceptance and civil rights. But how is sexuality visible? Course addresses this question by analyzing queer film and media since the 1970s, focusing primarily on explicit representations of GLBTQ characters and communities in US cinema, television, and cyberculture. Themes include positive images, AIDS, coming out, celebrity, and the gay market. Through queer theory and criticism, analysis of the contested relationships between spectators and texts, identity and commodities, realism and fantasy, activism and entertainment, desire and politics. GER:DB-Hum

*4 units, not given this year*

**FILMSTUD 114. Comics**

(Same as FILMSTUD 314) The modern medium of comics, a history that spans 150 years. The flexibility of the medium encountered through the genres of humorous and dramatic comic strips, superheroes, undergrounds, independents, journalism, and autobiography. Innovative creators including McCay, Kirby, Barry, Ware, and critical writings including McCloud, Eisner, Groenstee. Topics include text/image relations, panel-to-panel relations, the page, caricature, sequence, seriality, comics in the context of the fine arts, and relations to other media. GER:DB-Hum

*4 units, not given this year*

**FILMSTUD 115. Documentary Issues and Traditions**

(Same as FILMSTUD 315) Issues include objectivity/subjectivity, ethics, censorship, representation, reflexivity, responsibility to the audience, and authorial voice. Parallel focus on form and content. GER:DB-SocSci

*4 units, Aut (Krawitz, J)*

**FILMSTUD 116. International Documentary**

(Same as FILMSTUD 316) Historical, aesthetic, and formal developments of documentary through nonfiction films in Europe, Asia, Latin America, and Africa. GER:DB-Hum

*4 units, not given this year*

**FILMSTUD 118. The Road Movie**

(Same as FILMSTUD 318) No doubt influenced by classical Hollywood, the road movie emerges as a distinct genre in the late 1960s, celebrating youth culture rebellion through an independent, anti-genre film sensibility. The course addresses these and other angles of the road movie. How does the road movie express American cultural values and historical preoccupations? How does

the road movie uniquely articulate issues of violence, sexuality, mobility and technology? How do international road movies differ from American road movies?

*4 units, not given this year*

**FILMSTUD 122. Kubrick**

(Same as FILMSTUD 322) Thematic and stylistic richness of the cinema of Stanley Kubrick. Methodological approaches to the subject. Emphasis is on questions of close textual analysis, authorship and genre, and critique of ideology. Focus is on *A Clockwork Orange*. Other films include: *2001: A Space Odyssey*, Barry Lyndon, *Killer's Kiss*, and *The Shining*.

*4 units, not given this year*

**FILMSTUD 130. American Independent Film**

(Same as FILMSTUD 330) Course explores the historical, aesthetic and social significance of the American independent film. The rise in popularity of American independent films since the 1980s proves that audiences do want to view innovative, sophisticated films. At the same time, film festival culture and Hollywood distribution companies have assimilated and packaged the "indie" film. Lecturers present a critical survey of the diverse range of American independent films, focusing on narrative experimentation from the 1960s through the 1990s.

*4 units, Win (Laderman, D)*

**FILMSTUD 131. CINEMATOGRAPH**

(Same as FILMSTUD 331, SLAVGEN 185, SLAVGEN 285) The term cinematography, which literally means inscribing motion, tends to lose the graphic part in modern use. However, several influential film-makers not only practiced the art of inscribing motion but also wrote texts discussing the aesthetic premises of cinematographic art. This course explores theories of cinema as propagated by the following film-makers: Vertov, Eisenstein, Godard, Bresson, Antonioni, Pasolini, Tarkovsky, Greenaway, and Lynch. Selected key texts will be supplemented by screenings of classic films, indicative of each director's work.

*3-5 units, Aut (Skakov, N)*

**FILMSTUD 132. East Asian Cinema**

(Same as FILMSTUD 332) Social, historical, and aesthetic dimensions of the cinemas of Japan, Hong Kong, Taiwan, mainland China, and Korea. Topics such as nation and gender, form and genre, and local and transnational conditions of practice and reception. Screenings include popular and art films from the silent to contemporary eras, including, Zhang Yimou, Wong Kar-wai, Hou Hsiao-hsien, Ozu Yasujiro, Kurosawa Akira, and Im Kwon-taek.

*4 units, not given this year*

**FILMSTUD 135. History of Video Art**

(Same as FILMSTUD 335) Focus is on artists who have contributed to the history of video art. Topics include: theoretical analyses of the medium; challenges to the performer-spectator dynamic (Dan Graham and Vito Acconci); feminist culture critique (Martha Rosler and Dara Birnbaum); closed-circuit installations and performances (Peter Campus and Joan Jonas); combinations of linguistic and bodily investigations (Bruce Nauman and Gary Hill); representations of girl culture (Sadie Benning); guerrilla television (TVTV and Ant Farm); image processing (Woody and Steina Vasulka); the turn toward cinematic installations (Stan Douglas and Douglas Gordon); and more recent trends (Cory Arcangel and Ryan Trecartin).

*4 units, not given this year*

**FILMSTUD 136. Gender and Sexuality in Chinese Cinema**

(Same as FILMSTUD 336) Representations of gender and sexuality in the cinemas of China, Taiwan, and Hong Kong, covering key periods and genres such as the golden age of Shanghai film, Hong Kong action pictures, opera films, post-socialist art films, and new queer cinema. Historical and contemporary perspectives on cinematic constructions of femininity, masculinity, and sexuality as they relate to issues of nationalism, modernity, globalization, and feminist and queer politics. Weekly screening required. GER:EC-Gender

*4 units, Spr (Ma, J)*

**FILMSTUD 137. European New Wave Cinemas**

(Same as FILMSTUD 337) an exploration of the major currents, movements, and schools in the European cinema of the post-war era from the late 1940s to the 1970s. A mixture of historical,

aesthetic, and theoretical concerns will inform the study of French New Wave, British Free Cinema, Italian cinema in the 1960s, the New German Cinema of the 1970s, and more. GER:DB-Hum

*4 units, not given this year*

**FILMSTUD 140. Film Aesthetics: Editing**

(Same as FILMSTUD 340) Practical and theoretical approaches to editing and montage. The role of editing in film meaning, and cognitive and emotional impact on the viewer. Developments in the history and theory of cinema including continuity system, Soviet montage, French new wave, postwar and American avant garde. Aesthetic functions, spectatorial effects, and ideological implications of montage. Film makers include Eisenstein, Godard, and Conner. GER:DB-Hum

*4 units, not given this year*

**FILMSTUD 145. Politics and Aesthetics in East European Cinema**

(Same as FILMSTUD 345) From 1945 to the mid-80s, emphasizing Polish, Hungarian, Czech, Slovak, and Yugoslav contexts. The relationship between art and politics; postwar establishment of film industries; and emergence of national film movements such as the Polish school, Czech new wave, and new Yugoslav film. Thematic and aesthetic preoccupations of filmmakers such as Wajda, Jancso, Forman, and Kusturica. GER:DB-Hum

*4 units, not given this year*

**FILMSTUD 150. Cinema and the City**

(Same as FILMSTUD 350) Utopian built environments of vast perceptual and experiential richness in the cinema and city. Changing understandings of urban space in film. The cinematic city as an arena of social control, social liberation, collective memory, and complex experience. Films from international narrative traditions, industrial films, experimental cinema, documentaries, and musical sequences. Recommended: 4 or equivalent. GER:DB-Hum, EC-GlobalCom

*4 units, not given this year*

**FILMSTUD 153A. Transmedia TV**

(Same as FILMSTUD 353A) Beginning from theoretical questions about the structure of media texts and their production, distribution, reception, and regulation, this course analyzes how the collision of broadcast and broadband is reshaping the media landscape. Course investigates the definition of television and its articulation across multiple platforms, including streaming video, online tie-ins, fan remixes, and web shows. Such convergence involves both intensified corporate consolidation and intensified viewer participation. As the boundary between producers and consumers of entertainment breaks down, course explores renegotiating the possibilities of the TV experience.

*4 units, not given this year*

**FILMSTUD 156. Copy This Class (The Art of the Remix)**

(Same as FILMSTUD 356) Mashups, sampling, parodies, fan video, DIY media, memes: we are in the midst of an explosion in vernacular creativity that appropriates, celebrates, critiques, and transforms commercial entertainment. New digital technologies and Internet platforms support a developing ecology of remix forms with unprecedented reach, richness, and cultural influence. At the same time, the value and legitimacy of this popular production is hotly contested on the basis of artistic merit, traditional literacies, and intellectual property. Course analyzes and engages in contemporary remix culture via precursors like appropriation art and hip hop, exploring theoretical questions about originality, capitalism, law, and digital media. GER:DB-Hum

*4 units, not given this year*

**FILMSTUD 167. The Hollywood Musical**

(Same as AMSTUD 167, FILMSTUD 367) The sense of physical, emotional, aesthetic, and social liberation in this most colorful of film genres. Musicals as a place for the staging of issues of identity, including the impact of African American and Jewish culture, and issues of gay reception and interpretation. Attention to technologies of sound and color, the relation to vaudeville and Broadway, and ethnic and aesthetic diversity. Musicals as the epitome of filmic illusionism and the Hollywood studio system; the implications of their seduction of audiences; the meaning of spectacle, the centrality of performance. Busby Berkeley, Fred Astaire, Judy Garland, Bob Fosse, Stanley Donen, Gene Kelly,

Vincente Minnelli. GER:DB-Hum

4 units, not given this year

### **FILMSTUD 170. The Cinematic Century**

(Same as ARTHIST 170, ARTHIST 370) Few contemporary institutions and forms of representation have had a greater impact on the world than film. This class examines film history through institutions and practices as well as in formal developments in the medium in an international context but with an underlying interest in explaining the international forces that shaped Hollywood's rise. Through screenings of both documentary and fiction film, this class will suggest that the century just past be understood through the primary lens of the way cinema shaped its course.

4 units, Spr (Staff)

### **FILMSTUD 240A. History and Poetics of Cinematography**

The history of cinematographic devices and styles through the work of such cinematographers as Billy Bitzer, Eduard Tisse, Greg Toland, Kazuo Miyagawa, John Alton, James Wong Howe, Sergei Urusevskii, Raoul Coutard, and Jack Cardiff.

5 units, not given this year

### **FILMSTUD 250A. Politics of Representation**

Counterpoising viewpoints on media visibility drawn from identity politics and post-structuralist theory, course explores the questions entangled in negotiating a politics of representation: Can images show how things really are? Who is seen and who isn't? Can interpretation go beyond stereotypes? How are we situated as media content and consumers? Focusing primarily on gender, race, sexuality, and their intersections, course analyzes specific invocations of these categories in film, television, and cyberculture. Texts presenting opposing perspectives by theorists, critics, and activists to scaffold each example. Ultimate objective to explore how different media forms open or close possibilities for progressive representation, reception, and political change.

5 units, not given this year

### **FILMSTUD 251. Media in Transition**

In a culture obsessed with new media, we are bombarded with hype about the present as a revolutionary phase of convergence. But everything old was once new, and pioneering media of the past also had to negotiate existing technologies, ideologies, and fantasies. This seminar is organized around case studies of transitional media moments from the long 20th century, including proto-cinema, ham radio, early television, hypertext, and digital film. In exploring the material and discursive aspects of remediation through theoretical, historical, and media archaeological readings, we will ask: what is a medium and how do they emerge and evolve.

5 units, not given this year

### **FILMSTUD 279. Asian American Experiences and Documentary Practice**

(Same as ASNAMST 179, CSRE 179) Focus is on documentary cinema as a technology for understanding Asian Americans in the U.S. The social and historical context of the formation of the Asian American filmmaker, an authorial position that emerges in the 60s and 70s as part of the civil rights movement. Works include films by Loni Ding, Bob Nakamura and Curtis Choy; readings about the establishment of Asian American media industries and Asian American film criticism as a multi-genre. Social issue documentaries that represent new ethnographies of social experience including transnational adoption (Daughter From Danang), refugee experience (AKA Don Bonus), and sex tourism (The Women Outside). Readings include analyses of the implications of these works for cinema studies, ethnic studies, and the politics of film in everyday life. Experimental documentaries and their interrogation of the limits of the documentary form in representing identities and social problems. How does representation matter within and for Asian America GER:DB-Hum

5 units, not given this year

### **FILMSTUD 290. Movies and Methods**

Open to graduate students and advanced undergraduates (permission of instructor required); capstone course for majors (senior seminar). Topics vary year to year. Focus is on historiography and theory.

5 units, Aut (Levi, P)

### **FILMSTUD 297. Honors Thesis Writing**

May be repeated for credit.

1-5 units, Aut (Staff), Win (Staff), Spr (Staff)

### **FILMSTUD 299. Independent Study: Film and Media Studies**

May be repeated for credit.

1-15 units, Aut (Staff), Win (Staff), Spr (Staff)

## **GRADUATE COURSES IN FILM STUDIES**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

### **FILMSTUD 218. Sexual Ethics in Cinema**

Course focuses on romance, sex, desire and love in Hollywood and independent films. Examines various approaches to understanding the power of cinema to move and transform its subjects using film phenomenology and psychoanalysis approaches in the face-to-face encounter, haptic cinema and the shattering of the self and its assembly/reassembly--with attention to cultural, historical and social contexts framing the films' production and consumption. Advanced undergraduates and graduate students welcome.

5 units, not given this year

### **FILMSTUD 300A. History of World Cinema I, 1895-1929**

(Same as FILMSTUD 100A) From cinema's precursors to the advent of synchronized sound.

4 units, alternate years, not given this year

### **FILMSTUD 300B. History of World Cinema II, 1930-1959**

(Same as FILMSTUD 100B) The impact of sound to the dissolution of Hollywood's studio system.

4 units, Aut (Laderman, D)

### **FILMSTUD 300C. History of World Cinema III, 1960-Present**

(Same as FILMSTUD 100C) From the rise of the French New Wave to the present.

4 units, Spr (Ma, J)

### **FILMSTUD 301. Fundamentals of Cinematic Analysis**

(Same as FILMSTUD 101) The close analysis of film. Emphasis is on formal and narrative techniques in structure and style, and detailed readings of brief sequences. Elements such as cinematography, mise-en-scène, composition, sound, and performance. Films from various historical periods, national cinemas, directors, and genres. Prerequisite: FILMSTUD 4 or equivalent. Recommended: ARTHIST 1 or FILMSTUD 102.

4 units, Win (Ma, J)

### **FILMSTUD 302. Theories of the Moving Image**

(Same as FILMSTUD 102) Major theoretical arguments and debates about cinema: realism, formalism, poststructuralism, feminism, postmodernism, and phenomenology. Prerequisites: ARTHIST 1, FILMSTUD 4.

4 units, Spr (Levi, P)

### **FILMSTUD 313. Queer Film and Media**

(Same as FILMSTUD 113) According to identity politics, visibility is a key tactic in the fight for societal acceptance and civil rights. But how is sexuality visible? Course addresses this question by analyzing queer film and media since the 1970s, focusing primarily on explicit representations of GLBTQ characters and communities in US cinema, television, and cyberculture. Themes include positive images, AIDS, coming out, celebrity, and the gay market. Through queer theory and criticism, analysis of the contested relationships between spectators and texts, identity and commodities, realism and fantasy, activism and entertainment, desire and politics.

4 units, not given this year

### **FILMSTUD 314. Comics**

(Same as FILMSTUD 114) The modern medium of comics, a history that spans 150 years. The flexibility of the medium encountered through the genres of humorous and dramatic comic strips, superheroes, undergrounds, independents, journalism, and autobiography. Innovative creators including McCay, Kirby, Barry, Ware, and critical writings including McCloud, Eisner, Groenstee. Topics include text/image relations, panel-to-panel relations, the page, caricature, sequence, seriality, comics in the context of the fine arts, and relations to other media.

4 units, not given this year

### **FILMSTUD 315. Documentary Issues and Traditions**

(Same as FILMSTUD 115) Issues include objectivity/subjectivity, ethics, censorship, representation, reflexivity, responsibility to the



audience, and authorial voice. Parallel focus on form and content.

*4 units, Aut (Krawitz, J)*

**FILMSTUD 316. International Documentary**

(Same as FILMSTUD 116) Historical, aesthetic, and formal developments of documentary through nonfiction films in Europe, Asia, Latin America, and Africa.

*4 units, not given this year*

**FILMSTUD 318. The Road Movie**

(Same as FILMSTUD 118) No doubt influenced by classical Hollywood, the road movie emerges as a distinct genre in the late 1960s, celebrating youth culture rebellion through an independent, anti-genre film sensibility. The course addresses these and other angles of the road movie. How does the road movie express American cultural values and historical preoccupations? How does the road movie uniquely articulate issues of violence, sexuality, mobility and technology? How do international road movies differ from American road movies?

*4 units, not given this year*

**FILMSTUD 322. Kubrick**

(Same as FILMSTUD 122) Thematic and stylistic richness of the cinema of Stanley Kubrick. Methodological approaches to the subject. Emphasis is on questions of close textual analysis, authorship and genre, and critique of ideology. Focus is on *A Clockwork Orange*. Other films include: *2001: A Space Odyssey*, *Barry Lyndon*, *Killer's Kiss*, and *The Shining*.

*4 units, not given this year*

**FILMSTUD 330. American Independent Film**

(Same as FILMSTUD 130) Course explores the historical, aesthetic and social significance of the American independent film. The rise in popularity of American independent films since the 1980s proves that audiences do want to view innovative, sophisticated films. At the same time, film festival culture and Hollywood distribution companies have assimilated and packaged the "indie" film. Lecturers present a critical survey of the diverse range of American independent films, focusing on narrative experimentation from the 1960s through the 1990s.

*4 units, Win (Laderman, D)*

**FILMSTUD 331. CINEMATOGRAPH**

(Same as FILMSTUD 131, SLAVGEN 185, SLAVGEN 285) The term cinematography, which literally means inscribing motion, tends to lose the graphic part in modern use. However, several influential film-makers not only practiced the art of inscribing motion but also wrote texts discussing the aesthetic premises of cinematographic art. This course explores theories of cinema as propagated by the following film-makers: Vertov, Eisenstein, Godard, Bresson, Antonioni, Pasolini, Tarkovsky, Greenaway, and Lynch. Selected key texts will be supplemented by screenings of classic films, indicative of each director's work.

*3-5 units, Aut (Skakov, N)*

**FILMSTUD 332. East Asian Cinema**

(Same as FILMSTUD 132) Social, historical, and aesthetic dimensions of the cinemas of Japan, Hong Kong, Taiwan, mainland China, and Korea. Topics such as nation and gender, form and genre, and local and transnational conditions of practice and reception. Screenings include popular and art films from the silent to contemporary eras, including, Zhang Yimou, Wong Kar-wai, Hou Hsiao-hsien, Ozu Yasujiro, Kurosawa Akira, and Im Kwon-taek.

*4 units, not given this year*

**FILMSTUD 335. History of Video Art**

(Same as FILMSTUD 135) Focus is on artists who have contributed to the history of video art. Topics include: theoretical analyses of the medium; challenges to the performer-spectator dynamic (Dan Graham and Vito Acconci); feminist culture critique (Martha Rosler and Dara Birnbaum); closed-circuit installations and performances (Peter Campus and Joan Jonas); combinations of linguistic and bodily investigations (Bruce Nauman and Gary Hill); representations of girl culture (Sadie Benning); guerrilla television (TVTV and Ant Farm); image processing (Woody and Steina Vasulka); the turn toward cinematic installations (Stan Douglas and Douglas Gordon); and more recent trends (Cory Arcangel and Ryan Trecartin).

*4 units, not given this year*

**FILMSTUD 336. Gender and Sexuality in Chinese Cinema**

(Same as FILMSTUD 136) Representations of gender and sexuality in the cinemas of China, Taiwan, and Hong Kong, covering key periods and genres such as the golden age of Shanghai film, Hong Kong action pictures, opera films, post-socialist art films, and new queer cinema. Historical and contemporary perspectives on cinematic constructions of femininity, masculinity, and sexuality as they relate to issues of nationalism, modernity, globalization, and feminist and queer politics. Weekly screening required.

*4 units, Spr (Ma, J)*

**FILMSTUD 337. European New Wave Cinemas**

(Same as FILMSTUD 137) an exploration of the major currents, movements, and schools in the European cinema of the post-war era from the late 1940s to the 1970s. A mixture of historical, aesthetic, and theoretical concerns will inform the study of French New Wave, British Free Cinema, Italian cinema in the 1960s, the New German Cinema of the 1970s, and more.

*4 units, not given this year*

**FILMSTUD 340. Film Aesthetics: Editing**

(Same as FILMSTUD 140) Practical and theoretical approaches to editing and montage. The role of editing in film meaning, and cognitive and emotional impact on the viewer. Developments in the history and theory of cinema including continuity system, Soviet montage, French new wave, postwar and American avant garde. Aesthetic functions, spectatorial effects, and ideological implications of montage. Film makers include Eisenstein, Godard, and Conner.

*4 units, not given this year*

**FILMSTUD 345. Politics and Aesthetics in East European Cinema**

(Same as FILMSTUD 145) From 1945 to the mid-80s, emphasizing Polish, Hungarian, Czech, Slovak, and Yugoslav contexts. The relationship between art and politics; postwar establishment of film industries; and emergence of national film movements such as the Polish school, Czech new wave, and new Yugoslav film. Thematic and aesthetic preoccupations of filmmakers such as Wajda, Jancso, Forman, and Kusturica.

*4 units, not given this year*

**FILMSTUD 350. Cinema and the City**

(Same as FILMSTUD 150) Utopian built environments of vast perceptual and experiential richness in the cinema and city. Changing understandings of urban space in film. The cinematic city as an arena of social control, social liberation, collective memory, and complex experience. Films from international narrative traditions, industrial films, experimental cinema, documentaries, and musical sequences. Recommended: 4 or equivalent.

*4 units, not given this year*

**FILMSTUD 353A. Transmedia TV**

(Same as FILMSTUD 153A) Beginning from theoretical questions about the structure of media texts and their production, distribution, reception, and regulation, this course analyzes how the collision of broadcast and broadband is reshaping the media landscape. Course investigates the definition of television and its articulation across multiple platforms, including streaming video, online tie-ins, fan remixes, and web shows. Such convergence involves both intensified corporate consolidation and intensified viewer participation. As the boundary between producers and consumers of entertainment breaks down, course explores renegotiating the possibilities of the TV experience.

*4 units, not given this year*

**FILMSTUD 356. Copy This Class (The Art of the Remix)**

(Same as FILMSTUD 156) Mashups, sampling, parodies, fan video, DIY media, memes: we are in the midst of an explosion in vernacular creativity that appropriates, celebrates, critiques, and transforms commercial entertainment. New digital technologies and Internet platforms support a developing ecology of remix forms with unprecedented reach, richness, and cultural influence. At the same time, the value and legitimacy of this popular production is hotly contested on the basis of artistic merit, traditional literacies, and intellectual property. Course analyzes and engages in contemporary remix culture via precursors like appropriation art and hip hop, exploring theoretical questions about



originality, capitalism, law, and digital media.

*4 units, not given this year*

#### **FILMSTUD 367. The Hollywood Musical**

(Same as AMSTUD 167, FILMSTUD 167) The sense of physical, emotional, aesthetic, and social liberation in this most colorful of film genres. Musicals as a place for the staging of issues of identity, including the impact of African American and Jewish culture, and issues of gay reception and interpretation. Attention to technologies of sound and color, the relation to vaudeville and Broadway, and ethnic and aesthetic diversity. Musicals as the epitome of filmic illusionism and the Hollywood studio system; the implications of their seduction of audiences; the meaning of spectacle, the centrality of performance. Busby Berkeley, Fred Astaire, Judy Garland, Bob Fosse, Stanley Donen, Gene Kelly, Vincente Minnelli.

*4 units, not given this year*

#### **FILMSTUD 404. Postwar American Avant Garde Cinema**

History and theory of post-WW II American independent and experimental film. Emphasis is on issues of audiovisual form, structure, and medium specificity. Films and writings include Maya Deren, Stan Brakhage, Michael Snow, and Hollis Frampton.

*5 units, not given this year*

#### **FILMSTUD 406. Montage**

Graduate seminar in film aesthetics. Theoretical and practical approaches to editing/montage. Stylistic, semiotic, epistemological, and ideological functions of montage considered in film-historical contexts including: development of the continuity system of editing; flourishing of the Soviet montage school; and achievements of the post-war new waves. Filmmakers include D. W. Griffith, Sergei Eisenstein, Jean-Luc Godard, and Dusan Makavejev.

*5 units, not given this year*

#### **FILMSTUD 407. The Still Moving Image**

Tension and overlap between cinema and photography as technological media, beginning with Frankfurt school critiques of media theory, classical film, and photography theory through recent considerations of the post-cinematic age of digital and virtual images. How ideas of indexicality, medium specificity, memory, duration, narrativity, chance, stasis, repetition have informed accounts of the relationship of these media.

*5 units, Win (Ma, J)*

#### **FILMSTUD 410A. Documentary Perspectives I**

Restricted to M.F.A. documentary film students. Topics in nonfiction media. Presentations and screenings by guest filmmakers. Prerequisite: consent of instructor.

*4 units, Win (Samuelson, K)*

#### **FILMSTUD 410B. Documentary Perspectives II**

Restricted to M.F.A. documentary film students. Continuation of 410A. Topics in nonfiction media. Presentations and screenings by guest filmmakers. Prerequisite: consent of instructor.

*4 units, not given this year*

#### **FILMSTUD 411. Animation**

The fantasy of an image coming to life dates back centuries, and artists have long sought to imbue their images with liveliness, but it wasn't until the onset of the cinema that the fantasy was actualized. It is sometimes argued that animation is the ground against which cinema situates itself: the history of moving pictures begins with optical toys that greatly predate the invention of the cinema, and mainstream cinema is increasingly dominated by films that are computer animated, in whole or in part. This course seeks to delve into the implications of animation, considering its underlying fantasies (in art and literature), its particular phenomenologies, its relation to the uncanny, its status as a pure cinema, and its place in film theory. Different modes of production and style will be explored, including realist animation, abstract animation; animistic animation; animated drawings, objects, and puppets; CGI, and live/animation hybrids. Films will be drawn from a

*5 units, not given this year*

#### **FILMSTUD 430. Cinema and Ideology**

The relationship between cinema and ideology from theoretical and historical perspectives, emphasizing Marxist and psychoanalytic approaches. The practice of political filmmaking, and the cinema as an audiovisual apparatus and socio-cultural

institution. Topics include: dialectics; revolutionary aesthetics; language and power; commodity fetishism; and nationalism. Filmmakers include Dziga Vertov, Jean-Luc Godard, Bruce Conner, and Marco Ferreri. Theoretical writers include Karl Marx, Sergei Eisenstein, and Slavoj Zizek. Prerequisite: consent of instructor.

*5 units, Aut (Levi, P)*

#### **FILMSTUD 440. Sound Technology**

Development of sound technology and reproduction in context of modernity, with some emphasis on the crossings of sound and image in the history and theory of technological reproduction. Topics include phonography, recording, and mass culture (Adorno, Sterne, Thompson, Lastra); cinematic sound and music (Chion, Altman, Gorbman); filmic and compositional practices in the American avant-garde (Joseph, Kahn); acoustic ecology (Schafer). Weekly screenings or listenings.

*5 units, not given this year*

#### **FILMSTUD 441. Theories of Cinematic Spectacle**

How cinematic spectacle has been theorized; the adoption of new technologies such as sound, color, or special effects; theories of the sublime and the grotesque. Spectacle as a vehicle for propaganda or pedagogy, and its relation to narrative and gender. The role of spectacle in experimental cinema and its deconstruction by Godard and others. Recommended: 4 or equivalent.

*5 units, not given this year*

#### **FILMSTUD 620. Area Core Examination Preparation**

For Art History Ph.D. candidates. Prerequisite: consent of instructor.

*5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

#### **FILMSTUD 660. Independent Study**

For graduate students only. Approved independent research projects with individual faculty members.

*1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

#### **FILMSTUD 660E. Extended Seminar**

May be repeated for credit. (Staff)

*4 units, Aut (Staff), Win (Staff), Spr (Staff)*

## FILM, PRACTICE OF (FILMPROD) COURSES

### UNDERGRADUATE COURSES IN FILM, PRACTICE OF

Primarily for undergraduates; graduate students may enroll with consent of adviser.

#### **FILMPROD 10AX. Filmmaking**

Fundamentals of digital video production. Process of expressing ideas in an audio-visual medium from the concept stage through post-production. Examples of narrative, documentary, and experimental work screened and discussed. Hands-on experience in directing, shooting, editing on Final Cut Pro, sound design, and a fuller understanding of film production.

*2 units, Aut (Krawitz, J)*

#### **FILMPROD 101. Screenwriting**

(Same as FILMPROD 301) Priority to Film and Media Studies majors. Craft, form, and approaches to writing for the screen. Prerequisites: 1) ENGLISH 90, 2) ENGLISH 190F or FILMPROD 104, and 3) consent of instructor.

*5 units, Spr (Tobin, A)*

#### **FILMPROD 103. Adaptation**

A close analysis of film adaptation, using various source materials to examine the demands form makes on content and the creative choices made in adaptation to film. Source materials will include plays, fiction, biography, history, graphic novels, and reference to video games and amusement park rides. A weekly film screening is a requirement of the course.

*4 units, Win (Tobin, A)*

#### **FILMPROD 104. Visual Writing**

A writing workshop that is an exploration of visual storytelling. Beginning with visual literacy, the class progresses from basic

cinematic techniques through scene exercises to revisions and ultimately to connecting scenes in order to build sequences of script pages. Open to all majors; may substitute for ENGL 190F prerequisite for FP101.

4 units, Win (Tobin, A)

**FILMPROD 105. Script Analysis**

(Same as FILMPROD 305) Analysis of screenplay and film from the writer's perspective, with focus on ideation, structure, and dramatic tension in narrative features. Sources include screenplays and screenings.

4 units, Aut (Tobin, A)

**FILMPROD 114. Introduction to Film and Video Production**

Hands-on. Techniques of film and video making including conceptualization, visualization, story structure, cinematography, sound recording, and editing.

5 units, Spr (Symons, J)

**GRADUATE COURSES IN FILM, PRACTICE OF**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**FILMPROD 301. Screenwriting**

(Same as FILMPROD 101) Priority to Film and Media Studies majors. Craft, form, and approaches to writing for the screen. Prerequisites: 1) ENGLISH 90, 2) ENGLISH 190F or FILMPROD 104, and 3) consent of instructor.

5 units, Spr (Tobin, A)

**FILMPROD 305. Script Analysis**

(Same as FILMPROD 105) Analysis of screenplay and film from the writer's perspective, with focus on ideation, structure, and dramatic tension in narrative features. Sources include screenplays and screenings.

4 units, Aut (Tobin, A)

**FILMPROD 400. Film/Video Writing and Directing**

Restricted to M.F.A. documentary students. Emphasis is on the development of the research, conceptualization, visualization, and preproduction skills required for nonfiction filmmaking. Prerequisite: consent of instructor.

4 units, Aut (Samuelson, K)

**FILMPROD 401. Nonfiction Film Production**

Restricted to M.F.A. documentary students. 16mm production techniques and concepts. Final project is a short black-and-white film with multitrack sound design. Prerequisite: consent of instructor.

4 units, Aut (Krawitz, J)

**FILMPROD 402. Digital Video**

Restricted to M.F.A. documentary students. Fundamentals of digital storytelling. Working with small format cameras, interviewing techniques, and nonlinear editing skills. Prerequisite: consent of instructor.

4 units, Win (Krawitz, J)

**FILMPROD 403. Advanced Documentary Directing**

Restricted to M.F.A. documentary students. Further examination of structure, emphasizing writing and directing nonfiction film. Prerequisite: consent of instructor.

4 units, Spr (Symons, J)

**FILMPROD 404. Advanced Film and Video Production**

Restricted to M.F.A. documentary students. Techniques of visual storytelling and observational shooting. Final quarter of professional training in 16mm motion picture production. Prerequisite: consent of instructor.

4 units, Spr (Samuelson, K)

**FILMPROD 405. Producing Practicum**

Restricted to M.F.A. documentary students. Advanced producing principles through the preproduction of the M.F.A. thesis project, including development of a professional film proposal. Practical training in fundraising. Prerequisite: consent of instructor.

4 units, Aut (Symons, J)

**FILMPROD 406A. Documentary M.F.A. Thesis Seminar I**

Restricted to M.F.A. documentary students. Production of film or video project. Focus is on shooting strategies, ethical challenges, and practical production issues. Prerequisite: consent of instructor.

4 units, Win (Samuelson, K)

**FILMPROD 406B. Documentary M.F.A. Thesis Seminar II**

Restricted to M.F.A. documentary students. Editing and post-production of film or video project. Emphasis is on aesthetic choices (structure, narration, music), distribution, contracts, and audience. Prerequisite: consent of instructor.

4 units, Spr (Krawitz, J)

**FRENCH GENERAL (FRENGEN)  
COURSES**

**UNDERGRADUATE COURSES IN FRENCH GENERAL**

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**FRENGEN 146. Revolution! A Global History from 1640 to the Present**

(Same as HISTORY 104A) The modern world was born out of Revolution. To this day, dramatic political change is most often the result of Revolution. This course will explore how Revolution became a model for changing the course of history. From the English revolutions of the 1600's to the current upheavals in the Arab world, passing through the French, Russian, and Chinese revolutions, we will study how Revolution has been conceived, carried out, and re-invented around the world. GER:DB-Hum

4 units, Aut (Baker, K; Edelstein, D)

**FRENGEN 167. Social Animals, Social Revolutions and Social Networks**

(Same as BIO 167, CS 81G) We like to think of social networks as contemporary phenomena. But before Facebook, individuals organized themselves in social networks; before Twitter, revolutionaries used media to communicate and coordinate their messages. In fact, even animal societies are networked. Do all these social networks share certain properties? What can we learn by comparing them? These are some of the questions we will ask in this course, as we traverse the natural world and past societies before taking a fresh look at our modern social networks. GER:DB-NatSci

4 units, Spr (Gordon, D; Edelstein, D; Roberts, E)

**FRENGEN 172. Dream Visions: The Roman de la Rose**

(Same as FRENGEN 272, ITALGEN 172, ITALGEN 272) What truths are in dreams? How does the quest for a symbolic object embody a moral struggle? What motivates a personal search for divine love? Study of arguably the most influential work of the European Middle Ages, the Roman de la Rose of Guillaume de Lorris and Jean de Meun. Focus on the work as erotic, allegorical quest for the mystical Rose, and scholastic encyclopedia through close analysis, secondary readings, and study of manuscript illumination. Use of medieval and modern French edition.

3-5 units, not given this year

**FRENGEN 181. Philosophy and Literature**

(Same as CLASSGEN 81, COMPLIT 181, ENGLISH 81, ITALGEN 181, GERGEN 181) Required gateway course for Philosophical and Literary Thought; crosslisted in departments sponsoring the Philosophy and Literature track: majors should register in their home department; non-majors may register in any sponsoring department. Introduction to major problems at the intersection of philosophy and literature. Issues may include authorship, selfhood, truth and fiction, the importance of literary form to philosophical works, and the ethical significance of literary works. Texts include philosophical analyses of literature, works of imaginative literature, and works of both philosophical and literary significance. Authors may include Plato, Montaigne, Nietzsche, Borges, Beckett, Barthes, Foucault, Nussbaum, Walton, Nehamas, Pavel, and Pippin. GER:DB-Hum

4-5 units, Win (Staff)

**FRENGEN 192E. Images of Women in French Cinema: 1930-1990**

The myth of the feminine idol in French films in historical and cultural context. The mythology of stars as the imaginary vehicle

that helped France to change from traditional society to modern nation after 1945. Filmmakers include Renoir, Truffaut, and Nelly Kaplan. The evolution of the role of women in France over 60 years. Lectures in English; films in French with English subtitles. This course must be taken for either 3 units or 5 units; cannot be taken for 4 units. GER:DB-Hum, EC-Gender

3-5 units, Spr (Apostolides, J)

**FRENGEN 204. Songs of Love and War: Gender, Crusade, Politics**

Medieval love, satirical and Crusade lyrics in the Old Occitan, and Old French traditions. Focus on deictic address, corporeal subjectivity, the female voice, love debates, and the body as a figure of political conflict. Also modern translation and reception of the troubadour tradition. Poets include Ovid, Bernart de Ventadorn, Bertran de Born, La Comtessa de Dia, Thibaut de Champagne, Sordello, Dante, Pound, and Neruda. GER:DB-Hum, EC-Gender

3-5 units, Win (Galvez, M)

**FRENGEN 268. INTERPRETATION AND THEORY**

(Same as DRAMA 167T, DRAMA 367) This course will present majors French authors whose work have help to create Literary and Drama Theory in America. Among the authors we will devote a special interest to the work of Roland Barthes, Jacques Derrida, Jacques Lacan, Luce Irigaray, Gilles Deleuze, Julia Kristeva, Jacques Rancière and Alain Badiou. Paralellism between the interpretation of drama and the interpretation of painting will constitute the core of this course.

5 units, Aut (Apostolides, J)

**GRADUATE COURSES IN FRENCH GENERAL**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**FRENGEN 219. The Renaissance Body**

The body as locus for desire, pleasure, disease, mortality, sexuality, and gender; and as canon of beauty and reflection of cosmic harmony. How literature responded to the development of an anatomical gaze in arts and medicine; how it staged the aesthetic, religious, philosophical, and moral issues related to such a promotion or deconstruction of the body. Does literature aim at representing the body, or use it as signifier for intellectual, emotional, and political ideas? Readings from Rabelais, Ronsard, Labé, Montaigne; medical texts and archival documents from <http://renaissancebodyproject.stanford.edu>.

3-5 units, not given this year

**FRENGEN 225. Introduction to Medieval French Literature**

Introduction to the premodern period of French literature through the interpretation of canonical works (La Chanson de Roland; Béroul and Thomas, Tristan; selected lais of Marie de France; selected romans of Chrétien de Troyes; Le Roman de la Rose). Special attention will be given to the socio-cultural contexts in which these works were composed and first received, and to the emergence of the concept of writing as a self-defining act. We will study Old French language and the material aspects of a medieval work.

3-5 units, Aut (Galvez, M)

**FRENGEN 237. Jean-Jacques Rousseau**

A comprehensive and yet focused introduction to the work and life of the French 18th-century philosophe who undoubtedly had the strongest impact on posterity (occasionally comparing Rousseau with two other key-figures of French Enlightenment, Voltaire and Denis Diderot). Special attention will be paid to Rousseau's reception history, both as the inventor of new concepts and discourses (eg. vertu persécutée) that have shaped our understanding of social life up until the present day, and on a new type of sensibilité mainly based on the capacity of compassion (pitié). This seminar, in its concluding sessions, will explore aspects of an aesthetic and political genealogy of our time.

3-5 units, Win (Gumbrecht, H)

**FRENGEN 242. Women Mystics from the Middle Ages to the Present**

(Same as ITALGEN 242) The predominantly female mystical experience or direct-embodied encounter with a spiritual reality

that is difficult, perhaps impossible, to reduce to words, or to explain rationally. Sources include European texts from the Middle Ages to the present by women and men who attempt to convey the experience metaphorically, to interpret it theologically and philosophically, and to transmit it actively to others.

3-5 units, not given this year

**FRENGEN 256E. Political Anthropology from Rousseau to Freud**

A confrontation between ways of accounting for society in an individualistic framework: the social contract; political economy; individualistic sociology; society as crowd; mass psychology; and sociopolitical institutions. Creating a typology of the ways in which a given anthropology constrains conceptions of the social and political order. Writers include Rousseau, Hume, Smith, Constant, Tocqueville, Marx, Durkheim, Weber, and Freud.

3-5 units, Win (Dupuy, J)

**FRENGEN 272. Dream Visions: The Roman de la Rose**

(Same as FRENGEN 172, ITALGEN 172, ITALGEN 272) What truths are in dreams? How does the quest for a symbolic object embody a moral struggle? What motivates a personal search for divine love? Study of arguably the most influential work of the European Middle Ages, the Roman de la Rose of Guillaume de Lorris and Jean de Meun. Focus on the work as erotic, allegorical quest for the mystical Rose, and scholastic encyclopedia through close analysis, secondary readings, and study of manuscript illumination. Use of medieval and modern French edition.

3-5 units, not given this year

**FRENGEN 278. European Nihilism**

(Same as ITALGEN 278) This course will probe the thought of nothingness in various European writers and thinkers. The main authors include Giacomo Leopardi, Nietzsche, Michelstader, Heidegger, Beckett, and Emile Cioran.

3-5 units, Win (Harrison, R)

**FRENGEN 288. Decadence and Modernism from Mallarme to Marinetti**

(Same as ITALGEN 288) How the notion of decadence, initially a term of derision, shapes and underlies the positive terms of symbolism and modernism. Readings include theories of decadence and examples of symbolist and modernist texts that attempt to exorcise decadent demons, such as lust, mysticism, and the retreat into artificiality. Authors include Huysmans, Poe, Mallarmé, Nietzsche, Nordau, d'Annunzio, Valry, Ungaretti, Marinetti, and Breton.

3-5 units, Aut (Wittman, L)

**FRENGEN 289. French and Italian Women Writers**

(Same as ITALGEN 289) How does women's writing evolve from the very early 20th century, when women's liberation movements first began and WW I brought major social changes, to the flowering of feminine writing in the 70s and beyond? What is the relationship between women writers and filmmakers, and feminism? Is it legitimate to consider women writers in a separate category? To what extent does a reevaluation of women writers mean reconsidering modern literary history? Authors and filmmakers include Aleramo, Yourcenar, de Beauvoir, Banti, Duras, Cavani.

3-5 units, not given this year

**FRENGEN 301E. New Methods and Sources in French and Italian Studies**

(Same as ITALGEN 301E) Based on student interest. Changes in research methods: the use of digitized texts, resources, and databases available through Stanford Libraries, gateways. Emphasis is on strategies for exploration of broad and specialized topics through new and traditional methods. Using a flexible schedule based on enrollment and the level of students, knowledge, may be offered in forms including a shortened version on the basics, independent study, or a syllabus split over two quarters. Unit levels adjusted accordingly.

1-4 units, Spr (Sussman, S)

**FRENGEN 334. Introduction to Multispecies Theory in the Humanities and Social Sciences**

(Same as ANTHRO 334A) This course will focus on such problems as: posthumanism and the emergence of non-anthropocentric human and social sciences, multispecism, in the re-thinking of disciplines, redefinition of the concept of life in

the human and social sciences by including non-human subjects, animals and plants as others, rethinking the category of the social as a collective of humans and non-humans, nonintentional agency (as well as understanding of vitalism and animism), animal holocaust, multispecies art and living organisms as media in art (bio-art), ethics of compassion and the problem of the dignity of the non-human (including recent interest in the dignity of plants).

*5 units, Spr (Domanska, E)*

### **FRENGEN 356. Theories of the Novel**

(Same as COMPLIT 322A) The novel as the literary genre most closely identified with the development of cultural modernity by literary historians and theorists. Critical models for defining the novel's poetics and cultural work. Critical readings such as texts by Lukacs, Bakhtin, Auerbach, Barthes, Armstrong, Gallagher, Bourdieu, Macherey, Jameson, Said and Spivak. Tutor texts such as Defoe's Robinson Crusoe, Flaubert's Madame Bovary, and Woolf's *To the Lighthouse*.

*3-5 units, not given this year*

### **FRENGEN 369. Introduction to Graduate Studies: Criticism as Profession**

(Same as COMPLIT 369, ITALGEN 369, GERLIT 369) Based on a survey of (and a conversation about) the history of academic Literary Criticism, and on presentation (and discussion) of contemporary theoretical positions, this seminar will try to enhance a reflection on the conditions, difficulties, and rewards of Literary Criticism as a profession and as an intellectual life form. Attention will be paid to the most relevant (and most pressing) institutional frame-conditions but this attention will not prevent us from trying to explore a (seldom used) potential of eccentricity and freedom that has always been inherent to (although sometimes dormant in) Literary Criticism.

*5 units, Aut (Gumbrecht, H)*

### **FRENGEN 395. Philosophical Reading Group**

(Same as COMPLIT 359A, ITALGEN 395) Discussion of one contemporary or historical text from the Western philosophical tradition per quarter in a group of faculty and graduate students. For admission of new participants, a conversation with H. U. Gumbrecht is required. May be repeated for credit.

*1 unit, Aut (Gumbrecht, H), Win (Gumbrecht, H)*

## FRENCH LANGUAGE (FRENLANG) COURSES

### **UNDERGRADUATE COURSES IN FRENCH LANGUAGE**

Primarily for undergraduates; graduate students may enroll with consent of adviser.

#### **FRENLANG 1. First-Year French, First Quarter**

Proficiency-based. Development of discourse appropriate in French and Francophone contexts.

*5 units, Aut (Hulstyn, M), Win (Howard, H), Spr (Howard, H)*

#### **FRENLANG 1A. Accelerated First-Year French, Part 1**

Completes first-year language sequence in two rather than three quarters. Recommended for students with previous knowledge of French who place into 1A on the placement test or who are familiar with another Romance language. 2A fulfills the University foreign language requirement. Prerequisite: French placement test and consent of instructor.

*5 units, Aut (Lasnier, M), Win (Lasnier, M)*

#### **FRENLANG 2. First-Year French, Second Quarter**

Continuation of 1. Proficiency-based. Development of discourse appropriate in French and Francophone contexts. Prerequisite 1 or equivalent.

*5 units, Aut (Kershaw, M), Win (Staff), Spr (Lasnier, M)*

#### **FRENLANG 2A. Accelerated First-Year French, Part 2**

Continuation of 1A. Completes first-year language sequence in two rather than three quarters. Recommended for students with previous knowledge of French who place into 1A on the placement test or who are familiar with another Romance language. Fulfills the University foreign language requirement. Prerequisite: 1A, or

French placement test and consent of instructor.

*5 units, Win (Kershaw, M), Spr (Kershaw, M)*

#### **FRENLANG 3. First-Year French, Third Quarter**

Continuation of 2. Proficiency-based. Development of discourse appropriate in French and Francophone contexts. Prerequisite: 2 or equivalent. Fulfills the language requirement.

*5 units, Aut (Shapirshteyn, V), Win (Lasnier, M), Spr (Staff)*

#### **FRENLANG 5A. Intensive First-Year French, Part A**

Same as FRENLANG 1. Accelerated. Written exercises, compositions, conversational practice, and daily work. Only Stanford graduate students restricted to 9 units may register for 205A,B,C.

*5 units, Sum (Staff)*

#### **FRENLANG 5B. Intensive First-Year French, Part B**

Same as FRENLANG 2. Continuation of 5A. Written exercises, compositions, conversational practice, and daily work. Only Stanford graduate students restricted to 9 units may register for 205A,B,C. Prerequisite 1 or 5A.

*5 units, Sum (Staff)*

#### **FRENLANG 5C. Intensive First-Year French, Part C**

Same as FRENLANG 3. Continuation of 5B. Written exercises, compositions, conversational practice, and daily work. Only Stanford graduate students restricted to 9 units may register for 205A,B,C. Fulfills the University language requirement. Prerequisite 2 or 5B.

*5 units, Sum (Staff)*

#### **FRENLANG 10. Beginning French Oral Communication**

For students who have completed 2 or equivalent. Emphasis is on speaking skills, vocabulary, and pronunciation. May be repeated once for credit.

*2 units, Aut (Dozer-Rabedeau, J), Win (Dozer-Rabedeau, J), Spr (Dozer-Rabedeau, J)*

#### **FRENLANG 15. Intermediate French Oral Communication**

For students who have completed the first-year language requirement. May be repeated once for credit.

*2 units, Aut (Dozer-Rabedeau, J), Win (Dozer-Rabedeau, J), Spr (Dozer-Rabedeau, J)*

#### **FRENLANG 15S. Intermediate Conversation: French in Everyday Life**

Same content as 15. May be repeated once for credit. Prerequisite: one year of college French or equivalent.

*3 units, not given this year*

#### **FRENLANG 20A. France and Francophonie**

Second-year French conversation based on themes from the regions of France and the Francophone world. Intermediate-level speaking skills and advanced-level functions. Topics include travel, food, and crosscultural comparisons. Students returning from study abroad programs are encouraged to enroll. May be repeated once for credit. Prerequisite: 22C or equivalent.

*2 units, Aut (Staff)*

#### **FRENLANG 20B. French Cinema**

Second-year French conversation based on films. Intermediate-level speaking skills and advanced-level functions. Themes include: French filmmakers, stars, and trends. Required film viewing in and outside class in French. May be repeated once for credit. Prerequisite: 22C or equivalent.

*2 units, Win (Staff)*

#### **FRENLANG 20C. Contemporary French Language**

Second-year French conversation. Intermediate-level speaking skills and advanced-level functions for formal and informal situations. Useful for students planning to travel or study abroad. May be repeated once for credit. Prerequisite: 22C or equivalent.

*2 units, Spr (Staff)*

#### **FRENLANG 21C. Second-Year French: Cultural Emphasis, First Quarter**

Sequence integrating culture and language. Emphasis is on advanced proficiency in oral and written discourse including presentational language and socio culturally appropriate discourse in formal and informal, academic, and professional contexts. Prerequisite: one year of college French or consent of coordinator.

*4-5 units, Aut (Lasnier, M), Win (Kershaw, M), Spr (Dozer-Rabedeau, J)*

**FRENLANG 22C. Second-Year French: Cultural Emphasis, Second Quarter**

Continuation of 21C. Sequence integrating culture and language. Emphasis is on advanced proficiency in oral and written discourse including presentational language and socio culturally appropriate discourse in formal and informal, academic, and professional contexts. Prerequisite: 21C or consent of coordinator.

4-5 units, Aut (Howard, H), Win (Dozer-Rabedeau, J), Spr (Kershaw, M)

**FRENLANG 23C. Second-Year French: Cultural Emphasis, Third Quarter**

Continuation of 22C. Sequence integrating culture and language. Emphasis is on advanced proficiency in oral and written discourse including presentational language and socioculturally appropriate discourse in formal and informal, academic, and professional contexts. Prerequisite: 22C or consent of coordinator.

4-5 units, Aut (Dozer-Rabedeau, J), Win (Staff), Spr (Lasnier, M)

**FRENLANG 24C. Second-Year French: Literary Texts**

Proficiency oriented. Discussion, writing, reading, and listening comprehension based on literary texts. Prerequisite: 23.

3-4 units, not given this year

**FRENLANG 24R. Second-Year French: International Relations, Political Science, and Economics Emphasis**

Proficiency-based. Discussion, writing, reading, and listening comprehension based on political, economic, and social topics. Prerequisite: 23.

3-4 units, not given next year

**FRENLANG 60A. Beginning French Conversation**

(AU)

1 unit, Aut (de Castries, P), Win (de Castries, P), Spr (de Castries, P)

**FRENLANG 60B. Intermediate French Conversation**

(AU) (Staff)

1 unit, Aut (de Castries, P), Win (de Castries, P), Spr (de Castries, P)

**FRENLANG 60C. Advanced French Conversation**

(AU)

1 unit, Aut (de Castries, P), Win (de Castries, P), Spr (de Castries, P)

**FRENLANG 60D. French Viticulture**

See <http://www.stanford.edu/class/frenlang60d/>. Prerequisite: 21 or older. (AU)

1 unit, Aut (de Castries, P), Win (de Castries, P), Spr (de Castries, P)

**FRENLANG 60E. French Cooking**

(AU)

1 unit, Aut (de Castries, P), Win (de Castries, P), Spr (de Castries, P)

**FRENLANG 60F. French Cinema**

May be repeated for credit. (AU)

1 unit, Aut (de Castries, P), Win (de Castries, P), Spr (de Castries, P)

**FRENLANG 60G. French Poetry**

(AU)

1 unit, Aut (Staff), Win (Staff), Spr (Staff)

**FRENLANG 60N. French cheese**

1 unit, not given this year

**FRENLANG 60P. Advanced Viticulture**

Prerequisite: Completion of 60D. (AU)

1 unit, Win (de Castries, P), Spr (de Castries, P)

**FRENLANG 60T. Teaching French Conversation**

(AU)

1 unit, Aut (de Castries, P), Win (de Castries, P), Spr (de Castries, P)

**FRENLANG 120. Advanced French Oral Communication**

Speaking skills and functions including narration, description, supporting opinions, and hypothesizing about current events and issues in France. May be repeated once for credit. Prerequisites: 23C or equivalent, and consent of instructor.

3 units, Aut (Staff), Win (Staff), Spr (Staff)

**FRENLANG 121. Introduction to French Texts**

Readings of major literary figures and themes from medieval times to the present. Prerequisite: 23 or consent of coordinator. Recommended: 124.

3-4 units, not given this year

**FRENLANG 122. Introduction to French Culture and Civilization**

Discussion of French art, geography, history, political change, and social institutions. Prerequisite: 23 or equivalent.

3-4 units, not given this year

**FRENLANG 123. French Creative Writing**

Advanced. Model texts introduce students to genres and styles; review of grammar and vocabulary. Discussion of original writing by students. Prerequisite: 23 or equivalent.

3-4 units, not given this year

**FRENLANG 124. Mastering Advanced French Grammar: Grammar through Contemporary Literature and Culture**

Required for students majoring or minoring in French; recommended for students planning to take literature courses. Review of difficulties in French. Grammatical and logical analysis. Prerequisite: 23C or equivalent.

3-4 units, Aut (Kershaw, M), Win (Lasnier, M), Spr (Howard, H)

**FRENLANG 125. French Phonetics**

For majors and other students who plan to enroll in advanced courses. Study and practice of the French language sound system. Language lab. Prerequisite: 23 or equivalent.

3-4 units, not given this year

**FRENLANG 199. Language Specials**

Prerequisite: consent of instructor.

1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**GRADUATE COURSES IN FRENCH LANGUAGE**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**FRENLANG 1G. Accelerated First-Year Business French, Part 1**

For GSB students only. Limited enrollment.

4 units, not given this year

**FRENLANG 2G. Accelerated First-Year Business French, Part 2**

For GSB students only. Limited enrollment.

4 units, not given this year

**FRENLANG 3G. Accelerated First-Year Business French, Part 3**

For GSB students only. Limited enrollment.

4 units, not given this year

**FRENLANG 205A. Intensive First-Year French for Stanford Grads, Part A**

FRENLANG 205A. Same as FRENLANG 1. For Stanford graduate students only. Accelerated. Written exercises, compositions, conversational practice, and daily work. Stanford graduate students restricted to 9 units may take 205A,B,C for a total of 9 units or 2 of the courses for a total of 9 units.

3-5 units, Sum (Staff)

**FRENLANG 205B. Intensive First-Year French for Stanford Grads, Part B**

For Stanford graduate students only. Continuation of 205A. Accelerated. Written exercises, compositions, conversational practice, and daily work. Prerequisite 205B or equivalent. Stanford graduate students restricted to 9 units may take 205A,B,C for a total of 9 units or 2 of the courses for a total of 9 units. Prerequisite 205A or equivalent.

3-5 units, Sum (Staff)

**FRENLANG 205C. Intensive First-Year French for Stanford Grads - Part C**

For Stanford graduate students only. Continuation of 205B. Accelerated. Written exercises, compositions, conversational practice, and daily work. Stanford graduate students restricted to 9 units may take 205A,B,C for a total of 9 units or 2 of the courses

for a total of 9 units. Prerequisite 205B or equivalent.

3-5 units, *Sum (Staff)*

### **FRENLANG 250. Reading French**

For seniors or graduate students seeking to meet the University reading requirement for advanced degrees. Reading strategies for comprehension of secondary literature for academic research. Fulfills the University foreign language requirement for advanced degrees if student earns a grade of 'B.' Prerequisite: one year or reading proficiency in another Romance language.

4 units, *Win (Staff)*

### **FRENLANG 250S. Reading French**

For seniors or graduate students seeking to meet the University reading requirement for advanced degrees. Reading strategies for comprehension of secondary literature for academic research. Fulfills the University foreign language requirement for advanced degrees if student earns a grade of 'B.' Prerequisite: one year or reading proficiency in another Romance language.

2-4 units, *Sum (Staff)*

### **FRENLANG 394. Graduate Studies in French Conversation**

Prerequisite: consent of the instructor.

1-3 units, *Aut (Staff), Win (Staff), Spr (Staff)*

### **FRENLANG 395. Graduate Studies in French**

Prerequisite: consent of instructor.

2-5 units, *Aut (Staff), Win (Staff), Spr (Staff)*

## FRENCH LITERATURE (FRENLIT) COURSES

### **UNDERGRADUATE COURSES IN FRENCH LITERATURE**

Primarily for undergraduates; graduate students may enroll with consent of adviser.

#### **FRENLIT 38N. Coffee & Cigarettes: The Making of French Intellectual Culture**

(F,Sem) Stanford Introductory Seminar. Stanford Introductory Seminar. Preference to freshmen. This course will examine a quintessential French figure l'intellectuel from a long-term historical perspective. We will observe how this figure was shaped over time by such other cultural types as the writer, the artist, the historian, the philosopher, and the moralist. Proceeding in counter-chronological order, from the late 20th to the 16th century, we will read a collection of classic French works. As this course is a gateway for French studies, special emphasis will be placed on oral proficiency. Prerequisite: students must have two years of college-level French (or equivalent).

4 units, *Aut (Edelstein, D)*

#### **FRENLIT 122. Nation in Motion: Film, Race and Immigration in Contemporary French Cinema**

An examination of the current debates in France regarding national identity, secularism, and the integration of immigrants, notably from the former colonies. Course confronts films' and other media's visual and discursive rhetorical strategies used to represent ethnic or religious minorities, discrimination, citizens' resistance to government policies, inter-racial marriages, or women's rights within immigrant communities. By embodying such themes in stories of love, hardships, or solidarity, the motion pictures make the movements and emotions inherent to immigration tangible: to what effect? GER:DB-Hum

3-5 units, *Win (Alduy, C)*

#### **FRENLIT 124. Constructing the French**

How did language, history and the arts (short stories, plays, films, and paintings) help to legitimize and popularize different visions of French identity and culture (many of which are still influential today)? Topics include the Other, French republicanism, the myth of the Grand Siècle, collaboration during WWII, colonialism, and verlan. Authors include Montaigne, Montesquieu, Voltaire, Rostand, Vercors, Hugo, Camus and Sarkozy! Readings and discussions in French.

3-5 units, *Spr (Robert, Y)*

#### **FRENLIT 130. Introduction to Medieval and Renaissance**

### **French Literature**

Introduction to the Middle Ages and the Renaissance. The birth of a national literature and its evolution. Literature as addressing cultural, philosophical, and artistic issues which question assumptions on love, ethics, art, and the nature of the self. Readings: epics (La Chanson de Roland), medieval romances (Tristan, Chrétien de Troyes' Yvain), post-Petrarchan poetics (Du Bellay, Ronsard, Labé), and prose humanists (Rabelais, Montaigne). Prerequisite: FRENLANG 124 or consent of instructor. GER:DB-Hum, WIM

4 units, *Aut (Galvez, M)*

#### **FRENLIT 131. Absolutism, Enlightenment, and Revolution in 17th- and 18th-Century France**

The literature, culture, and politics of France from Louis XIV to Olympe de Gouges. How this period produced the political and philosophical foundations of modernity. Readings include Corneille, Molière, Racine, Lafayette, Voltaire, Diderot, Rousseau, Beaumarchais, and Gouges. Prerequisite: FRENLANG 124 or consent of instructor. GER:DB-Hum, WIM

4 units, *Win (Apostolides, J)*

#### **FRENLIT 132. Literature, Revolutions, and Changes in 19th- and 20th-Century France**

Major literary genres, and social and cultural contexts. Focus is on the emergence of new literary forms such as *surréalisme*, *nouveau roman*, and *nouveau théâtre*. Topics of colonization, decolonization, and feminism. Readings include Balzac, Baudelaire, Césaire, Colette, and Ionesco. Prerequisite: FRENLANG 124 or consent of instructor. GER:DB-Hum, WIM

4 units, *Spr (Staff)*

#### **FRENLIT 133. Literature and Society in Africa and the Caribbean**

(Same as COMPLIT 141) The course is reading, analysis and discussion of some of the most representative texts by 20th century Francophone writers from a variety of locations: the French Caribbean, Africa North and South of the Sahara. These works convey the changing aspects of Francophone Africa and the French Caribbean societies and cultures: from oral to written, colonization and changes, tradition competing with modernity, particularly for women, building new identities immigration narrative. The course aims to broaden knowledge of the Francophone societies and cultures, as well as improve skills in speaking and writing in French. Lectures and discussions are conducted in French, most required readings and background material are in French as well. Reading in fiction, poetry and theater include Laye Camara, Ferdinand Oyono, Maryse Condé, Aimé Césaire, Leila Sebbar, Mariama Ba, and others. Prerequisite: FRENLANG 124 or consent of instructor. GER:DB-Hum, EC-GlobalCom, WIM

4 units, *Win (Boyi, E)*

#### **FRENLIT 159. Confessions in 19th-Century French Literature**

Evolution of confessional mode in 19th-century first-person narrative. In what way the confessional mode of the Christian practice was preserved in literature and what changes it underwent in the narratives about the self. How did the religious crisis in 19th century France invest the literary confessions? The topics are confessors, conversion, sincerity, repentance, guilt. Authors include Saint Augustine, Rousseau, Musset, Constant, Sainte-Beuve, Fouché, Guizot, Lamartine, Verlaine, Nerval. Taught in French. GER:DB-Hum

3-5 units, *not given this year*

#### **FRENLIT 179. Le Roman au féminin: French Women Writers from the 90's and 00's**

From Marie Darrieussecq's *Truismes* (1996) to Christine Angot, Virginie Despentes, Nothomb, or Marie NDiaye, women writers have been regularly stealing the show since the 1990's. What does it say about the French society? What do they say about contemporary France, and how? Do they transgress literary genres, carving out new literary spaces for unspoken points of views, or are they transcending the notion of *écriture féminine* that might too conveniently reduce their scandalous novels to a label? Prerequisite: FRENLIT 130 (or higher) or consent of instructor. GER:DB-Hum

3-5 units, *Spr (Alduy, C)*

#### **FRENLIT 189A. Honors Research**

Senior honors students enroll for 5 units in Winter while writing

the honors thesis, and may enroll in 189B for 2 units in Spring while revising the thesis. Prerequisite: DLCL 189.

5 units, Win (Staff)

#### **FRENLIT 189B. Honors Research**

Open to juniors with consent of adviser while drafting honors proposal. Open to senior honors students while revising honors thesis. Prerequisites for seniors: 189A, DLCL 189.

2 units, Spr (Staff)

#### **FRENLIT 190Q. Parisian Cultures of the 19th and Early 20th Centuries**

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Political, social, and cultural events in Paris from the Napoleonic era and the Romantic revolution to the 30s. The arts and letters of bourgeois, popular, and avant garde cultures. Illustrated with slides. Prerequisite: students must have two years of college-level French (or equivalent).

4 units, Spr (Bertrand, M)

#### **FRENLIT 199. Individual Work**

Restricted to French majors with consent of department. Normally limited to 4-unit credit toward the major. May be repeated for credit.

1-12 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

## **GRADUATE COURSES IN FRENCH LITERATURE**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

#### **FRENLIT 219. The Renaissance Body**

The body as locus for desire, pleasure, disease, mortality, sexuality, and gender; and as canon of beauty and reflection of cosmic harmony. How literature responded to the development of an anatomical gaze in arts and medicine; how it staged the aesthetic, religious, philosophical, and moral issues related to such a promotion or deconstruction of the body. Does literature aim at representing the body, or use it as signifier for intellectual, emotional, and political ideas? Readings from Rabelais, Scève, Ronsard, Labé, d'Aubigné, Montaigne, and medical texts.

3-5 units, not given this year

#### **FRENLIT 222. The Political Unconscious of the Ancien Regime**

The lasting influence in Europe of absolutism. Topics include political theories, the importance of court life, art as a political tool, modifications in human sensibility, literature, and social transformations.

3-5 units, not given this year

#### **FRENLIT 225. Multicultural Moliere**

Molière's life and work as a point of departure for the notion of multiculturalism. Born in a bourgeois family, Molière was in contact with social milieux including the French peasantry for whom he wrote farces, and the court of Louis XIV for whom he provided spectacles at Versailles. Major plays, including Tartuffe, Le bourgeois gentilhomme, and Le malde imaginaire as the expression of the new court culture. Sociohistorical and contemporary literary approaches: Molière as the unifying artistic figure in a multicultural France.

3-5 units, not given this year

#### **FRENLIT 238. Jean-Paul Sartre and Simone de Beauvoir**

The course will examine the relation between the two thinkers, with special emphasis on the debate in France about the engaged intellectual. It will also explore the Sartre/Merleau-Ponty correspondence at the time of their quarrel around 1953, as well as the Sartre/Camus controversy. Readings include: Sartre's, Qu'est-ce que la littérature ?, Situations II, L'idiot de la famille; Beauvoir's, Le deuxième sexe, Mémoires d'une jeune fille rangée, Les Mandarins, La Force des choses; Merleau-Ponty's Sartre et l'ultra-bolchévisme, in Parcours deux; and Adorno's paper Engagement, in Notes to Literature.

3-5 units, Aut (Gayraud, A)

#### **FRENLIT 248. Literature, History, and Representation**

(Same as COMPLIT 250) Literary works as historical narratives; texts which envision ways of reconstructing or representing an ancient or immediate past through collective or individual narratives. Narration and narrator; relation between individual and

collective history; historical events and how they have shaped the narrative; master narratives; and alternative histories. Reading include Glissant, Césaire, Dadié, Cixous, Pérec, Le Clézio, Mokkedem, Benjamin, de Certeau, and White.

3-5 units, not given this year

#### **FRENLIT 256. Mind and Body in 20th-Century French Fiction**

How fiction articulates the tensions among the sensuous, the sensual, the embodied, and the aspiration to purity, abstraction, and transcendence. Focus is on questioning dichotomies such as nature/culture, masculine/feminine, sacred/profane, and written word/voice. Authors include Gide, Camus, Butor, Duras, and Tournier.

3-5 units, not given this year

#### **FRENLIT 263. French Theater Through the Ages**

Today's most admired French plays were often deeply controversial when first performed. In this course, we will study a selection of plays that elicited heated arguments, from quarrels in the press to all out war in the auditorium. This will allow us to explore issues unique to different literary movements, as well as trans-historical questions concerning the political and moral value of theater. Authors include Corneille, Molière, Beaumarchais, Chénier, Hugo, Jarry and Genet. Readings and discussions in French.

3-5 units, Win (Robert, Y)

#### **FRENLIT 267. National Literatures, Littérature-monde: A New Comparatism**

(Same as COMPLIT 267) This course will focus on the implications of a global francophonie, through discussion of texts produced in different francophone times and spaces. Among the topics to be explored: confrontation of inward/outward territories and the questions of otherness, identity and minority status, the relation between history and literature, transnationality, métissage of languages and transnationality. Readings include Montaigne and Calvin, Tzvetan Todorov, Lise Gauvin, Aimé Césaire, Bernard Dadié, Edouard Glissant, Leila Sebbar and others.

3-5 units, not given this year

#### **FRENLIT 276. From Romance to Novel: 17th-Century French Fiction**

Modern literary historians aren't the only ones to have had difficulty conceptualizing the novel without using romance as a foil: lexically, the opposition has been with us, in France and England, for a good three and a half centuries; the tension even generated, many say, the foundational Don Quixote. In this seminar, we will be both reviewing the critical literature on the topic and looking closely at three works from the French tradition that may--or may not--document the transition from romance to novel: d'Urfé's L'Astrée, Sorel's Le Berger extravagant, and Lafayette's La Princesse de Clèves,.

3-5 units, Spr (Staff)

#### **FRENLIT 278. Special Topics (Francophone Literature): From Exoticism to a Discourse of Auto-Representation**

(Same as AFRICAST 278, COMPLIT 278) Critical analysis of major issues relating to literatures in French language in and outside France. Focus is on exoticism and self-representation, with an emphasis on the evolution of mentalities, new sensitivities and the role of literature in developing individual or collective identity. Readings include Le Clézio, Memmi, Malouf, Lopes, Schwarz-Bart, Delaygue, Glissant, Todorov, Kane and others. Primary sources, secondary sources and film. Taught in French.

3-5 units, not given this year

#### **FRENLIT 280. Women in Print: Gender, Authorship, and Book Culture in Early Modern France**

The relationships between gender, concepts of authorship, and early modern book culture in Renaissance France. What rhetorical, commercial, or textual strategies were used by printers, publishers, and writers, male and female alike, to create a new commodity, the female-authored book, and a new notion, that of female author, at a time when the phrase was still an oxymoron. Readings from Marguerite de Navarre, Helisenne de Crenne, Pernelle du Guillet, Louise Labé, the Dame des Roches, and Marie de Gournay.

3-5 units, Aut (Alduy, C)

#### **FRENLIT 293A. Topics in French Literature and Philosophy**

Five-week course. May be repeated for credit.



2 units, Aut (Serres, M)

**FRENLIT 293B. Topics in French Literature and Philosophy**

Five-week course. May be repeated for credit.

2 units, Spr (Serres, M)

**FRENLIT 299. Individual Work**

May be repeated for credit.

1-12 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**FRENLIT 358. The Novel as/and Critical Discourse**

(Same as COMPLIT 348) Literature is the site of a multiplicity of knowledges. This course is an attempt to build a history of ideas in the Francophone world. We will be looking at narrative styles, as well as the ways in which the 20th century theoretical discourse among Francophone intellectuals is often embedded in the novel. The role of intellectuals in society will be discussed, with a focus on three major topics: identities, religion (Islam, Christianity, violence), and democracy. Reading includes Assia Djebar, Abdelwahab Meddeb, Henri Lopes, Amin Malouf, VY Mudimbe, Franz Fanon, Jean-Paul Sartre, Edward Said and others.

3-5 units, Win (Boyi, E)

**FRENLIT 399. Individual Work**

For students in French working on special projects or engaged in pre-dissertation research.

1-12 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**FRENLIT 802. TGR Dissertation**

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

## GENETICS (GENE) COURSES

### UNDERGRADUATE COURSES IN GENETICS

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**GENE 25SI. The Art and Science of Beer**

Colloquium-style lecture series. Topics include: basics of beer brewing, the science behind the brew, history of beer brewing, government regulation, regional traditions and techniques, American micro-brewing. Includes hands-on brewing experience.

1 unit, Spr (Staff)

**GENE 104Q. Law and the Biosciences**

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Focus is on human genetics; also assisted reproduction and neuroscience. Topics include forensic use of DNA, genetic testing, genetic discrimination, eugenics, cloning, pre-implantation genetic diagnosis, neuroscientific methods of lie detection, and genetic or neuroscience enhancement. Student presentations on research paper conclusions.

3 units, Win (Greely, H)

**GENE 109Q. Genomics: A Technical and Cultural Revolution**

(Same as BIOMEDIN 109Q) Preference to sophomores. Concepts of genomics, high-throughput methods of data collection, and computational approaches to analysis of data. The social, ethical, and economic implications of genomic science. Students may focus on computational or social aspects of genomics.

3 units, not given this year

**GENE 199. Undergraduate Research**

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### GRADUATE COURSES IN GENETICS

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**GENE 202. Human Genetics**

Utilizes lectures and small group discussions to design a working knowledge of human genetics as applicable to clinical medicine and research. Basic principles of inheritance, risk assessment, and population genetics, illustrated by using clinical examples drawn from diverse areas of medical genetics practice including prenatal, pediatric, adult and cancer genetics. Practical aspects of molecular and cytogenetic diagnostic methods emphasized. Existing and

emerging treatment strategies for single gene disorders also covered. Prerequisites: biochemistry; basic genetics.

4 units, Aut (Bernstein, J)

**GENE 203. Advanced Genetics**

(Same as BIO 203, DBIO 203) For graduate students in Bioscience programs; may be appropriate for graduate students in other programs. Focused on application of the genetics toolbox to problems in modern biology research. Topics covered include analytic methods, genetic manipulation, genome analysis, and human genetics. Lectures and faculty-led discussion sections with evaluation of papers. Students with minimal experience in genetics should prepare by working out problems in college level textbooks.

4 units, Aut (Stearns, T; Bustamante, C; Fire, A; Sidow, A)

**GENE 206. Epigenetics**

(Same as BIO 156, BIO 256, PATH 206) For graduate students in the Biosciences and upper level Biology undergraduates. Mechanisms by which phenotypes not determined by the DNA sequence are stably inherited in successive cell divisions. From the discovery of position-effect variegation in *Drosophila* in the 1920s to present-day studies of covalent modifications of histones and DNA methylation. Topics include: position effect, gene silencing, heterochromatin, centromere identity, genomic imprinting, histone code, variant histones, and the role of epigenetics in cancer. Prerequisite: BIO41 and BIO42, or GENE 203, or consent of instructor.

2 units, alternate years, not given this year

**GENE 209. Current Topics in Human, Population, and Statistical Genomics**

Intensive seminar/workshop. Topics, drawn from current and past literature, may include: assessing and population genetic analysis of genomic variation; genome-to-phenome mapping; reconstructing demographic history from genome sequence data; domestication genomics; host-pathogen genome evolution; detecting signatures of selection; experimental design in human genetics; linkage and association mapping; ethical and social issues in human, plant, and animal genetics research. Emphasis on analysis and logic or experimental and observational genomics research. Faculty-led discussion with evaluation of response papers, problem sets, and intensive course project. May be repeated for credit.

2 units, Win (Bustamante, C), Spr (Staff)

**GENE 210. Genomics and Personalized Medicine**

Principles of genetics underlying associations between genetic variants and disease susceptibility and drug response. Topics include: genetic and environmental risk factors for complex genetic disorders; design and interpretation of genome-wide association studies; pharmacogenetics; full genome sequencing for disease gene discovery; population structure and genetic ancestry; use of personal genetic information in clinical medicine; ethical, legal, and social issues with personal genetic testing. Hands-on workshop making use of personal or publicly available genetic data. 2 units lecture only; 3 units lecture and workshop. Prerequisite: GENE 202 or 203.

2-3 units, Spr (Staff)

**GENE 211. Genomics**

Genome evolution, organization, and function; technical, computational, and experimental approaches; hands-on experience with representative computational tools used in genome science; and a beginning working knowledge of PERL.

3 units, Win (Cherry, J; Sherlock, G)

**GENE 212. Introduction to Biomedical Informatics Research Methodology**

(Same as BIOE 212, BIOMEDIN 212, CS 272) Hands-on software building. Student teams conceive, design, specify, implement, evaluate, and report on a software project in the domain of biomedicine. Creating written proposals, peer review, providing status reports, and preparing final reports. Guest lectures from professional biomedical informatics systems builders on issues related to the process of project management. Software engineering basics. Prerequisites: BIOMEDIN 210, 211, 214, 217 or consent of instructor.

3 units, Spr (Altman, R)

**GENE 214. Representations and Algorithms for**



**Computational Molecular Biology**

(Same as BIOE 214, BIOMEDIN 214, CS 274) Topics: introduction to bioinformatics and computational biology, algorithms for alignment of biological sequences and structures, computing with strings, phylogenetic tree construction, hidden Markov models, Gibbs Sampling, basic structural computations on proteins, protein structure prediction, protein threading techniques, homology modeling, molecular dynamics and energy minimization, statistical analysis of 3D biological data, integration of data sources, knowledge representation and controlled terminologies for molecular biology, microarray analysis, machine learning (clustering and classification), and natural language text processing. Prerequisites: programming skills; consent of instructor for 3 units.

3-4 units, Aut (Altman, R)

**GENE 215. Frontiers in Biological Research**

(Same as BIOC 215, DBIO 215) Literature discussion in conjunction with the Frontiers in Biological Research seminar series in which investigators present current work. Students and faculty meet beforehand to discuss papers from the speaker's primary research literature. Students meet with the speaker after the seminar to discuss their research and future direction, commonly used techniques to study problems in biology, and comparison between the genetic and biochemical approaches in biological research.

1 unit, Aut (Harbury, P; Villeneuve, A; Calos, M), Win (Harbury, P; Villeneuve, A; Calos, M)

**GENE 218. Computational Analysis of Biological Images**

(Same as PATH 218) Physical and computational tools for acquisition, processing, interpretation, and archiving of biological images. Emphasis is on digital microscopy.

2 units, not given this year

**GENE 221. Current Issues in Aging**

(Same as DBIO 221) Current research literature on genetic mechanisms of aging in animals and human beings. Topics include: mitochondria mutations, insulin-like signaling, sirtuins, aging in flies and worms, stem cells, human progeria, and centenarian studies. Prerequisite: GENE 203.

2 units, Spr (Staff), alternate years, not given next year

**GENE 222. Method and Logic in Experimental Genetics**

For graduate students only. How experimental strategies are applied to biological questions irrespective of discipline boundaries. Examples include purifying activities from complex mixtures, localizing molecules in space and time, discovering macromolecular interactions, inferences from sequence similarity, using structure to elucidate function, and applying genomics to biological problems. Weekly discussion of two representative papers selected by faculty and a student presentation of a third paper which illustrate principles of biochemistry and cell and molecular biology, and the historical context of important scientific advances.

3 units, Win (Baker, J; Pringle, J)

**GENE 233. The Biology of Small Modulatory RNAs**

(Same as MI 233, PATH 233) Open to graduate and medical students. Explores recent progress and unsolved questions in the field of RNA interference and microRNA biology. Students are required to read assigned primary literature before each class and actively participate in guided discussions on related technical and conceptual issues during class meetings. Assignments include critiques of assigned papers and developing a novel research proposal.

2 units, alternate years, not given this year

**GENE 234. Fundamentals of RNA Biology**

(Same as MI 234, PATH 234) For graduate or medical students and (if space allows) to active participants from other segments of the Stanford Community (e.g., TGR students); undergraduates by instructor consent. Fundamental issues of RNA biology, with the goal of setting a foundation for students to explore the expanding world of RNA-based regulation. Each week a topic is covered by a faculty lecture and journal club presentations by students.

2 units, Aut (Fire, A; Chen, C)

**GENE 235. C. Elegans Genetics**

Genetic approaches to *C. elegans*, practice in designing experiments and demonstrations of its growth and anatomy.

Probable topics include: growth and genetics, genome map and sequence, mutant screens that start with a desired phenotype, reverse genetics and RNAi screens, genetic duplications, uses of null phenotype non-null alleles, genetic interactions and pathway analysis, and embryogenesis and cell lineage. Focus of action, mosaic analysis, and interface with embryological and evolutionary approaches.

2 units, alternate years, not given this year

**GENE 243. Intellectual Property: Scientific Evidence in Patent Litigation**

(Same as LAW 343) Open to clinical MD and graduate students. Explores the role of scientific experts in patent infringement litigation. In other areas of the law where scientific experts are used -- medical malpractice, environmental law, criminal law -- the science itself is often in dispute. In patent cases, however, the parties generally agree on the science. This affects the relationship between the lawyer and the expert and the substantive content of their interactions. Patent experts need to be able to explain science to the judge and jury. But they also must help the litigators choose which legal issues to press and which to concede, and to be aware of how the complications of the science might help, hurt, obscure or reveal how the law should be applied to the facts. The class examines judicial decisions and trial documents involving scientific evidence in patent litigation, followed by work in teams on final projects: simulations of expert testimony in a patent case. Simulati

3 units, Win (Morris, R)

**GENE 244. Introduction to Statistical Genetics**

Statistical methods for analyzing human genetics studies of Mendelian disorders and common complex traits. Probable topics include: principles of population genetics; epidemiologic designs; familial aggregation; segregation analysis; linkage analysis; linkage-disequilibrium-based association mapping approaches; and genome-wide analysis based on high-throughput genotyping platforms. Prerequisite: STATS 116 or equivalent or consent of instructor.

3 units, alternate years, not given this year

**GENE 245. Computational Algorithms for Statistical Genetics**

(Same as STATS 345) Computational algorithms for human genetics research. Topics include: permutation, bootstrap, expectation maximization, hidden Markov model, and Markov chain Monte Carlo. Rationales and techniques illustrated with existing implementations commonly used in population genetics research, disease association studies, and genomics analysis. Prerequisite: GENE 244 or consent of instructor.

2-3 units, alternate years, not given this year

**GENE 260. Supervised Study**

Genetics graduate student lab research from first quarter to filing of candidacy. Prerequisite: consent of instructor.

1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**GENE 271. Human Molecular Genetics**

For genetic counseling students, graduate students in genetics, medical students, residents, and postdoctoral fellows interested in the practice of medical genetics. Gene structure and function; the impact of mutation and polymorphism as they relate to developmental pathways and health and human disease; population based genetics; approaches to the study of complex genetic conditions; GWAS and genome sequencing technologies; gene therapy, proteomics, stem cell biology, and pharmacogenetics. Undergraduates require consent of instructor and a basic genetics course.

4 units, Aut (Kwan, A; Francke, U)

**GENE 272. Introduction to Medical Genetics**

For genetic counseling students, graduate students in human genetics, medical students, residents, and fellows; undergraduates with consent of instructor. Principles of medical genetics including taking a family history, modes of inheritance, and mathematical principles of medical genetics (Bayes theorem, population genetics). An additional problem set is required for 3 units.

2-3 units, Aut (Hudgins, L; Ormond, K)

**GENE 273. Introduction to Clinical Genetics Testing**

For genetic counseling students, graduate students in genetics, medical students, residents, and fellows; undergraduates with consent of instructor. Uses a combination of case based approach

and didactic lectures to introduce the laboratory concepts of cytogenetics and molecular genetics, and illustrate common genetic conditions that are diagnosed through such testing, introducing students to skills in case preparation, management and presentation. An additional problem set is required for 3 units.

2-3 units, Aut (Kwan, A; Hudgins, L)

**GENE 274A. A Case Based Approach to Clinical Genetics**

For genetic counseling students, graduate students in genetics, medical students, residents and fellows. Case-based scenarios and guest expert lectures. Students learn skills in case preparation, management, and presentation, as well as content around common genetic disorders.

2 units, Win (Hudgins, L; Kwan, A)

**GENE 274B. A Case Based Approach to Clinical Genetics**

For genetic counseling students, graduate students in genetics, medical students, residents, and fellows. Case-based scenarios and guest expert lectures. Students learn skills in case preparation, management, and presentation, as well as content around common genetic disorders.

2 units, Spr (Staff)

**GENE 275. Role Play and Genetic Counseling Observations**

Students role play aspects of genetic counseling sessions and learn through clinical observations. Observation includes genetic counseling sessions in prenatal, pediatric, and cancer settings.

2 units, Aut (Kwan, A; Ormond, K)

**GENE 276. Genetic Counseling Clinical Rotations**

For genetic counseling students only. Supervised clinical experiences. May be repeated for credit. Prerequisite: GENE 275.

4-7 units, Aut (Ormond, K; Kwan, A), Win (Ormond, K; Kwan, A), Spr (Ormond, K; Kwan, A), Sum (Ormond, K; Kwan, A)

**GENE 278. Prenatal Genetic Counseling**

Internet-based course for genetic counseling students, graduate students in genetics, medical students, residents, and fellows; genetic counseling students should take this course in conjunction with their initial prenatal genetics rotation. Topics include prenatal genetic screening and diagnosis in the first and second trimesters, ultrasound, teratology, and genetic carrier screening.

1 unit, Aut (Ormond, K), Win (Ormond, K), Spr (Ormond, K), Sum (Ormond, K)

**GENE 279. Pediatric and Adult Genetic Counseling**

Internet-based course for genetic counseling students, graduate students in genetics, medical students, residents, and fellows; genetic counseling students should take this course in conjunction with their initial general genetics rotation. Topics include: common genetic conditions; assessment of child development and medical history in the context of a genetic workup; dysmorphology; development of a differential diagnosis; and resources for case management and family support.

1 unit, Aut (Kwan, A), Win (Kwan, A), Spr (Kwan, A), Sum (Ormond, K)

**GENE 280. Metabolic Genetic Counseling**

Internet-based course for genetic counseling students, graduate students in genetics, medical students, residents, and fellows; genetic counseling students should take this course in conjunction with their metabolic genetics rotation. Topics include: overview of metabolic diseases; common pathways; diagnosis, management, and treatment of metabolic disorders; and newborn screening.

1 unit, Aut (Kwan, A), Win (Kwan, A), Spr (Kwan, A), Sum (Ormond, K)

**GENE 281. Cancer Genetic Counseling**

Internet-based course for genetic counseling students, graduate students in genetics, medical students, residents, and fellows; genetic counseling students should take this course in conjunction with their initial cancer genetics rotation. Topics include: cancer biology and cytogenetics; diagnosis and management of common cancer genetic syndromes; predictive testing; psychology of cancer genetic counseling; and topics recommended by ASCO guidelines.

1 unit, Aut (Ormond, K), Win (Ormond, K), Spr (Ormond, K), Sum (Ormond, K)

**GENE 282A. Genetic Counseling Research Seminar**

For genetic counseling students only. Facilitated discussions on identifying a topic and mentor for genetic counseling departmental research projects.

1 unit, Win (Ormond, K)

**GENE 282B. Genetic Counseling Research Seminar**

For genetic counseling students only. Lectures and facilitated discussions on research methodology for genetic counseling departmental research projects. Prerequisite: GENE 282A,

1 unit, Spr (Staff)

**GENE 283. Genetic Counseling Research**

Genetic counseling students conduct clinical research projects as required by the department for graduation. May be repeated for credit. Pre- or corequisite: GENE 282.

1-8 units, Aut (Ormond, K; Kwan, A), Win (Ormond, K; Kwan, A), Spr (Ormond, K; Kwan, A), Sum (Ormond, K; Kwan, A)

**GENE 284. Medical Genetics Seminar**

Presentation of research and cases. Students enrolling for 2 units also attend and report on external seminars. May be repeated for credit.

1-2 units, Aut (Kwan, A), Win (Kwan, A), Spr (Staff)

**GENE 285A. Genetic Counseling Seminar**

Year-long seminar primarily for genetic counseling students. Autumn: basics of medical communication; crosscultural and disability sensitive communication about genetics, and principles of providing genetic counseling. Winter: the impact of chronic illness and genetic disease in a developmental manner. Spring: applying therapeutic counseling approaches to the practice of genetic counseling. Undergraduates may enroll in Autumn Quarter with consent of instructor.

2-3 units, Aut (Ormond, K)

**GENE 285B. Genetics Counseling Seminar**

Year-long seminar primarily for genetic counseling students. Autumn: basics of medical communication; crosscultural and disability sensitive communication about genetics, and principles of providing genetic counseling. Winter: the impact of chronic illness and genetic disease in a developmental manner. Spring: applying therapeutic counseling approaches to the practice of genetic counseling. Prerequisite: GENE 285A.

2-3 units, Win (Ormond, K)

**GENE 285C. Genetic Counseling Seminar**

Year-long seminar primarily for genetic counseling students. Autumn: basics of medical communication; crosscultural and disability sensitive communication about genetics, and principles of providing genetic counseling. Winter: the impact of chronic illness and genetic disease in a developmental manner. Spring: applying therapeutic counseling approaches to the practice of genetic counseling. Prerequisite: 285 A/B.

2-3 units, Spr (Staff)

**GENE 286. Advanced Genetic Counseling Seminar**

For genetic counseling students only. Psychosocial issues associated with genetic counseling cases are discussed through presentation of cases that students have seen throughout their training. Professional development topics including: the expanding roles of genetic counselors; billing, reimbursement, and licensing; the role of genetic counseling in the changing healthcare system; the incorporation of genetics into all areas of medicine and public health; and implications of direct-to-consumer genetic testing. Must be taken for 3 quarters. Prerequisites: GENE 285 A,B,C and 276.

2 units, Aut (Ormond, K; Kwan, A)

**GENE 286B. Advanced Genetic Counseling Seminar**

Continuation of GENE 286A. For genetic counseling students only. Psychosocial issues associated with genetic counseling cases are discussed through presentations of cases that students have seen throughout their training. Professional development topics including: the expanding roles of genetic counselors; billing, reimbursement, and licensing; the role of genetic counseling in the changing healthcare system; the incorporation of genetics into all areas of medicine and public health; and implications of direct-to-consumer genetic testing. Prerequisites: GENE 285 A,B,C and 276.

2 units, Win (Ormond, K; Kwan, A)

**GENE 299. Directed Reading in Genetics**

Prerequisite: consent of instructor.

1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**GENE 399. Graduate Research**

Investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

*1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**GENE 801. TGR Project**

*0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**GENE 802. TGR Dissertation**

*0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

## GEOLOGICAL AND ENVIRONMENTAL SCIENCES (GES) COURSES

### UNDERGRADUATE COURSES IN GEOLOGICAL AND ENVIRONMENTAL SCIENCES

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**GES 1A. Introduction to Geology: The Physical Science of the Earth**

For non-majors or prospective majors in the Earth Sciences. Lectures, hands-on laboratories, and three one-day weekend field trips. Focus is on the physical and chemical processes of heat and mass transfer within the earth and its fluid envelopes, including deep-earth, crustal, surface, and atmospheric processes. Topics include the dynamics of and interactions between the inner earth, plate tectonics, surface processes, and atmospheric processes such as climate change and global warming. Only one of GES 1A, 1B, or 1C may be taken for credit. Prerequisites: MATH 19 or equivalent. GER: DB-NatSci

*5 units, Aut (Hilley, G)*

**GES 1BN. Introduction to Geology: California Desert Field Geology**

For non-majors and prospective majors or minors in the Earth Sciences. California's Death Valley and Owens Valley are used as natural laboratories for studying active geologic processes that shape Earth's surface (earthquakes, mountain building, volcanoes, glaciers) and for tracing a billion years of Earth history, climate change, and historic human impacts. Lectures on physical geology and hands-on laboratory exercises involving rock identification and interpreting topographic and geologic maps and remote sensing imagery provide the background necessary to appreciate the 6-day field trip to these desert areas during Spring Break. Camping and moderate hiking required. Only one of GES 1A, 1B, or 1C may be taken for credit. Recommended: high school chemistry. GER: DB-NatSci

*5 units, not given this year*

**GES 1C. Introduction to Geology: Dynamic Earth**

For non-majors or prospective majors in the Earth Sciences. Integrated lecture-lab includes hands-on activities and local field trips. Focus is on reading the dynamic geological landscape, with an emphasis on California-primarily Bay Area-geology. Topics include plate tectonics, earthquakes and volcanoes, Earth materials, geologic time, stream processes, and climate change over geologic time. Only one of GES 1A, 1B, or 1C may be taken for credit. GER: DB-NatSci

*4 units, Spr (Staff)*

**GES 4. Evolution and Extinction: Introduction to Historical Geology**

(Same as EARTHSYS 4) Introduction to the basic tools and principles geologists and paleontologists use to reconstruct the history of the Earth. Principles of stratigraphy, correlation, the geological timescale, the history of biodiversity, and the interpretation of fossils. The use of data from sedimentary geology, geochemistry, and paleontology to test theories for critical events in Earth history such as mass extinctions. Two half-day field trips. GER: DB-NatSci

*4 units, Win (Payne, J)*

**GES 5. Living on the Edge**

A weekend field trip along the Pacific Coast. Tour local beaches, geology, and landforms with expert guides from the Department of Geological and Environmental Sciences. Enjoy a BBQ dinner and stay overnight in cabins along the Santa Cruz coast. Get to know faculty and graduate students in the Earth Sciences. Requirements: One campus meeting and weekend field trip to Pacific Coast. Enrollment limited to 18. Freshman have first choice.

*1 unit, Aut (Miller, E)*

**GES 7A. An Introduction to Wilderness Skills**

Living, traveling, and working in the wilderness for those planning fieldwork in the back country. Local geology, environmental ethics, trip planning, first aid, and leadership techniques. Four mandatory weekend outings focus on back country travel, minimum impact camping, equipment use and maintenance, rock climbing, and navigation. 7A emphasizes wilderness travel and climbing. 7B emphasizes winter camping skills and back country skiing. Food, group, and major personal gear provided. Guest speakers. Fee. See <http://www.stanford.edu/class/ges7>, or email [oop-teachers@lists.stanford.edu](mailto:oop-teachers@lists.stanford.edu).

*1 unit, Aut (Bird, D)*

**GES 7B. An Introduction to Wilderness Skills**

Living, traveling, and working in the wilderness for those planning fieldwork in the backcountry. Local geology, environmental ethics, trip planning, first aid, and leadership techniques. Four mandatory weekend outings focus on backcountry travel, minimum impact camping, equipment use and maintenance, rock climbing, and navigation. 7A emphasizes wilderness travel and climbing. 7B emphasizes winter camping skills and backcountry skiing. Food, group, and major personal gear provided. Guest speakers. Fee. See <http://www.stanford.edu/class/ges7>, or email [oop-teachers@lists.stanford.edu](mailto:oop-teachers@lists.stanford.edu).

*1 unit, Win (Bird, D)*

**GES 7C. Advanced Wilderness Skills**

For students with prior backcountry experience. Backcountry skiing, mountaineering, climbing, first aid, and trip planning. Focus is on outdoor leadership experience and trip management techniques. Food, group, and major personal gear provided. Four mandatory weekend trips. Fee. See <http://www.stanford.edu/class/ges7/> for information or contact [oop-teachers@lists.stanford.edu](mailto:oop-teachers@lists.stanford.edu). Prerequisite: application.

*1 unit, Spr (Bird, D)*

**GES 8. Oceanography: An Introduction to the Marine Environment**

For non-majors and earth science and environmental majors. Topics: topography and geology of the sea floor; evolution of ocean basins; circulation of ocean and atmosphere; nature of sea water, waves, and tides; and the history of the major ocean basins. The interface between continents and ocean basins, emphasizing estuaries, beaches, and continental shelves with California margin examples. Relationships among the distribution of inorganic constituents, ocean circulation, biologic productivity, and marine environments from deep sea to the coast. One-day field trip to measure and analyze waves and currents. GER: DB-NatSci

*3 units, Sum (Staff)*

**GES 38N. The Worst Journey in the World: The Science, Literature, and History of Polar Exploration**

(Same as EARTHSYS 38N, EESS 38N) Preference to freshmen. The isolation of polar explorers under the harshest conditions on Earth, and the chronicles of their explorations and hardships dating to the 1500s for the Arctic and the 1700s for the Antarctic. Focus is on scientific and geographic achievements. Sources include *The Worst Journey in the World* by Apsley Cherry-Garrard who in 1911 participated in a midwinter Antarctic sledging trip to recover emperor penguin eggs. Class jointly authors essay on themes from such literature. Optional field trip into the high Sierra in December. (Dunbar) GER: DB-NatSci

*3 units, NEXTYEAR*

**GES 39N. Forensic Geoscience: Stanford CSI**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Geological principles, materials, and techniques indispensable to modern criminal investigations. Basic earth materials, their origin and variability, and how they can be used as evidence in criminal cases and investigations such as artifact provenance and

environmental pollution. Sources include case-based, simulated forensic exercises and the local environments of the Stanford campus and greater Bay Area. Local field trips; research presentation and paper. GER: DB-NatSci

3 units, Spr (Maher, K)

#### GES 40N. Diamonds

Preference to freshmen. Topics include the history of diamonds as gemstones, prospecting and mining, and their often tragic politics. How diamond samples provide clues for geologists to understand the Earth's deep interior and the origins of the solar system. Diamond's unique materials properties and efforts in synthesizing diamonds. GER: DB-NatSci

3 units, alternate years, not given this year

#### GES 42N. Landscapes and Tectonics of the San Francisco Bay Area

Active faulting and erosion in the Bay Area, and its effects upon landscapes. Earth science concepts and skills through investigation of the valley, mountain, and coastal areas around Stanford. Faulting associated with the San Andreas Fault, coastal processes along the San Mateo coast, uplift of the mountains by plate tectonic processes, and landsliding in urban and mountainous areas. Field excursions; student projects.

4 units, not given this year

#### GES 43Q. Environmental Problems

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Components of multidisciplinary environmental problems and ethical questions associated with decision making in the regulatory arena. Students lead discussions on environmental issues such as groundwater contamination from point and nonpoint sources, cumulative watershed effects related to timber and mining practices, acid rain, and subsurface disposal of nuclear waste. GER: DB-NatSci

3 units, Win (Loague, K)

#### GES 50Q. The Coastal Zone Environment

Preference to sophomores. The oceanographic, geological, and biological character of coastal zone environments, including continental shelves, estuaries, and coastal wetlands, with emphasis on San Francisco Bay. Five required field trips examine estuarine and coastal environments, and agencies and facilities that manage these resources. Students present original research. Prerequisite: beginning course in Biology such as BIOSCI 51, Chemistry such as CHEM 30 or 31, Earth Sciences such as GES 1 or 2, or Earth Systems such as EARTHSYS 10. GER: DB-NatSci

3 units, not given this year

#### GES 55Q. The California Gold Rush: Geologic Background and Environmental Impact

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Topics include: geologic processes that led to the concentration of gold in the river gravels and rocks of the Mother Lode region of California; and environmental impact of the Gold Rush due to population increase, mining operations, and high concentrations of arsenic and mercury in sediments from hard rock mining and milling operations. Recommended: introductory geology. GER: DB-NatSci

3 units, Win (Bird, D)

#### GES 90. Introduction to Geochemistry

The chemistry of the solid earth and its atmosphere and oceans, emphasizing the processes that control the distribution of the elements in the earth over geological time and at present, and on the conceptual and analytical tools needed to explore these questions. The basics of geochemical thermodynamics and isotope geochemistry. The formation of the elements, crust, atmosphere and oceans, global geochemical cycles, and the interaction of geochemistry, biological evolution, and climate. Recommended: introductory chemistry. GER: DB-NatSci

3-4 units, Win (Stebbins, J)

#### GES 101. Environmental and Geological Field Studies in the Rocky Mountains

(Same as EARTHSYS 100, EESS 101) Three-week, field-based program in the Greater Yellowstone/Teton and Wind River Mountains of Wyoming. Field-based exercises covering topics including: basics of structural geology and petrology; glacial geology; western cordillera geology; paleoclimatology; chemical weathering; aqueous geochemistry; and environmental issues such

as acid mine drainage and changing land-use patterns.

3 units, Aut (Chamberlain, P)

#### GES 102. Earth Materials: Introduction to Mineralogy

The minerals and materials that comprise the earth and their uses in modern society. How to identify, classify, and interpret rock-forming minerals. Emphasis is on information provided by common minerals about the nature of the Earth's interior and processes such as magmatism and metamorphism that operate there, as well as the major processes of weathering and erosion that link plate tectonics to earth cycles. Prerequisite: introductory geology course. Recommended: introductory chemistry. GER: DB-NatSci

3 units, Aut (Brown, G; Mao, W)

#### GES 102L. Introductory Mineralogy Laboratory

One weekly 3-hour laboratory to identify and interpret rock-forming minerals, industrially important minerals, and gems. Introduction to the use of hand lens, petrographic microscope and x-ray diffraction. Prerequisite: GES102 taken concurrently.

1 unit, Aut (Brown, G; Mao, W)

#### GES 103. Earth Materials: Rocks in Thin Section

Use of petrographic microscope to identify minerals and common mineral associations in igneous, metamorphic, and sedimentary rocks. Crystallization histories, mineral growth and reaction relations, deformation textures in metamorphic rocks, and provenance of siliciclastic rocks. Prerequisite 102.

3 units, Win (Miller, E)

#### GES 104. Earth Materials: Introduction to Petrology

The origin of different rock types as a function of geologic and plate tectonic setting. How mineral and energy resources occur in rocks. Prerequisite: introductory geology course. Recommended: GES102.

3 units, Spr (Mahood, G; Warren, J)

#### GES 104L. Introductory Petrology Laboratory

One weekly 3-hour laboratory on how to identify igneous, metamorphic, and sedimentary rocks, and interpret their mode and conditions of formation using hand lens and petrographic microscope. Prerequisite: GES 102L; GES103; GES104 taken concurrently.

1 unit, Spr (Mahood, G; Warren, J)

#### GES 105. Introduction to Field Methods

Two-week, field-based course in the White Mountains of eastern California. Introduction to the techniques for geologic mapping and geologic investigation in the field: systematic observations and data collection for lithologic columns and structural cross-sections. Interpretation of field relationships and data to determine the stratigraphic and deformational history of the region. Prerequisite: GES 1. Recommended: GES 102.

3 units, Aut (Grove, M; Miller, E)

#### GES 107. Journey to the Center of the Earth

(Same as GES 207, GEOPHYS 184, GEOPHYS 274) The interconnected set of dynamic systems that make up the Earth. Focus is on fundamental geophysical observations of the Earth and the laboratory experiments to understand and interpret them. What earthquakes, volcanoes, gravity, magnetic fields, and rocks reveal about the Earth's formation and evolution. Offered every other year, winter quarter.

3 units, Win (Lawrence, J; Mao, W)

#### GES 110. Structural Geology and Tectonics

Theory, principles, and practical techniques to measure, describe, analyze, and interpret deformation-related structures on Earth. Collection of fault and fold data in the field followed by lab and computer analysis; interpretation of geologic maps and methods of cross-section construction; structural analysis of fault zone and metamorphic rocks; measuring deformation; regional structural styles and associated landforms related to plate tectonic convergence, rifting, and strike-slip faulting; the evolution of mountain belts and formation of sedimentary basins. Prerequisite: GES 1, calculus. Recommended: 102. GER: DB-NatSci

3-5 units, Spr (Miller, E)

#### GES 111. Fundamentals of Structural Geology

(Same as CEE 195) Techniques for mapping using GPS and differential geometry to characterize structures; dimensional analysis and scaling relations; kinematics of deformation and flow;

measurement and analysis of stress; elastic deformation and properties of rock; brittle deformation including fracture and faulting; linear viscous flow including folding and magma dynamics; model development and methodology. Models of tectonic processes are constructed and solutions visualized using MATLAB. Prerequisites: GES 1, MATH 51, 52

3 units, Win (Pollard, D)

#### GES 115. Engineering Geology and Global Change

(Same as CEE 196) The application of geology and global change to the planning, design, and operation of engineering projects. Case histories taught in a seminar setting and field trips emphasize the impact of geology and global change on both individual engineering works and the built environment by considering Quaternary history and tectonics, anthropogenic sea level rise, active geologic processes, engineering properties of geologic deposits, site exploration, and professional ethics. Prerequisite: GES 1 or consent of instructor. GER: DB-NatSci

3 units, Spr (Holzer, T)

#### GES 119. A Solar System Odyssey: Introduction to Planetary Geology

How could planetary bodies such as Earth, Moon and Mars form so close together, with such similar starting products have such drastically different outcomes? Did Mars ever have standing water? Does Europa have a subsurface ocean teeming with life? In this course, you will study the formation and evolution of planets and moons, and how differences such as mass and composition have led to a diverse selection of terrain. Through our exploration of selected topics in planetary geology (volcanism, cratering, tectonics), we will actively debate contemporary controversies in planetary geology. GES 1 required or permission of the instructor.

3 units, Aut (Lawrence, K)

#### GES 120. Planetary and Early Biological Evolution Seminar

(Same as GES 220) Interdisciplinary. For upper division science undergraduates and graduate students. Synthesis of biology, geology, physics, and chemistry. Recent approaches for identifying traces of past life on Earth. How to look for life on other planets such as Mars, Europa, and Titan. May be repeated for credit.

2-3 units, not given this year

#### GES 121. What Makes a Habitable Planet?

(Same as GES 221) Physical processes affecting habitability such as large impacts and the atmospheric greenhouse effect, comets, geochemistry, the rise of oxygen, climate controls, and impact cratering. Detecting and interpreting the spectra of extrasolar terrestrial planets. Student-led discussions of readings from the scientific literature. Team taught by planetary scientists from NASA Ames Research Center.

3 units, not given this year

#### GES 122. Planetary Systems: Dynamics and Origins

(Students with a strong background in mathematics and the physical sciences should register for 222.) Motions of planets and smaller bodies, energy transport in planetary systems, composition, structure and dynamics of planetary atmospheres, cratering on planetary surfaces, properties of meteorites, asteroids and comets, extrasolar planets, and planetary formation. Prerequisite: some background in the physical sciences, especially astronomy, geophysics, or physics.

3-4 units, Aut (Marley, M; Lissauer, J)

#### GES 123. Paleobiology

(Same as EARTHSYS 122) Introduction to the fossil record with emphasis on marine invertebrates. Major debates in paleontological research. The history of animal life in the oceans. Topics include the nature of the fossil record, evolutionary radiations, mass extinctions, and the relationship between biological evolution and environmental change. Fossil taxa through time. Exercises in phylogenetics, paleoecology, biostratigraphy, and statistical methods. GER: DB-NatSci

4 units, alternate years, not given this year

#### GES 130. Soil Physics and Hydrology

The occurrence, distribution, circulation, and reaction of water at the surface and within the near surface. Topics: precipitation, evapotranspiration, infiltration and vadose zone, groundwater, surface water and streamflow generation, and water balance estimates. Current and classic theory in soil physics and hydrology. Urban, rangeland, and forested environments. GER: DB-NatSci

3 units, Aut (Loague, K)

#### GES 131. Hydrologically-Driven Landscape Evolution

Materials of the Earth and hydrologically driven landscape processes. Topics: hillslope hydrology, weathering of rocks and soils, erosion, flow failures, mass wasting, and conceptual models of landscape evolution. Current and classic theory in geomorphology. GER: DB-NatSci

3 units, Win (Loague, K)

#### GES 150. Senior Seminar: Issues in Earth Sciences

Focus is on written and oral communication in a topical context. Topics from current frontiers in earth science research and issues of concern to the public. Readings, oral presentations, written work, and peer review.

3 units, Aut (Bird, D)

#### GES 151. Sedimentary Geology and Petrography: Depositional Systems

Topics: weathering, erosion and transportation, deposition, origins of sedimentary structures and textures, sediment composition, diagenesis, sedimentary facies, tectonics and sedimentation, and the characteristics of the major siliciclastic and carbonate depositional environments. Lab: methods of analysis of sediments in hand specimen and thin section. Field trips. Prerequisites: 1, 102, 103. GER: DB-NatSci

4 units, alternate years, not given this year

#### GES 163. Introduction to Isotope Geochemistry

(Same as GES 263) Stable, cosmogenic, and radiogenic isotopes; processes that govern isotopic variations. Application of isotopes to geologic, biologic, and hydrologic questions. Major isotopic systems and their applications. Simple modeling techniques used in isotope geochemistry.

3 units, Aut (Maher, K)

#### GES 170. Environmental Geochemistry

(Same as EARTHSYS 170) Solid, aqueous, and gaseous phases comprising the environment, their natural compositional variations, and chemical interactions. Contrast between natural sources of hazardous elements and compounds and types and sources of anthropogenic contaminants and pollutants. Chemical and physical processes of weathering and soil formation. Chemical factors that affect the stability of solids and aqueous species under earth surface conditions. The release, mobility, and fate of contaminants in natural waters and the roles that water and dissolved substances play in the physical behavior of rocks and soils. The impact of contaminants and design of remediation strategies. Case studies. Prerequisite: 90 or consent of instructor. GER: DB-NatSci

4 units, Win (Brown, G)

#### GES 171. Geochemical Thermodynamics

Introduction to the application of chemical principles and concepts to geologic systems. The chemical behavior of fluids, minerals, and gases using simple equilibrium approaches to modeling the geochemical consequences of diagenetic, hydrothermal, metamorphic, and igneous processes. Topics: reversible thermodynamics, solution chemistry, mineral-solution equilibria, reaction kinetics, and the distribution and transport of elements by geologic processes. Prerequisite: GES 102. GER: DB-NatSci

3 units, Aut (Bird, D)

#### GES 180. Igneous Processes

For juniors, seniors and beginning graduate students in Earth Sciences. Structure and physical properties of magmas; use of phase equilibria and mineral barometers and thermometers to determine conditions of magmatic processes; melting and magmatic lineages as a function of tectonic setting; processes that control magma composition including fractional crystallization, partial melting, and assimilation; petrogenetic use of trace elements and isotopes. Labs emphasize identification of volcanic and plutonic rocks in thin section and interpretation of rock textures. Prerequisite 102, 103, or consent of instructor.

4 units, Spr (Stebbins, J)

#### GES 181. Metamorphic Processes

For juniors, seniors, and beginning graduate students in Earth Sciences. Thermodynamics and phase equilibria of multiple component systems; use of phase equilibria to determine pressure and temperature of metamorphic assemblages; geochronology of metamorphic rocks; heat flow in the lithosphere; links between

tectonics and metamorphism; and the role of heat and mass transfer in the Earth's crust and mantle. Labs emphasize identification of metamorphic rocks and minerals for common pelitic and basic rocks and interpretation of rock textures. May be taken for 3 units without lab. Prerequisites: 102, 103, or consent of instructor. GER: DB-NatSci

*3-5 units, not given this year*

#### **GES 182. Field Seminar on Continental-Margin Volcanism**

For juniors, seniors, and graduate students in the earth sciences and archeology. One weekend-long, and two one-day field trips to study Cenozoic volcanism associated with subduction and with passage of the Mendocino Triple Junction off the west coast of California: Mt. Lassen/Mt. Shasta/Modoc plateau; Clear Lake/Sonoma volcanics; Pinnacles National Monument. Andesite and basalt lavas, cinder cones, mixed magmas, blast deposit, debris avalanches, volcanic mudflows, hydrologic controls of springs in volcanic terrains, hydrothermal alteration and modern geothermal systems, Hg mineralization, obsidian source. Recommended: 1 or equivalent.

*2 units, Aut (Mahood, G)*

#### **GES 183. California Desert Geology**

Field seminar. Six-day field trip over Spring Break to Mojave Desert, Death Valley, and Owens Valley. Basin-and-range faulting, alluvial fans, playas, sand dunes, metamorphic rocks, granites of the Sierra Nevada, obsidian lava flows and the deposits of major explosive eruptions, hot springs and ore deposits, and desert landscapes. Camping and moderate hiking. Recommended: introductory geology.

*1 unit, not given this year*

#### **GES 184. Field Seminar on Eastern Sierran Volcanism**

For nonmajors and prospective majors in the earth sciences and archaeology. Four-day trip over Memorial Day weekend to study silicic and mafic volcanism in the eastern Sierra Nevada: basaltic lavas and cinder cones erupted along normal faults bounding Owens Valley, Long Valley caldera, postcaldera rhyolite lavas, hydrothermal alteration and hot springs, Holocene rhyolite lavas of the Inyo and Mono craters, subaqueous basaltic and silicic eruptions of Mono Basin, floating pumice blocks. If snow-level permits, silicic volcanism associated with the Bodie gold district. Recommended: 1 or equivalent.

*1 unit, Spr (Mahood, G)*

#### **GES 185. Volcanology**

For juniors, seniors, and beginning graduate students in earth sciences. Eruptive processes that create volcanic deposits and landforms; relation to physical properties of magmas. Volcanic hazards and the effects of eruptions on climate; volcanic-hosted geothermal systems and mineral resources. Required 4-day field trip over Memorial Day weekend to study silicic and mafic volcanism in the eastern Sierra Nevada. Those taking the class for 4 units will complete a 3-hour weekly lab involving hand specimen and thin section identification and interpretation, which emphasizes recognizing types of lavas and products of explosive eruptions. Prerequisite: 1, for those taking the course for 3 units; 103 and 104 or equivalent for those taking the course for 4 units. GER: DB-NatSci

*3-4 units, Win (Mahood, G)*

#### **GES 186. Geoarchaeology**

For juniors, seniors, and beginning graduate students with interests in archaeology or geosciences. Geological concepts, techniques, and data in the study of artifacts and the interpretation of the archaeological record. Topics include: sediments and soils; sedimentary settings of site formation; postdepositional processes that disturb sites; paleoenvironmental reconstruction of past climates and landscapes using plant and animal remains and isotopic studies; raw materials (minerals, metals, stone, shells, clay, building materials) and methods used in sourcing; estimating age based on stratigraphic and radiometric techniques. Weekly lab; weekend field trip to local archaeological/geological site. GER: DB-NatSci

*5 units, not given this year*

#### **GES 190. Research in the Field**

Two to three-week long courses that provide students with the opportunity to collect data in the field as part of a team-based investigation of research questions or topics under the expert

guidance of knowledgeable faculty and graduate students. Topics and locations vary. May be taken multiple times for credit. Prerequisites: GES 1, GES 102, GES 105.

*2-4 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

#### **GES 191. GES Field Trips**

Four- to seven-day field trips to locations of geologic and environmental interest. Includes trips offered during Thanksgiving and Spring breaks. May be repeated for credit. See <http://pangea.stanford.edu/GES/undergraduates/courses/>.

*1 unit, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

#### **GES 192. Undergraduate Research in Geological and Environmental Sciences**

Field-, lab-, or literature-based. Faculty supervision. Written reports. May be repeated for credit.

*1-10 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

#### **GES 197. Senior Thesis**

For seniors who wish to write a thesis based on research in 192 or as a summer research fellow. May not be repeated for credit; may not be taken if enrolled in 199.

*3-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

#### **GES 198. Special Problems in Geological and Environmental Sciences**

Reading and instruction under faculty supervision. Written reports. May be repeated for credit.

*1-10 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

#### **GES 199. Honors Program**

Research on a topic of special interest. See Undergraduate Honors Program above. May be repeated for credit.

*1-10 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

## **GRADUATE COURSES IN GEOLOGICAL AND ENVIRONMENTAL SCIENCES**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

#### **GES 207. Journey to the Center of the Earth**

(Same as GES 107, GEOPHYS 184, GEOPHYS 274) The interconnected set of dynamic systems that make up the Earth. Focus is on fundamental geophysical observations of the Earth and the laboratory experiments to understand and interpret them. What earthquakes, volcanoes, gravity, magnetic fields, and rocks reveal about the Earth's formation and evolution. Offered every other year, winter quarter.

*3 units, Win (Lawrence, J; Mao, W)*

#### **GES 208. Topics in Geobiology**

(Same as EESS 208) Reading and discussion of classic and recent papers in the field of Geobiology. Co-evolution of Earth and life; critical intervals of environmental and biological change; geomicrobiology; paleobiology; global biogeochemical cycles; scaling of geobiological processes in space and time.

*1 unit, Aut (Payne, J; Francis, C)*

#### **GES 209. Microstructures**

Microstructures in metamorphic rocks reveal temperature, pressure, and rates of deformation in the crust and variations in its thermo-mechanical behavior. Topics include the rheology of rocks and minerals, strain partitioning, shear zones and brittle-ductile transition in the crust, mechanisms of foliation and lineation development, preferred crystallographic fabrics, and geochronologic methods useful for dating deformation. Labs involve microstructure analysis of suites of rocks from classic localities. 5 units for extra project.

*3-5 units, Aut (Miller, E; Warren, J)*

#### **GES 210. Geologic Evolution of the Western U.S. Cordillera**

The geologic and tectonic evolution of the U.S. Cordillera based on its rock record through time. This region provides good examples of large-scale structures and magmatic activity generated during crustal shortening, extension, and strike-slip faulting and affords opportunity to study crustal-scale processes involved in mountain building in context of plate tectonic motions.

*2-3 units, not given this year*

#### **GES 211. Topics in Regional Geology and Tectonics**

May be repeated for credit.

*2-3 units, Aut (Miller, E), Win (Miller, E), Spr (Miller, E)*

**GES 212. Topics in Tectonic Geomorphology**

For upper-division undergraduates and graduate students. Topics vary and may include coupling among erosional, tectonic, and chemical weathering processes at the scale of orogens; historical review of tectonic geomorphology; hillslope and fluvial process response to active uplift; measures of landscape form and their relationship to tectonic uplift and bedrock lithology. May be repeated for credit.

*2 units, not given this year*

**GES 213. Topics in Sedimentary Geology**

For upper division undergraduates and graduate students. Topics vary each year but the focus is on current developments and problems in sedimentary geology, sedimentology, and basin analysis. These include issues in deep-water sediments, their origin, facies, and architecture; sedimentary systems on the early Earth; and relationships among tectonics, basin development, and basin fill. May be repeated for credit.

*2 units, by arrangement*

**GES 214. Topics in Paleobiology**

For upper division undergraduates and graduate students. Topics vary each year; focus is on paleontological, sedimentological, and geochemical approaches to the history of life. Topics may include: mass extinction events; evolutionary radiations; the history of global biodiversity; links between evolutionary histories of primary producers and consumers; and the quality of the fossil record. Term paper. May be repeated for credit.

*2 units, OCCASIONAL*

**GES 215. Structural Geology and Rock Mechanics**

(Same as CEE 297R, GEOPHYS 251) Quantitative field and laboratory data integrated with solutions to boundary value problems of continuum mechanics to understand tectonic processes in Earth's crust that lead to the development of geological structures including folds, faults, fractures and fabrics. Topics include: techniques and tools for structural mapping; differential geometry to characterize structures; dimensional analysis and scaling relations; kinematics of deformation and flow; traction and stress analysis, conservation of mass and momentum in a deformable continuum; linear elastic deformation and elastic properties; brittle deformation including fracture and faulting; model development and methodology. Data sets analyzed using MATLAB. Prerequisites: GES 1, MATH 53, MATLAB or equivalent.

*4 units, Aut (Pollard, D)*

**GES 216. Rock Fracture Mechanics**

Principles and tools of elasticity theory and fracture mechanics are applied to the origins and physical behaviors of faults, dikes, joints, veins, solution surfaces, and other natural structures in rock. Field observations, engineering rock fracture mechanics, and the elastic theory of cracks. The role of natural fractures in brittle rock deformation, and fluid flow in the earth's crust with applications to crustal deformation, structural geology, petroleum geology, engineering, and hydrogeology. Prerequisite: 215 or equivalent.

*3-5 units, alternate years, not given this year*

**GES 217. Faults, Fractures, and Fluid Flow**

Process-based approach to rock failure; the microstructures and overall architectures of the failure products including faults, joints, solution seams, and types of deformation bands. Fluid flow properties of these structures are characterized with emphasis on sealing and transmitting of faults and their role in hydrocarbon flow, migration, and entrapment. Case studies of fracture characterization experiments in aquifers, oil and gas reservoirs, and waste repository sites. Guest speakers; weekend field trip. Prerequisite: first-year graduate student in Earth Sciences.

*3 units, alternate years, not given this year*

**GES 220. Planetary and Early Biological Evolution Seminar**

(Same as GES 120) Interdisciplinary. For upper division science undergraduates and graduate students. Synthesis of biology, geology, physics, and chemistry. Recent approaches for identifying traces of past life on Earth. How to look for life on other planets such as Mars, Europa, and Titan. May be repeated for credit.

*2-3 units, not given this year*

**GES 221. What Makes a Habitable Planet?**

(Same as GES 121) Physical processes affecting habitability such as large impacts and the atmospheric greenhouse effect, comets,

geochemistry, the rise of oxygen, climate controls, and impact cratering. Detecting and interpreting the spectra of extrasolar terrestrial planets. Student-led discussions of readings from the scientific literature. Team taught by planetary scientists from NASA Ames Research Center.

*3 units, not given this year*

**GES 222. Planetary Systems: Dynamics and Origins**

(For students with a strong background in mathematics and the physical sciences; other should register for 122.) Motions of planets, moons, and small bodies; energy transport in planetary systems; meteorites and the constraints they provide on the formation of the solar system; asteroids and Kuiper belt objects; comets; planetary rings; planet formation; and extrasolar planets. In-class presentation of student papers.

*3-4 units, Aut (Marley, M; Lissauer, J)*

**GES 223. Planetary Systems: Atmospheres, Surfaces, and Interiors**

Focus is on physical processes, such as radiation transport, atmospheric dynamics, thermal convection, and volcanism, shaping the interiors, surfaces, and atmospheres of the major planets in the solar system. How these processes manifest themselves under various conditions in the solar system. Case study of the surface and atmosphere of Mars. Application of comparative planetary science to extrasolar planets and brown dwarfs. In-class presentation of student papers.

*3 units, by arrangement*

**GES 224. Modeling Transport and Transformations in the Environment**

An introduction to geochemical and reactive transport modeling using Geochemist's Workbench and other appropriate models. Students required to participate in a weekend-long short course at the beginning of the quarter. Throughout the quarter the students will use the principles and tools presented in the class to develop and analyze an environmental problem as part of a simulated consulting exercise. Topics covered include contaminant transport, mineral dissolution/precipitation and aquifer microbiology. Prerequisites: Either EESS 221 (CEE 260C) or EESS 220 (CEE 260A) and either GES 90, 170, or 171, or permission from instructors.

*2-3 units, alternate years, not given this year*

**GES 237. Surface and Near-Surface Hydrologic Response**

(Same as CEE 260B) Quantitative review of process-based hydrology and geomorphology. Introduction to finite-difference and finite-element methods of numerical analysis. Topics: biometeorology, unsaturated and saturated subsurface fluid flow, overland and open channel flow, and physically-based simulation of coupled surface and near-surface hydrologic response. Links hydrogeology, soil physics, and surface water hydrology.

*3 units, Aut (Loague, K)*

**GES 238. Soil Physics**

Physical properties of the soil solid phase emphasizing the transport, retention, and transformation of water, heat, gases, and solutes in the unsaturated subsurface. Field experiments.

*3 units, alternate years, not given this year*

**GES 240. Geostatistics for Spatial Phenomena**

(Same as ENERGY 240) Probabilistic modeling of spatial and/or time dependent phenomena. Kriging and cokriging for gridding and spatial interpolation. Integration of heterogeneous sources of information. Multiple-point geostatistics and training image-based stochastic imaging of reservoir/field heterogeneities. Introduction to GSLIB and SGEMS software. Case studies from the oil and mining industry and environmental sciences. Prerequisites: introductory calculus and linear algebra, STATS 116, GES 161, or equivalent.

*2-3 units, Win (Journal, A)*

**GES 246. Reservoir Characterization and Flow Modeling with Outcrop Data**

(Same as ENERGY 146, ENERGY 246) Project addressing a reservoir management problem by studying an outcrop analog, constructing geostatistical reservoir models, and performing flow simulation. How to use outcrop observations in quantitative geological modeling and flow simulation. Relationships between disciplines. Weekend field trip.

*3 units, Aut (Graham, S; Tchelepi, H; Mukerji, T; Boucher, A)*



**GES 249. Petroleum Geochemistry in Environmental and Earth Science**

How molecular fossils in crude oils, oil spills, refinery products, and human artifacts identify their age, origin, and environment of formation. The origin and habitat of petroleum, technology for its analysis, and parameters for interpretation, including: origins of molecular fossils; function, biosynthesis, and precursors; tectonic history related to the evolution of life, mass extinctions, and molecular fossils; petroleum refinery processes and the kinds of molecular fossils that survive; environmental pollution from natural and anthropogenic sources including how to identify genetic relationships among crude oil or oil spill samples; applications of molecular fossils to archaeology; worldwide petroleum systems through geologic time.

3 units, alternate years, not given this year

**GES 250. Sedimentation Mechanics**

The mechanics of sediment transport and deposition and the origins of sedimentary structures and textures as applied to interpreting ancient rock sequences. Dimensional analysis, fluid flow, drag, boundary layers, open channel flow, particle settling, erosion, sediment transport, sediment gravity flows, soft sediment deformation, and fluid escape. Field trip required.

4 units, alternate years, not given this year

**GES 251. Sedimentary Basins**

Analysis of the depositional framework and tectonic evolution of sedimentary basins. Topics: tectonic and environmental controls on facies relations, synthesis of basin development through time in terms of depositional systems and tectonic settings. Weekend field trip required. Prerequisites: 110, 151.

3 units, Aut (Graham, S)

**GES 252. Sedimentary Petrography**

Siliciclastic sediments and sedimentary rocks. Research in modern sedimentary mineralogy and petrography and the relationship between the composition and texture of sediments and their provenance, tectonic settings, and diagenetic histories. Topics vary yearly. Prerequisite: 151 or equivalent.

4 units, alternate years, not given this year

**GES 253. Petroleum Geology and Exploration**

The origin and occurrence of hydrocarbons. Topics: thermal maturation history in hydrocarbon generation, significance of sedimentary and tectonic structural setting, principles of accumulation, and exploration techniques. Prerequisites: 110, 151. Recommended: GEOPHYS 223.

3 units, alternate years, not given this year

**GES 254. Carbonate Sedimentology**

Processes of precipitation and sedimentation of carbonate minerals with emphasis on marine systems. Topics include: geographic and bathymetric distribution of carbonates in modern and ancient oceans; genesis and environmental significance of carbonate grains and sedimentary textures; carbonate rocks and sediments as sources of geochemical proxy data; carbonate diagenesis; changes in styles of carbonate deposition through Earth history; carbonate depositional patterns and the global carbon cycle. Lab exercises emphasize petrographic and geochemical analysis of carbonate rocks including map and outcrop scale, hand samples, polished slabs, and thin sections.

3-4 units, Spr (Payne, J)

**GES 255. Basin and Petroleum System Modeling**

For advanced undergraduates or graduate students. Students use stratigraphy, subsurface maps, and basic well log, lithologic, paleontologic, and geochemical data to construct 1-D, 2-D, and 3-D models of petroleum systems that predict the extent of source-rock thermal maturity, petroleum migration paths, and the volumes and compositions of accumulations through time (4-D). Recent software such as PetroMod designed to reconstruct basin geohistory. Recommended: 251 or 253.

3 units, alternate years, not given next year

**GES 256. Quantitative Methods in Paleobiology**

Introduction to statistical methods relevant to the analysis of paleobiological data. Methods include principles of inference, linear and logistic regression, principal components analysis, time-series, and re-sampling methods. Paleobiological problems include assessment of spatial and temporal patterns in biodiversity, selectivity of extinction and origination, and evolutionary trends.

Readings, examples, and problems from the primary literature. Term paper. Prerequisite: Previous course in paleobiology or permission of the instructor.

3 units, OCCASIONAL

**GES 257. Clastic Sequence Stratigraphy**

Sequence stratigraphy facilitates integration of all sources of geologic data, including seismic, log, core, and paleontological, into a time-stratigraphic model of sediment architecture. Tools applicable to regional and field scales. Emphasis is on practical applications and integration of seismic and well data to exploration and field reservoir problems. Examples from industry data; hands-on exercises.

3 units, Spr (McHargue, T)

**GES 258. Introduction to Depositional Systems**

The characteristics of the major sedimentary environments and their deposits in the geologic record, including alluvial fans, braided and meandering rivers, aeolian systems, deltas, open coasts, barred coasts, marine shelves, and deep-water systems. Emphasis is on subdivisions; morphology; the dynamics of modern systems; and the architectural organization and sedimentary structures, textures, and biological components of ancient deposits.

3 units, Aut (Lowe, D)

**GES 259. Stratigraphic Architecture**

The stratigraphic architecture of deposits associated with a spectrum of depositional environments, using outcrop and subsurface data. Participants read and discuss selected literature.

1 unit, Aut (McHargue, T)

**GES 260. Laboratory Methods in Organic Geochemistry**

Knowledge of components in geochemical mixtures to understand geological and environmental samples. The presence and relative abundance of these compounds provides information on the biological source, depositional environment, burial history, biodegradation, and toxicity of organic materials. Laboratory methods to detect and quantify components of these mixtures. Methods for separation and analysis of organic compounds in geologic samples: extraction, liquid chromatography, absorption by zeolites, gas chromatography and gas chromatography-mass spectrometry. Student samples considered as material for analysis. Prerequisite: GES 249 or consent of instructor.

2-3 units, not given this year

**GES 261. Physics and Chemistry of Minerals and Mineral Surfaces**

The concepts of symmetry and periodicity in crystals; the physical properties of crystals and their relationship to atomic-level structure; basic structure types; crystal chemistry and bonding in solids and their relative stability; the interaction of x-rays with solids and liquids (scattering and spectroscopy); structural variations in silicate glasses and liquids; UV-visible spectroscopy and the color of minerals; review of the mineralogy, crystal chemistry, and structures of selected rock-forming silicates and oxides; mineral surface and interface geochemistry.

4 units, Spr (Brown, G)

**GES 262. Thermodynamics and Disorder in Minerals and Melts**

The thermodynamic properties of crystalline, glassy, and molten silicates and oxides in light of microscopic information about short range structure and ordering. Measurements of bulk properties such as enthalpy, density, and their pressure and temperature derivatives, and structural determination by spectroscopies such as nuclear magnetic resonance and Mössbauer. Basic formulations for configurational entropy, heats of mixing in solid solutions, activities; and the energetics of exsolution, phase transitions, and nucleation. Quantitative models of silicate melt thermodynamics are related to atomic-scale views of structure. A general view of geothermometry and geobarometry. Prerequisites: introductory mineralogy and thermodynamics.

3 units, alternate years, not given this year

**GES 263. Introduction to Isotope Geochemistry**

(Same as GES 163) Stable, cosmogenic, and radiogenic isotopes; processes that govern isotopic variations. Application of isotopes to geologic, biologic, and hydrologic questions. Major isotopic systems and their applications. Simple modeling techniques used in isotope geochemistry.

3 units, Aut (Maher, K)



**GES 264. Mathematical Modeling in Biogeochemistry**

The basics of translating a conceptual model into a numerical model is presented. Emphasis on building models, box modeling, methods of solving models. Lab exercises draw from examples in biogeochemistry, including modeling global biogeochemical cycles, sediment biogeochemistry, and microbial processes.

3 units, not given this year

**GES 267. Solution-Mineral Equilibria: Theory**

Procedures for calculating and evaluating the thermodynamic properties of reversible and irreversible reactions among rock-forming minerals and aqueous solutions in geologic systems. Emphasis is on the generation and utility of phase diagrams depicting solution-mineral interaction relevant to phase relations associated with weathering diagenetic, hydrothermal, and metamorphic processes, and the prediction of temperature, pressure, and the chemical potential of thermodynamic components compatible with observed mineralogic phase relations in geologic outcrops. Individual research topics. Prerequisite: 171.

3 units, OCCASIONAL

**GES 272. Biomineralization**

The functional properties of many animal and plant skeletons are dependent largely on mineralization. The relationship between mineralization processes and adaptation for all the animal phyla is reviewed. The sedimentologic contribution of mineralized skeletons, especially in carbonate reefs and pelagic sedimentation is considered. Synthesis of organic matrix and the composite nature of many animal and plant skeletons, and their development and morphogenesis are described. The mechanisms of crystal nucleation and growth are considered. The macroevolutionary history of biomineralization, and mass extinctions and the diversification of well skeletonized groups in the geologic record are considered.

3 units, not given this year

**GES 273. Isotope Geochemistry Seminar**

Current topics including new analytical techniques, advances in isotopic measurements, and new isotopic approaches and systems.

1-3 units, Win (Maher, K)

**GES 275. Electron Probe Microanalytical Techniques**

The practical and theoretical aspects of x-ray generation and detection, and the behavior of electron beams and x-rays in solids. The basic principles needed to quantitatively analyze chemically complex geological materials. Operation of the JEOL 733 electron microprobe and associated computer software for quantitatively analyzing materials. X-ray chemical mapping. Enrollment limited to 8.

2-3 units, Win (Jones, R)

**GES 277. Flood Basalts and Mass Extinctions**

Recent work in geochronology and paleobiology supports the temporal coincidence of the eruption of continental flood basalts with mass extinction in the marine and terrestrial realms. The mechanisms and timescale of flood basalt eruptions, their likely environmental and biological consequences, and the evidence for flood basalt eruptions as the triggers of many mass extinction events. Sources include recent primary literature.

3 units, OCCASIONAL

**GES 281. Principles of 40Ar/39Ar Thermochronometry**

The 40Ar/39Ar method is based upon the K-Ar decay scheme and allows high precision geochronology and thermochronology to be performed with K-bearing minerals. Provides a detailed exploration of the method including all practical considerations and laboratory procedures for standardization and instrument calibration. A laboratory component allows practical experience in making measurements and interpreting results.

3-4 units, Spr (Grove, M)

**GES 282. Interpretative Methods in Detrital Geochronology**

Over the past decade, the number of studies that make use of isotopic provenance data has sky-rocketed. This type of data is now routinely used throughout the geosciences to solve a broad range of geologic problems. This seminar examines the state-of-the-art of existing interpretative methods for detrital geo/thermochronology data in provenance studies and critically examines their strengths and weaknesses. While this course will touch upon sampling approaches analytical aspects of data collection, focus is primarily upon data interpretation.

1-5 units, not given this year

**GES 283. Thermochronology and Crustal Evolution**

Thermochronology analyzes the competition between radioactive in-growth and temperature-dependant loss of radiogenic isotopes within radioactive mineral hosts in terms of temperature-time history. Coupled with quantitative understanding of kinetic phenomena and crustal- or landscape-scale interpretational models, thermochronology provides an important source of data for the Earth Sciences, notably tectonics, geomorphology, and petrogenesis. Focus on recent developments in thermochronology, specifically analytical and interpretative innovations developed over the past decade. Integrates the latest thermochronology techniques with field work in a small-scale research project focused upon crustal evolution.

4 units, Win (Grove, M)

**GES 284. Field Seminar on Eastern Sierran Volcanism**

For graduate students in the earth sciences and archaeology. Four-day trip over Memorial Day weekend to study silicic and mafic volcanism in the eastern Sierra Nevada: basaltic lavas and cinder cones erupted along normal faults bounding Owens Valley, Long Valley caldera, postcaldera rhyolite lavas, hydrothermal alteration and hot springs, Holocene rhyolite lavas of the Inyo and Mono craters, subaqueous basaltic and silicic eruptions of Mono Basin, floating pumice blocks. If snow-level permits, silicic volcanism associated with the Bodie gold district. Recommended: 1 or equivalent.

1 unit, Spr (Mahood, G)

**GES 285. Igneous Petrogenesis**

Radiogenic isotopes, stable isotopes, and trace elements applied to igneous processes; interaction of magmas with mantle and crust; convergent-margin magmatism; magmatism in extensional terrains; origins of rhyolites; residence times of magmas and magma chamber processes; granites as imperfect mirrors of their source regions; trace element modeling of igneous processes; trace element discriminant diagrams in tectonic analysis; phase equilibria of partial melting of mantle and crust; geothermometry and geobarometry. Topics emphasize student interest. Prerequisite: 180 or equivalent.

4 units, alternate years, not given this year

**GES 290. Departmental Seminar in Geological and Environmental Sciences**

Current research topics. Presentations by guest speakers from Stanford and elsewhere. May be repeated for credit.

1 unit, Win (Maher, K; Mao, W), Spr (Maher, K; Mao, W)

**GES 291. GES Field Trips**

Field trips for teaching and research purposes. Trips average 5-10 days. Prerequisite: consent of instructor.

1 unit, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**GES 292. Directed Reading with Geological and Environmental Sciences Faculty**

May be repeated for credit.

1-10 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**GES 299. Field Research**

Two-three week field research projects. Written report required. May be repeated three times.

2-4 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**GES 310. Climate Change, Climate Variability, and Landscape Development**

The impact of long-term climate change on erosional processes and the evolution of Cenozoic landscapes. Climate data that highlight recurring climate variability on inter-annual to decadal timescales. The behavior of climate on multi-decadal to tectonic timescales over which significant changes in topography take place. The effects of climate change and variability on landscape development, sedimentary environments, and the deposits of these events. May be repeated for credit.

1 unit, not given this year

**GES 311. Interpretation of Tectonically Active Landscapes**

Focuses on interpreting various topographic attributes in terms of horizontal and vertical tectonic motions. Topics include identification, mapping, and dating of geomorphic markers, deducing tectonic motions from spatial changes in landscape steepness, understanding processes that give rise to different

landscape elements, interrogating the role of climate and lithology in producing these landscape elements, and understanding relationships between tectonic motions, surface topography, and the spatial distribution of erosion. Consists of two one hour lectures per week and one laboratory section that help students gain proficiency in Quaternary mapping and interpretation of topographic metrics.

*3 units, alternate years, not given this year*

**GES 315. Literature of Structural Geology**

Classic studies and current journal articles. May be repeated for credit.

*1 unit, Aut (Pollard, D), Win (Pollard, D)*

**GES 325. The Evolution of Body Size**

(Same as BIO 325) Preference to graduate students and upper-division undergraduates in GES and Biology. The influence of organism size on evolutionary and ecological patterns and processes. Focus is on integration of theoretical principles, observations of living organisms, and data from the fossil record. What are the physiological and ecological correlates of body size? Is there an optimum size? Do organisms tend to evolve to larger size? Does productivity control the size distribution of consumers? Does size affect the likelihood of extinction or speciation? How does size scale from the genome to the phenotype? How is metabolic rate involved in evolution of body size? What is the influence of geographic area on maximum body size?

*2 units, Win (Haaly, E; Payne, J)*

**GES 328. Seminar in Paleobiology**

For graduate students. Current research topics including paleobotany, vertebrate and invertebrate evolution, paleoecology, and major events in the history of life on Earth.

*1 unit, not given this year*

**GES 336. Stanford Alpine Project Seminar**

Seminar on the geology of the Himalaya, Tibetan plateau, and India. Weekly student presentations on continental collision tectonics, structure, petrology, geomorphology, culture, and other topics of interest. Students create a guidebook of geologic stops in advance of field trip to northwestern India in summer 2011. May be repeated for credit.

*1 unit, Aut (Staff), Win (Staff), Spr (Staff)*

**GES 340. Volatiles in the Mantle**

Seminar to review and discuss current research in mineral physics, seismology, geochemistry and geodynamics on understanding the distribution, form, and role of volatiles in Earth's mantle.

*1-3 units, not given this year*

**GES 355. Advanced Stratigraphy Seminar and Field Course**

Student-led presentations; poster-sized display on assigned topic; field trip.

*1-3 units, OCCASIONAL*

**GES 381. Igneous Petrology and Petrogenesis Seminar**

Topics vary by quarter. May be repeated for credit.

*1-2 units, Spr (Mahood, G)*

**GES 382. Mantle Geochemistry**

The mantle is the largest geochemical reservoir on Earth and is fundamental to a variety of plate tectonic processes, from convection to the generation of crust. This course reviews current knowledge of the mantle based on the geochemistry of rocks derived from the upper mantle. Focus is on ocean ridge, subduction zone and hotspot processes. The tools used for studying the mantle, such as radiogenic isotopes, trace elements, diffusion and partition coefficients, melting equations, and isotope evolution models, will be explored in detail. Pre-requisites: basic geology, petrology and chemistry or consent of the instructor.

*1-3 units, Win (Warren, J)*

**GES 384. Volcanology Seminar**

Specialized and advanced topics vary by offering. May be repeated for credit.

*1-2 units, OCCASIONAL*

**GES 385. Practical Experience in the Geosciences**

On-the-job training in the geosciences. May include summer internship; emphasizes training in applied aspects of the geosciences, and technical, organizational, and communication dimensions. Meets USCIS requirements for F-1 curricular practical training. (Staff)

*1 unit, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**GES 399. Advanced Projects**

Graduate research projects that lead to reports, papers, or other products during the quarter taken. On registration, students designate faculty member and agreed-upon units.

*1-10 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**GES 400. Graduate Research**

Faculty supervision. On registration, students designate faculty member and agreed-upon units.

*1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**GES 801. TGR Project**

*0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**GES 802. TGR Dissertation**

*0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

## GEOPHYSICS (GEOPHYS) COURSES

### UNDERGRADUATE COURSES IN GEOPHYSICS

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**GEOPHYS 20Q. Predicting Volcanic Eruptions**

Preference to sophomores. The physics and chemistry of volcanic processes and modern methods of volcano monitoring. Volcanoes as manifestations of the Earth's internal energy and hazards to society. How earth scientists better forecast eruptive activity by monitoring seismic activity, bulging of the ground surface, and the discharge of volcanic gases, and by studying deposits from past eruptions. Focus is on the interface between scientists and policy makers and the challenges of decision making with incomplete information. Field trip to Mt. St. Helens, site of the 1980 eruption.

*3 units, NEXTYEAR*

**GEOPHYS 50N. Planetary Habitability, World View, and Sustainability**

(F,Sem) Stanford Introductory Seminar. Astrobiology and societal sustainability draw from most fields of physical and biological science. Class follows a historical format on the start of major scientific fields, and relates these sciences to the popular world view and the effect of world view on achieving sustainability. Simple experiments to see key results in a hands-on manner; how to improve experiments. How lack of insight in addition to the lack of equipment and computational methods limited the progress of science. Discussion of current astrobiology and sustainability topics in the popular press. Students pairs lead discussions on topics. Offered occasionally.

*3 units, Spr (Staff)*

**GEOPHYS 60N. Man versus Nature: Coping with Disasters Using Space Technology**

(F,Sem) (Same as EE 60N) Stanford Introductory Seminar. Preference to freshman. Natural hazards, earthquakes, volcanoes, floods, hurricanes, and fires, and how they affect people and society; great disasters such as asteroid impacts that periodically obliterate many species of life. Scientific issues, political and social consequences, costs of disaster mitigation, and how scientific knowledge affects policy. How spaceborne imaging technology makes it possible to respond quickly and mitigate consequences; how it is applied to natural disasters; and remote sensing data manipulation and analysis. Offered every year, winter quarter. GER:DB-EngrAppSci

*4 units, Win (Zebker, H)*

**GEOPHYS 100. Directed Reading**

(Staff)

*1-2 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**GEOPHYS 104. The Water Course**

(Same as EARTHSYS 104) The pathway that water takes from rainfall to the tap using student home towns as an example. How the geological environment controls the quantity and quality of water; taste tests of water from around the world. Current U.S. and

world water supply issues. Offered occasionally. GER: DB-NatSci  
3 units, not given this year

### **GEOPHYS 110. Earth on the Edge: Introduction to Geophysics**

Introduction to the foundations of contemporary geophysics. Topics drawn from four broad themes in: whole Earth geodynamics, geohazards, natural resources, and environment/sustainability. In each case the focus is on how the interpretation of a variety of geophysical measurements (e.g., gravity, seismology, heat flow, magnetism, electromagnetics, and geodesy) can be used to provide fundamental insight into the behavior of the Earth's complex geosystems. Prerequisite: CME 100 or MATH 51, or co-registration in either. Offered every year, autumn quarter. GER: DB-NatSci

3 units, Aut (Beroza, G; Lawrence, K)

### **GEOPHYS 112. Exploring Geosciences with MATLAB**

How to use MATLAB as a tool for research and technical computing, including 2-D and 3-D visualization features, numerical capabilities, and toolboxes. Practical skills in areas such as data analysis, regressions, optimization, spectral analysis, differential equations, image analysis, computational statistics, and Monte Carlo simulations. Emphasis is on scientific and engineering applications. Offered every year, autumn quarter.

1-3 units, Aut (Mukerji, T)

### **GEOPHYS 113. Earthquakes and Volcanoes**

(Same as EARTHSYS 113) Earthquake location, magnitude and intensity scales, seismic waves, styles of eruptions and volcanic hazards, tsunami waves, types and global distribution of volcanoes, volcano forecasting. Plate tectonics as a framework for understanding earthquake and volcanic processes. Forecasting; earthquake resistant design; building codes; and probabilistic hazard assessment. For non-majors and potential earth scientists. Offered every year, spring quarter. GER:DB-EngrAppSci

3 units, Spr (Beroza, G)

### **GEOPHYS 120. Ice, Water, Fire**

Introductory application of continuum mechanics to ice sheets and glaciers, water waves and tsunamis, volcanoes, and fluid flow in porous media. Emphasis on underlying physical processes and mathematical description using balance of mass and momentum, combined with constitutive equations for fluids and solids. Prerequisites: CME 100 or MATH 52 and PHYSICS 41. Offered every year, winter quarter. GER: DB-NatSci

3 units, Win (Dunham, E)

### **GEOPHYS 130. Introductory Seismology**

Introduction to seismology including: elasticity and the wave equation, P, S, and surface waves, dispersion, ray theory, reflection and transmission of seismic waves, seismic imaging, large-scale Earth structure, earthquake location, earthquake statistics and forecasting, magnitude scales, seismic source theory. Offered every year, Autumn quarter. (Beroza, G) GER: DB-NatSci

3 units, Aut (Beroza, G)

### **GEOPHYS 146A. Atmosphere, Ocean, and Climate Dynamics: The Atmospheric Circulation**

(Same as EARTHSYS 146A, EARTHSYS 246A, EESS 146A, EESS 246A, GEOPHYS 246A) Introduction to the physics governing the circulation of the atmosphere and ocean and their control on climate with emphasis on the atmospheric circulation. Topics include the global energy balance, the greenhouse effect, the vertical and meridional structure of the atmosphere, dry and moist convection, the equations of motion for the atmosphere and ocean, including the effects of rotation, and the poleward transport of heat by the large-scale atmospheric circulation and storm systems. Prerequisites: MATH 51 or CME100 and PHYSICS 41.

3 units, Win (Thomas, L; Diffenbaugh, N; Skinner, C), alternate years, not given next year

### **GEOPHYS 146B. Atmosphere, Ocean, and Climate Dynamics: the Ocean Circulation**

(Same as EARTHSYS 146B, EARTHSYS 246B, EESS 146B, EESS 246B, GEOPHYS 246B) Introduction to the physics governing the circulation of the atmosphere and ocean and their control on climate with emphasis on the large-scale ocean circulation. This course will give an overview of the structure and dynamics of the major ocean current systems that contribute to the meridional overturning circulation, the transport of heat, salt, and

biogeochemical tracers, and the regulation of climate. Topics include the tropical ocean circulation, the wind-driven gyres and western boundary currents, the thermohaline circulation, the Antarctic Circumpolar Current, water mass formation, atmosphere-ocean coupling, and climate variability. Prerequisites: EESS 146A/246A or CEE 164/262D or consent of instructor.

3 units, Spr (Thomas, L; Diffenbaugh, N), alternate years, not given next year

### **GEOPHYS 150. Geodynamics: Our Dynamic Earth**

In this course we cover the dynamic forces acting upon the Earth. We will investigate how geophysical forces effect the bending of tectonic plates, the flow of heat, sea level topography, the breaking point of rocks, porous flow, and how faults store and release energy. Math 52 or CME 102, GP 107 or permission from instructor. Offered every year, spring quarter. GER: DB-NatSci

3 units, Spr (Lawrence, J)

### **GEOPHYS 160. Introduction to SES Computing (ISESC)**

For beginning undergraduates and graduate students in the School of Earth Sciences. Computer concepts. What are computers and networks, and how do they work? Web page authoring. Introduction to scientific programming. Free computing tools for plotting data. Computer resources available to students in the school. An online repository of source codes useful for and developed by SES students, faculty, and staff. Specialists from around the school provide practical instruction and concrete examples of how to achieve basic computing needs. 2 units requires a class project: code development to be uploaded to the course's code repository. Offered every year, autumn quarter.

2-3 units, Aut (Lawrence, J)

### **GEOPHYS 162. Laboratory Methods in Geophysics**

Lab. Types of equipment used in experimental rock physics. Principles and measurements of geophysical properties such as porosity, permeability, acoustic wave velocity, and resistivity through lectures and laboratory experiments. Training in analytical project writing skills and understanding errors for assessing accuracy and variability of measured data. Students may investigate a scientific problem to support their own research. Offered every other year, spring quarter.

2-3 units, not given this year

### **GEOPHYS 170. Global Tectonics**

The architecture of the Earth's crust; regional assembling of structural or deformational features and their relationship, origin and evolution. The plate-tectonic cycle: rifting, passive margins, sea-floor spreading, subduction zones, and collisions. Case studies. Offered every other year, autumn quarter.

3 units, alternate years, not given this year

### **GEOPHYS 171. Tectonics Field Trip**

Long weekend field trip to examine large-scale features in the crust. Destinations may include the San Andreas fault, Mendocino Triple Junction, Sierra Nevada, and western Basin and Range province. Offered every other year, spring quarter.

1-3 units, alternate years, not given this year

### **GEOPHYS 181. Fluids and Flow in the Earth: Computational Methods**

(Same as GEOPHYS 200) Interdisciplinary problems involving the state and movement of fluids in crustal systems, and computational methods to model these processes. Examples of processes include: nonlinear, time-dependent flow in porous rocks; coupling in porous rocks between fluid flow, stress, deformation, and heat and chemical transport; percolation of partial melt; diagenetic processes; pressure solution and the formation of stylolites; and transient pore pressure in fault zones. MATLAB, Lattice-Boltzmann, and COMSOL Multiphysics. Term project. No experience with COMSOL Multiphysics required. Offered every other year, winter quarter.

3 units, alternate years, not given this year

### **GEOPHYS 182. Reflection Seismology**

(Same as GEOPHYS 222) The principles of seismic reflection profiling, focusing on methods of seismic data acquisition and seismic data processing for hydrocarbon exploration. Offered every other year, autumn quarter. GER: DB-NatSci

3 units, Aut (Levin, S)

### **GEOPHYS 183. Reflection Seismology Interpretation**

(Same as GEOPHYS 223) The structural and stratigraphic

interpretation of seismic reflection data, emphasizing hydrocarbon traps in two and three dimensions on industry data, including workstation-based interpretation. Lectures only, 1 unit. Prerequisite: 222, or consent of instructor. Offered every other year, spring quarter.

1-4 units, *Spr* (Klemperer, S; Graham, S)

**GEOPHYS 184. Journey to the Center of the Earth**

(Same as GES 107, GES 207, GEOPHYS 274) The interconnected set of dynamic systems that make up the Earth. Focus is on fundamental geophysical observations of the Earth and the laboratory experiments to understand and interpret them. What earthquakes, volcanoes, gravity, magnetic fields, and rocks reveal about the Earth's formation and evolution. Offered every other year, winter quarter.

3 units, *Win* (Lawrence, J; Mao, W)

**GEOPHYS 185. Rock Physics for Reservoir Characterization**

(Same as GEOPHYS 260) How to integrate well log and laboratory data to determine and theoretically generalize rock physics transforms between sediment wave properties (acoustic and elastic impedance), bulk properties (porosity, lithology, texture, permeability), and pore fluid conditions (pore fluid and pore pressure). These transforms are used in seismic interpretation for reservoir properties, and seismic forward modeling in what-if scenarios. Offered every other year, spring quarter.

3 units, *alternate years, not given this year*

**GEOPHYS 186. Tectonophysics**

(Same as GEOPHYS 290) The physics of faulting and plate tectonics. Topics: plate driving forces, lithospheric rheology, crustal faulting, and the state of stress in the lithosphere. Exercises: lithospheric temperature and strength profiles, calculation of seismic strain from summation of earthquake moment tensors, slip on faults in 3D, and stress triggering and inversion of stress from earthquake focal mechanisms. Offered every other year, winter quarter.

3 units, *alternate years, not given this year*

**GEOPHYS 187. Environmental Soundings Image Estimation**

(Same as GEOPHYS 211) Imaging principles exemplified by means of imaging geophysical data of various uncomplicated types (bathymetry, altimetry, velocity, reflectivity). Adjoints, back projection, conjugate-gradient inversion, preconditioning, multidimensional autoregression and spectral factorization, the helical coordinate, and object-based programming. Common recurring issues such as limited aperture, missing data, signal/noise segregation, and nonstationary spectra. See <http://sep.stanford.edu/sep/prof/>. Offered every year, autumn quarter.

3 units, *Aut* (Claerbout, J)

**GEOPHYS 190. Near-Surface Geophysics**

Introduction to the integration of geophysical field measurements and laboratory measurements for imaging and characterizing the top 100 meters of Earth. Examples will focus on applications related to water resource management. The link between the measured geophysical properties of rocks, soils, and sediments, and their material properties. Forward modeling and inversion of geophysical data sets. Each week includes two hours of lectures; plus one two-hour lab that involves acquisition of field or lab data, or computer modeling/analysis of data. Pre-requisite: CME 100 or Math 51, or co-registration in either. Offered every year, spring quarter. GER:DB-EngrAppSci

3 units, *Spr* (Knight, R)

**GEOPHYS 196. Undergraduate Research in Geophysics**

Field-, lab-, or computer-based. Faculty supervision. Written reports.

1-10 units, *Aut* (Staff), *Win* (Staff), *Spr* (Staff), *Sum* (Staff)

**GEOPHYS 197. Senior Thesis in Geophysics**

For seniors writing a thesis based on Geophysics research in 196 or as a summer research fellow.

3-5 units, *Aut* (Staff), *Win* (Staff), *Spr* (Staff), *Sum* (Staff)

**GEOPHYS 199. Senior Seminar: Issues in Earth Sciences**

Focus is on written and oral communication in a topical context. Topics from current frontiers in earth science research and issues of concern to the public. Readings, oral presentations, written work, and peer review. For 2010-11, enroll in GES 150. Offered every year, autumn quarter.

3 units, *Aut* (Staff)

## GRADUATE COURSES IN GEOPHYSICS

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**GEOPHYS 198. Honors Program**

Experimental, observational, or theoretical honors project and thesis in geophysics under supervision of a faculty member. Students who elect to do an honors thesis should begin planning it no later than Winter Quarter of the junior year. Prerequisites: department approval.

1-3 units, *Aut* (Staff), *Win* (Staff), *Spr* (Staff), *Sum* (Staff)

**GEOPHYS 200. Fluids and Flow in the Earth: Computational Methods**

(Same as GEOPHYS 181) Interdisciplinary problems involving the state and movement of fluids in crustal systems, and computational methods to model these processes. Examples of processes include: nonlinear, time-dependent flow in porous rocks; coupling in porous rocks between fluid flow, stress, deformation, and heat and chemical transport; percolation of partial melt; diagenetic processes; pressure solution and the formation of stylolites; and transient pore pressure in fault zones. MATLAB, Lattice-Boltzmann, and COMSOL Multiphysics. Term project. No experience with COMSOL Multiphysics required. Offered every other year, winter quarter.

3 units, *alternate years, not given this year*

**GEOPHYS 201. Frontiers of Geophysical Research at**

**Stanford: Faculty Lectures**

Required for new students entering the department. Second-year and other graduate students may attend either for credit or as auditors. Department faculty and senior research staff introduce the frontiers of research problems and methods being employed or developed in the department and unique to department faculty and students: what the current research is, why the research is important, what methodologies and technologies are being used, and what the potential impact of the results might be. Offered every year, autumn quarter.

1 unit, *Aut* (Beroza, G)

**GEOPHYS 202. Reservoir Geomechanics**

Basic principles of rock mechanics and the state of stress and pore pressure in sedimentary basins related to exploitation of hydrocarbon and geothermal reservoirs. Mechanisms of hydrocarbon migration, exploitation of fractured reservoirs, reservoir compaction and subsidence, hydraulic fracturing, utilization of directional and horizontal drilling to optimize well stability. Offered every other year, winter quarter.

3 units, *Win* (Zoback, M)

**GEOPHYS 210. Basic Earth Imaging**

Echo seismogram recording geometry, head waves, moveout, velocity estimation, making images of complex shaped reflectors, migration by Fourier and integral methods. Anti-aliasing. Dip moveout. Computer labs. See <http://sep.stanford.edu/sep/prof/>. Offered every year, autumn quarter.

3-4 units, *Aut* (Claerbout, J; Clapp, R)

**GEOPHYS 211. Environmental Soundings Image Estimation**

(Same as GEOPHYS 187) Imaging principles exemplified by means of imaging geophysical data of various uncomplicated types (bathymetry, altimetry, velocity, reflectivity). Adjoints, back projection, conjugate-gradient inversion, preconditioning, multidimensional autoregression and spectral factorization, the helical coordinate, and object-based programming. Common recurring issues such as limited aperture, missing data, signal/noise segregation, and nonstationary spectra. See <http://sep.stanford.edu/sep/prof/>. Offered every year, autumn quarter.

3 units, *Aut* (Claerbout, J)

**GEOPHYS 222. Reflection Seismology**

(Same as GEOPHYS 182) The principles of seismic reflection profiling, focusing on methods of seismic data acquisition and seismic data processing for hydrocarbon exploration. Offered every other year, autumn quarter.

3 units, *Aut* (Levin, S)

**GEOPHYS 223. Reflection Seismology Interpretation**

(Same as GEOPHYS 183) The structural and stratigraphic interpretation of seismic reflection data, emphasizing hydrocarbon traps in two and three dimensions on industry data, including workstation-based interpretation. Lectures only, 1 unit. Prerequisite: 222, or consent of instructor. Offered every other year, spring quarter.

1-4 units, Spr (Klemperer, S; Graham, S)

**GEOPHYS 224. Seismic Reflection Processing**

Workshop in computer processing of seismic reflection data. Students individually process a commercial seismic reflection profile from field tapes to migrated stack, using interactive software on a workstation. Prerequisite: consent of instructor.

2 units, alternate years, not given this year

**GEOPHYS 240. Borehole Seismic Modeling and Imaging**

Seismic imaging between boreholes for applications to subsurface characterization, reservoir imaging, and reservoir monitoring. Topics include data acquisition, data analysis, data processing and imaging. Inversion models for transmitted, reflected, and diffracted waves for imaging velocity, attenuation, and anisotropy in heterogeneous media. Use of field datasets and field applications. Prerequisites: 160 or equivalent; familiarity with Matlab or other programming language. Offered every other year, spring quarter.

3 units, Spr (Harris, J)

**GEOPHYS 241A. Seismic Reservoir Characterization**

(Same as ENERGY 141, ENERGY 241) (Same as GP241) Practical methods for quantitative characterization and uncertainty assessment of subsurface reservoir models integrating well-log and seismic data. Multidisciplinary combination of rock-physics, seismic attributes, sedimentological information and spatial statistical modeling techniques. Student teams build reservoir models using limited well data and seismic attributes typically available in practice, comparing alternative approaches. Software provided (SGEMS, Petrel, Matlab). Recommended: ERE240/260, or GP222/223, or GP260/262 or GES253/257; ERE246, GP112

3-4 units, Spr (Mukerji, T)

**GEOPHYS 246A. Atmosphere, Ocean, and Climate Dynamics: The Atmospheric Circulation**

(Same as EARTHSYS 146A, EARTHSYS 246A, EESS 146A, EESS 246A, GEOPHYS 146A) Introduction to the physics governing the circulation of the atmosphere and ocean and their control on climate with emphasis on the atmospheric circulation. Topics include the global energy balance, the greenhouse effect, the vertical and meridional structure of the atmosphere, dry and moist convection, the equations of motion for the atmosphere and ocean, including the effects of rotation, and the poleward transport of heat by the large-scale atmospheric circulation and storm systems. Prerequisites: MATH 51 or CME100 and PHYSICS 41.

3 units, Win (Thomas, L; Diffenbaugh, N; Skinner, C), alternate years, not given next year

**GEOPHYS 246B. Atmosphere, Ocean, and Climate Dynamics: the Ocean Circulation**

(Same as EARTHSYS 146B, EARTHSYS 246B, EESS 146B, EESS 246B, GEOPHYS 146B) Introduction to the physics governing the circulation of the atmosphere and ocean and their control on climate with emphasis on the large-scale ocean circulation. This course will give an overview of the structure and dynamics of the major ocean current systems that contribute to the meridional overturning circulation, the transport of heat, salt, and biogeochemical tracers, and the regulation of climate. Topics include the tropical ocean circulation, the wind-driven gyres and western boundary currents, the thermohaline circulation, the Antarctic Circumpolar Current, water mass formation, atmosphere-ocean coupling, and climate variability. Prerequisites: EESS 146A/246A or CEE 164/262D or consent of instructor.

3 units, Spr (Thomas, L; Diffenbaugh, N), alternate years, not given next year

**GEOPHYS 251. Structural Geology and Rock Mechanics**

(Same as CEE 297R, GES 215) Quantitative field and laboratory data integrated with solutions to boundary value problems of continuum mechanics to understand tectonic processes in Earth's crust that lead to the development of geological structures including folds, faults, fractures and fabrics. Topics include: techniques and tools for structural mapping, differential geometry

to characterize structures, dimensional analysis and scaling relations, kinematics of deformation and flow, traction and stress analysis, conservation of mass and momentum in a deformable continuum, linear elastic deformation and elastic properties, brittle deformation including fracture and faulting, model development and methodology. Data sets analyzed using MATLAB. Prerequisites: GES 1, MATH 53, MATLAB or equivalent.

4 units, Aut (Pollard, D)

**GEOPHYS 255. Report on Energy Industry Training**

On-the-job-training for master's and doctoral degree students under the guidance of on-site supervisors. Students submit a report detailing work activities, problems, assignment, and key results. May be repeated for credit. Prerequisite: written consent of adviser.

1-3 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**GEOPHYS 257. Introduction to Computational Earth Sciences**

Techniques for mapping numerically intensive algorithms to modern high performance computers such as the Center for Computational Earth and Environmental Science's (CEES) high productivity technical computing (HPTC). Topics include: debugging, performance analysis, and concepts of parallel programming; efficient serial and parallel programs; OpenMP; and MPI. Exercises using SMP and cluster computers. See <http://pangea.stanford.edu/research/cees/>. Recommended: familiarity with MATLAB, C, or Fortran. May be repeated for credit. Offered every other year, winter quarter.

2-4 units, not given this year

**GEOPHYS 258. Scientific Data Processing**

(Same as EE 257) Assimilation, processing, and modeling of large observational data sets. Solution of scientific and engineering problems, especially those requiring large amounts of data. Inverse methods and transform domain analysis for indirect measurements, implemented on digital computers using scientific languages. Large-scale computing, including hardware architectures, input/output and data bus bandwidth, programming efficiency, parallel programming techniques. Student projects involve analyzing real data by implementing an observational system such as tomography for medical and Earth observation uses, radar and matched filtering, multispectral/multitemporal studies, or migration processing. Prerequisites: Programming with high level language. Recommended: EE261, EE178/278A, ME300 or equivalent.

3-4 units, not given this year

**GEOPHYS 260. Rock Physics for Reservoir Characterization**

(Same as GEOPHYS 185) How to integrate well log and laboratory data to determine and theoretically generalize rock physics transforms between sediment wave properties (acoustic and elastic impedance), bulk properties (porosity, lithology, texture, permeability), and pore fluid conditions (pore fluid and pore pressure). These transforms are used in seismic interpretation for reservoir properties, and seismic forward modeling in what-if scenarios. Offered every other year, spring quarter.

3 units, alternate years, not given this year

**GEOPHYS 262. Rock Physics**

Properties of and processes in rocks as related to geophysical exploration, crustal studies, and tectonic processes. Emphasis is on wave velocities and attenuation, hydraulic permeability, and electrical resistivity in rocks. Application to in situ problems, using lab data and theoretical results. Offered every year, autumn quarter.

3 units, Aut (Mavko, G)

**GEOPHYS 265. Imaging Radar and Applications**

(Same as EE 355) Radar remote sensing, radar image characteristics, viewing geometry, range coding, synthetic aperture processing, correlation, range migration, range/Doppler algorithms, wave domain algorithms, polar algorithm, polarimetric processing, interferometric measurements. Applications: surface deformation, polarimetry and target discrimination, topographic mapping surface displacements, velocities of ice fields. Prerequisites: EE261. Recommended: EE254, EE278B, EE279.

3 units, not given this year

**GEOPHYS 270. Electromagnetic Properties of Geological Materials**

Laboratory observations and theoretical modeling of the electromagnetic properties and nuclear magnetic resonance response of geological material. Relationships between these properties and water-saturated materials properties such as composition, water content, surface area, and permeability. Offered occasionally.

2-3 units, not given this year

**GEOPHYS 274. Journey to the Center of the Earth**

(Same as GES 107, GES 207, GEOPHYS 184) The interconnected set of dynamic systems that make up the Earth. Focus is on fundamental geophysical observations of the Earth and the laboratory experiments to understand and interpret them. What earthquakes, volcanoes, gravity, magnetic fields, and rocks reveal about the Earth's formation and evolution. Offered every other year, winter quarter.

3 units, Win (Lawrence, J; Mao, W)

**GEOPHYS 280. 3-D Seismic Imaging**

The principles of imaging complex structures in the Earth subsurface using 3-D reflection seismology. Emphasis is on processing methodologies and algorithms, with examples of applications to field data. Topics: acquisition geometries of land and marine 3-D seismic surveys, time vs. depth imaging, migration by Kirchhoff methods and by wave-equation methods, migration velocity analysis, velocity model building, imaging irregularly sampled and aliased data. Computational labs involve some programming. Lab for 3 units. Offered every year, winter quarter.

2-3 units, Win (Biondi, B)

**GEOPHYS 281. Geophysical Inverse Problems**

Concepts of inverse theory, with application to geophysics. Inverses with discrete and continuous models, generalized matrix inverses, resolving kernels, regularization, use of prior information, singular value decomposition, nonlinear inverse problems, back-projection techniques, and linear programming. Application to seismic tomography, earthquake location, migration, and fault-slip estimation. Prerequisite: MATH 103. Offered every other year, autumn quarter.

3 units, alternate years, not given this year

**GEOPHYS 284. Hydrogeophysics**

The use of geophysical methods for imaging and characterizing the top 100 meters of Earth for hydrogeologic applications. Includes material properties, forward modeling, data acquisition, inversion, and integration with other forms of measurement. Each week includes three hours of lectures; plus one three-hour lab that involves acquisition of data at campus or nearby sites, or computer modeling of data. Offered occasionally.

3 units, OCCASIONAL

**GEOPHYS 286. Global Seismology**

This course investigates how waves propagate through the whole Earth. This course examines the questions "How do body waves and surface waves behave within the Earth?" and "What does that tell us about the Earth?" The course delves into both theory and how we apply that theory to understand seismic observations. Requirements: Math 52 or CME 102, GP130 or permission from instructor.

3 units, Win (Lawrence, J)

**GEOPHYS 287. Earthquake Seismology**

Seismic wave propagation in layered media, ray theory, Green's functions, seismic moment tensors, representation theorem, finite-source effects, kinematics and dynamics of earthquakes, and engineering aspects of seismology. Prerequisites: GEOPHYS 130 or equivalent. Offered every other year, spring quarter.

3-5 units, alternate years, not given this year

**GEOPHYS 288A. Crustal Deformation**

Earthquake and volcanic deformation, emphasizing analytical models that can be compared to data from GPS, InSAR, and strain meters. Deformation, stress, and conservation laws. Dislocation models of strike slip and dip slip faults, in 2 and 3 dimensions. Crack models, including boundary element methods. Dislocations in layered and elastically heterogeneous earth models. Models of volcano deformation, including sills, dikes, and magma chambers. Offered every other year, autumn quarter.

3-5 units, Aut (Segall, P), not given next year

**GEOPHYS 288B. Crustal Deformation**

Earthquake and volcanic deformation, emphasizing analytical models that can be compared to data from GPS, InSAR, and strain meters. Viscoelasticity, post-seismic rebound, and viscoelastic magma chambers. Effects of surface topography and earth curvature on surface deformation. Gravity changes induced by deformation and elastogravitational coupling. Poro-elasticity, coupled fluid flow and deformation. Earthquake nucleation and rate-state friction. Models of earthquake cycle at plate boundaries. Offered every other year, winter quarter.

3-5 units, Win (Segall, P), not given next year

**GEOPHYS 290. Tectonophysics**

(Same as GEOPHYS 186) The physics of faulting and plate tectonics. Topics: plate driving forces, lithospheric rheology, crustal faulting, and the state of stress in the lithosphere. Exercises: lithospheric temperature and strength profiles, calculation of seismic strain from summation of earthquake moment tensors, slip on faults in 3D, and stress triggering and inversion of stress from earthquake focal mechanisms. Offered every other year, winter quarter.

3 units, alternate years, not given this year

**GEOPHYS 385A. Reflection Seismology**

Research in reflection seismology and petroleum prospecting. May be repeated for credit.

1-5 units, Aut (Biondi, B; Clapp, R), Win (Biondi, B; Clapp, R), Spr (Biondi, B; Clapp, R), Sum (Staff)

**GEOPHYS 385B. Environmental Geophysics**

Research on the use of geophysical methods for near-surface environmental problems. May be repeated for credit.

1-5 units, Aut (Knight, R), Win (Knight, R), Spr (Knight, R), Sum (Staff)

**GEOPHYS 385D. Theoretical Geophysics**

Research on physics and mechanics of earthquakes, volcanoes, ice sheets, and glaciers. Emphasis is on developing theoretical understanding of processes governing natural phenomena.

1-5 units, Aut (Dunham, E), Win (Dunham, E), Spr (Dunham, E), Sum (Staff)

**GEOPHYS 385E. Tectonics**

Research on the origin, major structures, and tectonic processes of the Earth's crust. Emphasis is on use of deep seismic reflection and refraction data. May be repeated for credit.

1-5 units, Aut (Klemperer, S; Sleep, N), Win (Klemperer, S; Sleep, N), Spr (Klemperer, S; Sleep, N), Sum (Staff)

**GEOPHYS 385J. Global Seismic Techniques, Theory, and Application**

Topics chosen from surface wave dispersion measurement, 1D inversion techniques, regional tomographic inversion, receiver functions, ray theory in spherical geometry, seismic attenuation, seismic anisotropy, seismic focusing, reflected phases, stacking, and interpretations of seismic results in light of other geophysical constraints. May be repeated for credit.

1-5 units, Aut (Lawrence, J), Win (Lawrence, J), Spr (Lawrence, J), Sum (Staff)

**GEOPHYS 385K. Crustal Mechanics**

Research in areas of petrophysics, seismology, in situ stress, and subjects related to characterization of the physical properties of rock in situ. May be repeated for credit.

1-5 units, Aut (Zoback, M), Win (Zoback, M), Spr (Zoback, M), Sum (Staff)

**GEOPHYS 385L. Earthquake Seismology, Deformation, and Stress**

Research on seismic source processes, crustal stress, and deformation associated with faulting and volcanism. May be repeated for credit.

1-5 units, Aut (Beroza, G; Segall, P; Zoback, M), Win (Beroza, G; Segall, P; Zoback, M), Spr (Beroza, G; Segall, P; Zoback, M), Sum (Staff)

**GEOPHYS 385S. Wave Physics**

Theory, numerical simulation, and experiments on seismic and electromagnetic waves in complex porous media. Applications from Earth imaging and in situ characterization of Earth properties, including subsurface monitoring. Presentations by faculty, research staff, students, and visitors. May be repeated for credit.

1-5 units, Aut (Harris, J), Win (Harris, J), Spr (Harris, J), Sum (Staff)

### GEOPHYS 385V. Poroelasticity

Research on the mechanical properties of porous rocks: dynamic problems of seismic velocity, dispersion, and attenuation; and quasi-static problems of faulting, fluid transport, crustal deformation, and loss of porosity. Participants define, investigate, and present an original problem of their own. May be repeated for credit.

1-5 units, Aut (Mavko, G), Win (Mavko, G), Spr (Mavko, G), Sum (Staff)

### GEOPHYS 385Z. Radio Remote Sensing

Research applications, especially crustal deformation measurements. Recent instrumentation and system advancements. May be repeated for credit.

1-5 units, Aut (Zebker, H), Win (Zebker, H), Spr (Zebker, H), Sum (Staff)

### GEOPHYS 400. Research in Geophysics

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### GEOPHYS 801. TGR Project

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### GEOPHYS 802. TGR Dissertation

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

## GERMAN GENERAL (GERGEN) COURSES

### UNDERGRADUATE COURSES IN GERMAN GENERAL

Primarily for undergraduates; graduate students may enroll with consent of adviser.

#### GERGEN 38A. Introduction to Germanic Languages

(Same as GERLIT 138) The oldest attested stages of the Germanic language family, including Gothic, Old Norse, Old Saxon, Old English, Old Frisian, Old Low Franconian (Old Dutch), and Old High German. The linguistic interrelationships, prehistory, Germanic tribal groupings, and literature. GER:DB-Hum

4 units, not given this year

#### GERGEN 104N. Resistance Writings in Nazi Germany

(F,Sem) Stanford Introductory Seminar. Freshman and Sophomore Preference. This course focuses on letters and diaries written by resisters to the Nazi regime, in particular, Dietrich Bonhoeffer, Hans and Sophie Scholl, and James von Moltke. The course includes one resistance novel Every man dies alone by Hans Fallada. GER:DB-Hum

3 units, Win (Bernhardt, E)

#### GERGEN 122Q. The Culture of Pessimism in 19th- and 20th-Century Europe

European culture long relied on a narrative of inexorable human progress. Starting in the 19th century, this triumphalist narrative was shadowed by another tradition that rejected such trust in progress. The pessimistic tradition in Europe in literature, philosophy, the study of history, anthropology, and psychology; the distinction between pessimism in the fields of morality, culture, and intellectual life. Authors include Giacomo Leopardi, Arthur Schopenhauer, Lautréamont, T. S. Eliot, and Sigmund Freud. GER:DB-Hum

3-5 units, not given this year

#### GERGEN 128N. Medicine, Modernism, and Mysticism in Thomas Mann's the Magic Mountain

(F,Sem) Stanford Introductory Seminar. Published in 1924, the Magic Mountain is a novel of education, tracing the intellectual growth of a budding engineer through a maze of intellectual encounters during a seven-year sojourn in a sanatorium set high in the Swiss Alps. It engages with the key themes of modernism: the relativity of time, the impact of psychoanalysis, the power of myth, and an extended dispute between an optimistic belief in progress and a pessimistic vision of human nature. Through its detailed discussion of disease (tuberculosis) this remarkable text connects

the study of medicine to the humanities. GER:IHUM-3

4 units, Spr (Berman, R)

#### GERGEN 129. German Cinema

(Same as GERGEN 229) History of German cinema in the Weimar Republic, Nazi era, and the immediate aftermath of WWII. German thought, political valences, and social potential as portrayed in film.

5 units, not given next year

#### GERGEN 141. Fables of Retreat

Modern anti-heroes who assert themselves through feats of reduction and retreat. Writers include Rousseau, Tieck, Emerson, Thoreau, Melville, Dostoevsky, and Kafka.

3-5 units, not given this year

#### GERGEN 148. A Brief History of Misogyny

(Same as GERGEN 248) Genealogy of philosophical misogyny in 19th- and 20th-century German thought from German idealism. Authors include Schopenhauer, Nietzsche, Weininger, and the George circle. In English. GER:DB-Hum, EC-Gender

3-5 units, not given this year

#### GERGEN 160. Interiors and Interiority in the 19th Century

Interiority and the interior as focal points of 19th-century Europe. Domestic space, and its political dimensions and structures of feeling in 19th-century German literature, from the romance to the detective novel. Ideology of domesticity in German music, design, architecture, visual art, and science of the period. In German. GER:DB-Hum

4 units, not given this year

#### GERGEN 161. Wagnerian Echos: A Cultural History from Modernism to Popular Culture

(Same as MUSIC 150G) The afterlives of mythological themes from the operas and music dramas of Richard Wagner (The Flying Dutchman, Tannhäuser, Lohengrin, Ring Cycle, Parsifal) in literature, modernist aesthetics, fascist politics, film, philosophy, and contemporary media. GER:DB-Hum

3-5 units, not given this year

#### GERGEN 168A. Freud and the Enterprise of Psychoanalysis

(Same as GERGEN 268A) This seminar explores psychoanalysis at the juncture of its multiple meanings: as a therapeutic practice; as a theory of the functioning of the human mind; as a method of textual interpretation; as a cultural critique and a genealogy attempting to account for the origins of morality, religion, art, and other social institutions. In addition to Freud's major works, readings include short writings by Nietzsche, Ferenczi, Lacan, Laplanche, Kristeva, and Irigaray. GER:DB-Hum

3-5 units, Win (Douvaldzt, C)

#### GERGEN 170A. Postwar: German Culture after World War II

(Same as GERGEN 270A) How did German culture react to WW II, the Holocaust, and the exile of Germans from E. Europe? Questions of representations, political debate, and the future of Germany in Europe. German cinema, architecture, and art related to the subject. Readings include: Adorno, Grass, Habermas, Kluge, Bachmann, Jelinek, and Beyer. Recommended: German, but not required.

3-5 units, not given this year

#### GERGEN 170Q. Prussia: Culture and Literature

(S,Sem) Stanford Introductory Seminar. This course traces the history and culture of a country that disappeared not too long ago, but about which most of us tend to know very little. On February 27, 1947, the Allied Control Council issues its decree no. 46, which dissolved Prussia in the interest of maintaining world peace and security and the restoration of political life in Germany on a democratic basis. Prussia, the Council continued, has since forever been a carrier of militarism and reaction in Germany. Many of the stereotypical images of Germany and German-ness, and certainly most negative images of Germany, from the spiked helmet to the iron cross, the Red Baron and the Blitzkrieg, are bound up with Prussia, its military and its ruling class. Prussia's militaristic culture not only brought on a series of increasingly brutal wars, while also often being a beacon of Enlightenment and religious tolerance; it brought together Germany's most traditional backwater with its most p

3-5 units, Spr (Daub, A)



**GERGEN 174. Automatons, Puppets, and Cyborgs**

(Same as GERGEN 274) Technological visions of the human from Romanticism through the present. How has human function been reconceptualized over the past 200 years? Nineteenth-century machinic figures as frightening but offering new social possibilities; the new human type of the early twentieth century; and contemporary explorations of the posthuman. Topics include work by Hoffmann, Kleist, Brecht, Lang, Junger, Kraftwerk, and Chaos Computer Club. In English.

3-5 units, *Aut (Elswit, K)*

**GERGEN 177. Performing Mother Courage, Performing History**

(Same as GERGEN 277) Bertolt Brecht's 1939 play *Mother Courage and her Children* opens us to ask how performances enact history, act upon it, and offer access. The first unit historicizes *Mother Courage* through primary texts and secondary sources. The second thinks critically about archiving and how we ask cultural artifacts to stand for particular times and places. The third turns to reinventions of *Mother Courage* and the potential future of the past. Written and practical work. In English. GER:DB-Hum

3-5 units, *Spr (Elswit, K)*

**GERGEN 181. Philosophy and Literature**

(Same as CLASSGEN 81, COMPLIT 181, ENGLISH 81, FRENGEN 181, ITALGEN 181) Required gateway course for Philosophical and Literary Thought; crosslisted in departments sponsoring the Philosophy and Literature track: majors should register in their home department; non-majors may register in any sponsoring department. Introduction to major problems at the intersection of philosophy and literature. Issues may include authorship, selfhood, truth and fiction, the importance of literary form to philosophical works, and the ethical significance of literary works. Texts include philosophical analyses of literature, works of imaginative literature, and works of both philosophical and literary significance. Authors may include Plato, Montaigne, Nietzsche, Borges, Beckett, Barthes, Foucault, Nussbaum, Walton, Nehamas, Pavel, and Pippin. GER:DB-Hum

4-5 units, *Win (Staff)*

**GERGEN 183. Scenarios of Dissolution in the Modern Novel**

(Same as GERGEN 283) How do novels capture chaos? 20th-century novels responding to catastrophes such as: the disintegration of the Austro-Hungarian monarchy (Musil, Roth); demise of the Third Reich (Mann); chaotic forces in an oppressive order (Bulgakov); corrosion of imperial confidence through fear of barbarian invaders (Coetzee); and transformation of masses into a mob destroying the body politic from within (Krasznahorkai). GER:DB-Hum

4 units, *not given this year*

**GERGEN 201. Conservative Revolution**

(Same as COMPLIT 234) An examination of conservative critiques of modernity in the early 20th century, including topics such as German nationalism, the war experience, responses to democracy, anti-liberalism, cultural pessimism in the decline of the West, crises of authority, technology, geopolitics, existentialism, and tradition. Readings from authors such as Oswald Spengler, Thomas Mann, Carl Schmitt, Ernst Jünger, Hugo von Hofmannsthal, Rudolf Borchardt. Consideration of conservative exile authors such as Leo Strauss and Hannah Arendt. Readings in either English or German. GER:DB-Hum

3-5 units, *Aut (Berman, R)*

**GERGEN 205. Technologies of the Self**

Important moments in the history of the discursive and rhetorical construction of the subject. Emphasis is on tensions between uniqueness and exemplariness, chronology and repetition, narrative and archive, and aesthetics and ethics of retrospection. Works by Augustine, Teresa of Avila, Montaigne, Rousseau, Goethe, Nietzsche, Joyce, Gide, Sartre, Leiris, and Barthes. Theoretical and critical essays including by Lejeune, Starobinski, De Man, Derrida, Marin, Koerner, Foucault, and Beaujour. GER:DB-Hum

3-5 units, *not given this year*

**GERGEN 212. The Invention of Experience**

Experience viewed as a source of orientation irreducible to discursive knowledge in the 19th century. The encounter with art as the paradigm of experience; lived vs. cumulative experience; the

modern crisis of experience; experiential openness and the authority conferred by experience. If it is neither pleasure nor knowledge sought in art, could it be experience? Role of Goethe in the cult of experience (Faust I, *Elective Affinities*). Montaigne, Hegel, Emerson, Rilke, Benjamin, Koselleck, and Gadamer. GER:DB-Hum

3-5 units, *not given this year*

**GERGEN 221. Memory in the Modernist Novel**

Preference to freshmen. The art of memory as one of the main characteristics of modernity. The relationship between memory and modernism through major narrative texts: Rainer Maria Rilke's *The Notebooks of Malte Laurids Brigger*; James Joyce's *A Portrait of the Artist as a Young Man*; and Marcel Proust's *Combray*. How memory is represented in the novels, and its role in the perception of external reality. How memory helps to constitute personal identity. The metaphors used to define memory. Readings include theoretical and critical essays, and primary texts. GER:DB-Hum, DB-Hum

4 units, *not given this year*

**GERGEN 221A. Modernism and the Jewish Voice in Europe**

(Same as COMPLIT 247, SLAVGEN 221) Some of the most haunting literary voices of the 20th century emerged from the Jewish communities of Eastern and Central Europe. The Jewishness of the modernists is thematized, asking whether it contributed to shared attitudes toward text, history, or identity. Their works are situated in specific linguistic traditions: Yiddish, Hebrew, Russian, Polish, or German. Primary readings from Ansky, Bialik, Mandelstam, Babel, Schulz, Kafka, Celan; secondary readings in history, E. European literature, and theory, including Marx, Freud, Benjamin, and Arendt. GER:DB-Hum

3-4 units, *not given this year*

**GERGEN 267. Freud and the Apostle Paul**

(Same as GERGEN 367) Intersections between Freud's psychoanalysis of society and Paul's political theology. Emphasis is on the issues of law, love, justice, community, and language. Readings include Freud and Paul, and theoretical essays by Taubes, Badiou, Santner, Agamben, Assmann, Zizek, and Boyarin. GER:DB-Hum

3-5 units, *not given this year*

**GRADUATE COURSES IN GERMAN GENERAL**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**GERGEN 206. Narrative, Visuality, Memory**

(Same as GERGEN 306) Moments in the history of the relationship between the verbal and the visual: the classical *ars memoriae*; the ekphrasis debates of the 18th century; the emergence of a new visuality and mnemonic art as structuring principles for modernist narrative. Authors include Plato, Aristotle, Cicero, Augustine, Winckelmann, Lessing, Diderot, Goethe, Moritz, Flaubert, Rilke, Joyce, and Proust.

3-5 units, *not given this year*

**GERGEN 229. German Cinema**

(Same as GERGEN 129) History of German cinema in the Weimar Republic, Nazi era, and the immediate aftermath of WWII. German thought, political valences, and social potential as portrayed in film.

5 units, *not given next year*

**GERGEN 230. Truth in Art**

Does art disclose an ultimate truth or does it help people avoid, endure, or affirm a truth which would otherwise be hard to bear? How modern thinking about art is defined by the tension between the idea that pleasure in art is disinterested and outside striving for true knowledge or ethical orientation and the idea that art offers some kind of deeper insight into people's place in the world. How these tensions play out in Kant, Schopenhauer, Nietzsche, Heidegger, and Adorno. In English.

3-5 units, *not given this year*

**GERGEN 248. A Brief History of Misogyny**

(Same as GERGEN 148) Genealogy of philosophical misogyny in 19th- and 20th-century German thought from German idealism. Authors include Schopenhauer, Nietzsche, Weininger, and the



George circle. In English.

3-5 units, not given this year

**GERGEN 257. Art in Public Spaces: Berlin 1980-2000**

(Same as ARTHIST 457) Before and after the re-unification a great number of artistic projects reflect the problems of political memorial culture in Germany. The seminar will deal with art works in public spaces, mostly in Berlin, by German and international artists, from drop sculptures; and the decoration programs of Federal buildings up to the Holocaust Memorial.

3-5 units, not given this year

**GERGEN 268A. Freud and the Enterprise of Psychoanalysis**

(Same as GERGEN 168A) This seminar explores psychoanalysis at the juncture of its multiple meanings: as a therapeutic practice; as a theory of the functioning of the human mind; as a method of textual interpretation; as a cultural critique and a genealogy attempting to account for the origins of morality, religion, art, and other social institutions. In addition to Freud's major works, readings include short writings by Nietzsche, Ferenczi, Lacan, Laplanche, Kristeva, and Irigaray.

3-5 units, Win (Dowaldzi, C)

**GERGEN 270A. Postwar: German Culture after World War II**

(Same as GERGEN 170A) How did German culture react to WW II, the Holocaust, and the exile of Germans from E. Europe? Questions of representations, political debate, and the future of Germany in Europe. German cinema, architecture, and art related to the subject. Readings include: Adorno, Grass, Habermas, Kluge, Bachmann, Jelinek, and Beyer. Recommended: German, but not required.

3-5 units, not given this year

**GERGEN 274. Automats, Puppets, and Cyborgs**

(Same as GERGEN 174) Technological visions of the human from Romanticism through the present. How has human function been reconceptualized over the past 200 years? Nineteenth-century machinic figures as frightening but offering new social possibilities; the new human type of the early twentieth century; and contemporary explorations of the posthuman. Topics include work by Hoffmann, Kleist, Brecht, Lang, Junger, Kraftwerk, and Chaos Computer Club. In English.

3-5 units, Aut (Elswit, K)

**GERGEN 277. Performing Mother Courage, Performing History**

(Same as GERGEN 177) Bertolt Brecht's 1939 play Mother Courage and her Children opens us to ask how performances enact history, act upon it, and offer access. The first unit historicizes Mother Courage through primary texts and secondary sources. The second thinks critically about archiving and how we ask cultural artifacts to stand for particular times and places. The third turns to reinventions of Mother Courage and the potential future of the past. Written and practical work. In English.

3-5 units, Spr (Elswit, K)

**GERGEN 281. Hegel's Aesthetics**

This course will consider G.W.F. Hegel's voluminous Aesthetics in its totality, while placing the work into the wider context of Hegel's mature system. Part of the course will be devoted to considering Hegel's legacy in nineteenth and twentieth century aesthetics, both within the Hegelian tradition and outside of it. All readings and class discussions in English

3-5 units, Aut (Daub, A)

**GERGEN 283. Scenarios of Dissolution in the Modern Novel**

(Same as GERGEN 183) How do novels capture chaos? 20th-century novels responding to catastrophes such as: the disintegration of the Austro-Hungarian monarchy (Musil, Roth); demise of the Third Reich (Mann); chaotic forces in an oppressive order (Bulgakov); corrosion of imperial confidence through fear of barbarian invaders (Coetzee); and transformation of masses into a mob destroying the body politic from within (Krasznahorkai).

4 units, not given this year

**GERGEN 291A. Oedipus, Hamlet, Moses: Archetypes of the Hero**

Texts that provided psychoanalysis with its foundational myths. Oedipus, Moses, and Hamlet as archetypes of the hero related to moments of emerging modernity: from mythos to logos, polytheism to monotheism, and action to thought. The interplay

among knowledge, recognition, and desire; the role of sameness and alterity in the constitution of personal, familial, and national identities; and the relation between violence and the construction of history. Readings include: Exodus, Sophocles, Shakespeare, Freud, Aeschylus, Euripides, Cavafy, Hofmannsthal, and Wolf; theoretical and critical essays by Laplanche, Lyotard, Lacan, de Certeau, Kofman, Assmann, Said, and Cavell.

3-5 units, not given this year

**GERGEN 306. Narrative, Visuality, Memory**

(Same as GERGEN 206) Moments in the history of the relationship between the verbal and the visual: the classical ars memoriae; the ekphrasis debates of the 18th century; the emergence of a new visuality and mnemonic art as structuring principles for modernist narrative. Authors include Plato, Aristotle, Cicero, Augustine, Winckelmann, Lessing, Diderot, Goethe, Moritz, Flaubert, Rilke, Joyce, and Proust.

3-5 units, not given this year

**GERGEN 367. Freud and the Apostle Paul**

(Same as GERGEN 267) Intersections between Freud's psychoanalysis of society and Paul's political theology. Emphasis is on the issues of law, love, justice, community, and language. Readings include Freud and Paul, and theoretical essays by Taubes, Badiou, Santner, Agamben, Assmann, Zizek, and Boyarin.

3-5 units, not given this year

## GERMAN LANGUAGE (GERLANG) COURSES

### UNDERGRADUATE COURSES IN GERMAN LANGUAGE

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**GERLANG 1. First-Year German, First Quarter**

Speaking, reading, writing, and listening. Authentic materials. Interactive approach with emphasis on developing communicative expression. The cultural context in which German is spoken.

5 units, Aut (Hartman, S), Win (Strachota, K), Spr (Nissler, P)

**GERLANG 2. First-Year German, Second Quarter**

Continuation of 1. Speaking, reading, writing, and listening. Authentic materials. Interactive approach with emphasis on developing communicative expression. The cultural context in which German is spoken. Prerequisite 1 or consent of instructor.

5 units, Aut (Pohlmann, J), Win (Hartman, S), Spr (Staff)

**GERLANG 3. First-Year German, Third Quarter**

Continuation of 2. Speaking, reading, writing, and listening. Authentic materials. Interactive approach with emphasis on developing communicative expression. The cultural context in which German is spoken. Fulfills the University language requirement. Prerequisite: placement test, 2 or consent of instructor.

5 units, Aut (Youngs, E), Win (Pohlmann, J), Spr (Staff)

**GERLANG 5A. Intensive First-Year German, Part A**

Part A and Part B equivalent of 1,2,3 combined. Only Stanford graduate students restricted to 9 units may register for 205A,B.

5 units, Sum (Staff)

**GERLANG 5B. Intensive First-Year German, Part B**

Continuation of 5A. Part A and Part B equivalent of 1,2,3 combined. Only Stanford graduate students restricted to 9 units may register for 205A,B. Prerequisite 5A or equivalent. Fulfill the University Foreign Language Requirement.

5 units, Sum (Staff)

**GERLANG 10. Elementary German for Seniors and Graduate Students**

Intensive. For students who need to acquire reading ability in German for the Ph.D. or for advanced research in their own field. 250 fulfills Ph.D. reading exam.

4 units, Win (Petig, W), Sum (Staff)

**GERLANG 11P. Individually Programmed Beginning German**

For those who wish to complete more or fewer than 5 units a quarter, have scheduling conflicts, or prefer to work independently.

Self-paced work with text and tapes; instructor available for consultation on a regular basis. 3-unit minimum for beginners. Conversational practice available for additional unit. May be repeated for credit.

*1-12 units, Aut (Strachota, K), Win (Strachota, K), Spr (Staff)*

**GERLANG 20A. Beginning German Conversation**  
(AU)

*1 unit, Aut (Pohlmann, J), Win (Balint, L), Spr (Staff)*

**GERLANG 20B. Intermediate German Conversation**  
(AU)

*1 unit, Aut (Pohlmann, J), Win (Balint, L), Spr (Staff)*

**GERLANG 20C. Advanced German Conversation**  
(AU)

*1 unit, Aut (Pohlmann, J), Win (Balint, L), Spr (Staff)*

**GERLANG 20E. Fun Facts about Europe**  
(AU) (Staff)

*1 unit, Win (Balint, L)*

**GERLANG 20K. Küche Mitt (German Cooking Class)**  
(AU)

*1 unit, Aut (Pohlmann, J), Win (Balint, L), Spr (Staff)*

**GERLANG 20M. Mitt Movie Series**  
(AU)

*1 unit, Aut (Pohlmann, J), Win (Staff), Spr (Staff)*

**GERLANG 20P. Theme Projects**  
(AU)

*1 unit, Aut (Pohlmann, J), Win (Balint, L), Spr (Balint, L)*

**GERLANG 20T. Teaching German Conversation**  
(AU)

*1 unit, Aut (Pohlmann, J), Win (Balint, L), Spr (Balint, L)*

**GERLANG 21. Intermediate German I**

Reading short stories, and review of German structure. Discussions in German, short compositions, videos. Prerequisite: placement test, 3 or consent of instructor.

*4 units, Aut (Neely, F), Win (Staff)*

**GERLANG 21S. Intermediate German**

Reading short stories, and review of German structure. Discussions in German, short compositions, videos. Prerequisite: one year of college German; or two years high school German or equivalent, or AP German.

*4 units, Sum (Staff)*

**GERLANG 21W. Intermediate German I: German for Business and International Relations**

Equivalent to 21, but focus is on business and the political and economic geography of Germany. CDs and videos. For students planning to do a business internship in a German-speaking country. Prerequisite: placement test, 3 or consent of instructor.

*4 units, not given this year*

**GERLANG 22. Intermediate German II**

Continuation of 21, with greater emphasis on reading and writing skills. Literary texts of major 20th-century writers in historical context. Prerequisite: placement test, 21 or consent of instructor.

*4 units, Aut (Staff), Win (Petig, W), Spr (Staff)*

**GERLANG 22W. Intermediate German II: German for Business and International Relations**

Equivalent to 22, but continuation of 21W. Recommended for students planning to do a business internship in a German-speaking country. Prerequisite: placement test, 21, 21W or consent of instructor.

*4 units, Win (Staff)*

**GERLANG 23. One Hundred German Years**

Hundert deutsche Jahre - Hones German language skills while introducing the history and culture of Germany as experienced by ordinary people over the course of the 20th century. Themes include Germans and money, foreigners, Hitler, the Wall, food, etc. Video series, parallel readings, discussion in German, writing, advanced usage. Prerequisite: placement test, 22, 22W or consent of instructor.

*4 units, Aut (Strachota, K)*

**GERLANG 23C. Second Year German, Third Quarter**  
Continuation of 22.

*4 units, Win (Staff), Spr (Staff)*

**GERLANG 99. Language Specials**

Prerequisite: consent of instructor.

*1-12 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**GERLANG 105. Advanced Business German**

For students planning to work in a German-speaking country and for preparation of the International Business German exams. Case studies of typical business situations with accompanying videos, listening comprehension exercises, and class simulations. Business correspondence and reports in German. Prerequisite: placement test, 22 or consent of instructor.

*4 units, Spr (Petig, W)*

**GERLANG 110. German Newspapers**

For intermediate and advanced students. Articles from current newspapers and magazines, reading comprehension strategies with online news updates, and vocabulary. Writing practice if desired. May be repeated once for credit

*3-4 units, not given this year*

**GERLANG 111. Television News from Germany**

For intermediate and advanced students. Current news reports and features for listening comprehension and vocabulary. Extra listening, speaking, or writing practice for fourth unit.

*3-4 units, not given this year*

**GERLANG 199. Individual Reading**

Prerequisite: consent of instructor.

*1-12 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

## GRADUATE COURSES IN GERMAN LANGUAGE

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**GERLANG 205A. Intensive First-Year German for Stanford Grads**

Same as GERLANG 5A. For Stanford graduate students only. Stanford graduate students restricted to 9 units may take 205A and B for a total of 9 units.

*4-5 units, Sum (Staff)*

**GERLANG 205B. Intensive First-Year German for Stanford Grads**

Same as GERLANG 5B. For Stanford graduate students only. Continuation of 205A. Stanford graduate students restricted to 9 units may take 205A and B for a total of 9 units.

*4-5 units, Sum (Staff)*

**GERLANG 210. Elementary German for Graduate Students**

Restricted to Stanford graduate students. Prerequisite: consent of instructor.

*3-4 units, Sum (Staff)*

**GERLANG 250. Reading German**

For undergraduates and graduate students with a knowledge of German who want to acquire reading proficiency. Readings from scholarly works and professional journals. Recommended for students who need to pass the Ph.D. reading exam. Prerequisite: one year of German, or 10, or equivalent.

*4 units, Spr (Staff)*

**GERLANG 395. Graduate Studies in German**

Prerequisite: consent of instructor.

*2-5 units, Aut (Staff), Win (Staff), Spr (Staff)*

**GERLANG 399. Independent Study**

Prerequisite: consent of instructor.

*1-6 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

## GERMAN LITERATURE (GERLIT) COURSES

### UNDERGRADUATE COURSES IN GERMAN LITERATURE

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**GERLIT 16N. Music, Myth, and Modernity: Wagner's Ring Cycle and Tolkien's Lord of the Rings**

(Same as MUSIC 16N) Preference to freshmen. Roots of Wagner's operatic cycle and Tolkien's epic trilogy in a common core of Norse, Germanic, and Anglo-Saxon mythology. The role of musical motive and characterization in Wagner's music dramas and the film version of Tolkien's trilogy. Music as a key element in the psychological, political, and cultural revision of ancient myth in modern opera and film. GER:DB-Hum, EC-GlobalCom

3 units, not given this year

**GERLIT 118. Introduction to the Germanic Languages**

(Same as GERLIT 218) A comparative survey of the seven oldest Germanic languages (Gothic, Old Norse, Old Saxon, Old English, Old Frisian, Old Low Franconian, Old High German). Lectures on comparative linguistics, runology, old Germanic poetry, historical syntax and more.

3-5 units, Spr (Robinson, O)

**GERLIT 120. Law, Justice, and the Literary Imagination**

Have law and poetry risen from the same bed, as Jakob Grimm suggested in his essay *Von der Poesie im Recht*? Are there intrinsic connections between the legal and the literary? We will explore the ways in which narrative and drama articulate the relationship between law and justice, and represent the crises of the legal system. The course aims at enhancing reading fluency and textual analysis skills. Readings include texts by Schiller, Kleist, Kafka, Wedekind, and Brecht. Taught in German.

4 units, Win (Douvaldzi, C)

**GERLIT 120Q. Is God Dead?**

(Same as COMPLIT 50Q) A consideration of Nietzsche's claim that God is dead in relation to other texts of German literature and philosophy. The status of religious faith in relation to modernity and secularization; religion and science; culture and faith. Readings in German include selections from sacred and liturgical texts; fictional depictions of religious experience; religion in poetry; German theories of religion. Authors to be studied include Rilke, Hesse, Weiss, Schöder, Buber, Sachs, Haecker, Weber, Taubes, Ratzinger. GER:DB-Hum

3-5 units, not given this year

**GERLIT 121. THE VIENNESE COFFEEHOUSE**

This seminar examines the cultural and literary significance of *fin de siècle* Vienna's most enduring symbol: the Coffeehouse. What was the function of the café in aesthetic, literary and political debates central to Vienna at the turn of the century? How did coffeehouse and newspaper culture influence developments in modernist prose? Texts by Hermann Bahr, Arthur Schnitzler, Karl Kraus, Peter Altenberg, Felix Salten, Sigmund Freud, Egon Friedell and Alfred Polgar, in English translation, original German texts available upon request.

3-5 units, not given this year

**GERLIT 123N. The Brothers Grimm and Their Fairy Tales**

(F,Sem) Stanford Introductory Seminar. Historical, biographical, linguistic, and literary look at the Kinder- and Hausmärchen of Jacob and Wilhelm Grimm. Readings from the fairy tales, plus materials in other media such as film and the visual arts. Four short essays, one or two oral reports. In German. GER:DB-Hum

4 units, Aut (Robinson, O)

**GERLIT 124. Introduction to German Poetry**

(Same as GERLIT 224) Introduction to the reading and interpretation of lyrical poetry from the 18th century to present. Major poets writing in German including Gryphius, Goethe, Hölderlin, Novalis, Eichendorff, Heine, Rilke, Lasker-Schüler, Trakl, Benn, Celan, Brecht, Enzensberger, and Falkner. Close reading technique. Interpretive tools and theoretical concepts. Poetic form, voice, figural language, and the interaction of sensory registers. In German. GER:DB-Hum

4 units, not given this year

**GERLIT 127. Uncanny Literature in the Nineteenth Century**

From ghost children and animated statues, the walking dead to machine women and doppelgangers, 19th-century German literature teems with things that go bump in the night. The history of this tradition of fantastic literature in Germany, its origins, main authors, and defining features. Authors include E.T.A. Hoffmann, Wilhelm Hauff, Friedrich Schiller, Joseph von Eichendorff and Jeremias Gotthelf. Readings and writing in German. GER:DB-

Hum

4 units, not given this year

**GERLIT 127A. The German Ballad**

This course charts the history of the German ballad, from Goethe and Schiller, to Romantic and Realist poets - additional reading will attempt to contextualize the German ballad in the European context. Musical ballads and song arrangements will also be considered. GER:DB-Hum

3-5 units, Spr (Daub, A)

**GERLIT 130. Brecht and Modern Aesthetics**

Bertolt Brecht's poetic and dramatic works, and analysis of his contribution to modern paradigms of poetic and dramatic practice. Readings in German include poetry, dramas such as *Baal*, *Im Dickicht der Städte*, *Die Dreigroschenoper*, *Aufstieg und Fall der Stadt Mahagonny*, *Mutter Courage und ihre Kinder*, and theoretical writings on lyric poetry and drama.

3-3 units, not given this year

**GERLIT 131. Goethe: Poetic Vision and Vocation in the Age of Reason**

Introduction to Goethe's major works, reading across genres of poetry, drama, the novel, and autobiography; critical writings on art, nature, and aesthetics. Central trends in Goethe's thought; the interrelatedness of poetic vision and philosophical thinking in his works. Goethe in relation to other intellectual and philosophical movements of the period, including romanticism. GER:DB-Hum

3-5 units, Aut (Cammin, R)

**GERLIT 131A. Immigrant/Minority Literature and the Emergence of Multiculturalism in Germany**

Immigrant culture and literature in Germany across genres, including stories, drama, memoirs, and film. What do immigrants in Germany write about? What role does immigrant literary culture play in the formation of notions of cultural difference and dialogue? How do the dynamics of ethnic and cultural diversity influence concepts and notions of culture and nationhood in Germany? GER:DB-Hum

3 units, not given this year

**GERLIT 132. Nineteenth-Century Literature and Culture**

A study of literary movements in their philosophical and historical contexts. Romanticism, Realism, Naturalism. What changes defined German culture between the age of Napoleon to the eve of the First World War? How did Germany become a unified nation? The influence of thinkers such as Marx, Nietzsche and Freud. Taught in German.

4 units, Win (Berman, R)

**GERLIT 133Q. Modernism and Fiction**

Preference to sophomores. Innovative ideas and narrative forms in German modernism. International and specifically German features. Problems of narration. Texts such as Musil's *Törless*, Mann's *Tod in Venedig*, Kafka's *Die Verwandlung*, and Broch's *Passenow*. Close reading technique. Prerequisite: reading knowledge of German. GER:DB-Hum

4 units, not given this year

**GERLIT 134. FREUD'S VIENNA**

This course explores the intersections between literature, art, politics, psychoanalysis, and philosophy in turn of the century Vienna. Works by Hofmannsthal, Schnitzler, Bahr, Musil, Roth, Kraus, and Freud; shorter selections from Brentano, Herzl, Kraft-Ebbing, Loos, Mach, and Wittgenstein. (Replaces GerLit 133 for 2011/12) GER:DB-Hum

3-5 units, Spr (Douvaldzi, C)

**GERLIT 135. Outsiders and Outcasts: introduction to German Prose Fiction**

Close reading and discussion of literary works by Hebel, Tieck, Kleist, Hoffmann, Heine, Keller, Storm, R. Walser, and Kafka. Attention paid to writers' divergent responses to the artistic, ethical, and political challenges of modernity. Readings, discussion, and writing assignments in German; length of assignments adjusted to students' linguistic competence. Prerequisite: German language sequence at Stanford or equivalent. GER:DB-Hum

4 units, not given this year

**GERLIT 136. Berlin Topographies in the 20th Century**

Development of Berlin's spatial imaginaries from the boulevards

of the late 19th century to the Weimar Republic's urban agendas, and to the repeated reconstructions by the Nazis, the GDR and Berlin Republic. Sources: Walter Benjamin, Siegfried Kracauer, Berthold Brecht, Peter Weiss, Mascha Kaleko, Peter Schneider, Blixa Bargeld, Wolf Biermann, Christoph Hein, Monika Maron, Thomas Hettche, and Wim Wenders. In German. GER:DB-Hum  
4 units, not given this year

**GERLIT 138. Introduction to Germanic Languages**

(Same as GERGEN 38A) The oldest attested stages of the Germanic language family, including Gothic, Old Norse, Old Saxon, Old English, Old Frisian, Old Low Franconian (Old Dutch), and Old High German. The linguistic interrelationships, prehistory, Germanic tribal groupings, and literature. GER:DB-Hum

4 units, not given this year

**GERLIT 139. Love, Marriage and Passion in German Literature of the 19th and 20th Centuries**

(Same as GERLIT 339) The thesis that love relationships, in shifting social, cultural, and communication contexts, reflect and determine the dominant value system of a society. How the concepts of romantic, passionate, and pragmatic love evolved and competed with one another in texts by Goethe, Schlegel, Keller, Sacher-Masoch, Fontane, and Böll. In German. GER:DB-Hum

3-5 units, not given this year

**GERLIT 148. Heart to Heart: Theories of Expression at the Turns of Two Centuries**

(Same as GERLIT 248) Paradigms of expression around 1800 and 1900, from *Empfindsamkeit* (sensitivity) to German Expressionism. The heart that overflows into speech in the works of Klopstock, Goethe, Tieck, and Kleist, and the reformulation a century later of this idea as *avant garde* practice and modernist credo. Readings of poets, philosophers, and artists on relationships between inside and out, heart and voice, emotion and language, and self and art. Discussion in English. GER:DB-Hum

3-5 units, not given this year

**GERLIT 150C. Postwar German Culture and Thought: 1945 to the Present**

(Same as GERLIT 250C) How German culture and thought confronted the legacy of National Socialism, German guilt, and the possibility of a new beginning. German culture and the memory of communism (the German Democratic Republic) after 1989. Fiction of Thomas Mann, Gunter Grass, Alexander Kluge, and Hans Ulrich Treichel; poetry of Paul Celan and Ingeborg Bachmann; philosophical essays of Martin Heidegger, Theodor Adorno, Jürgen Habermas; films of Rainer Werner Fassbinder, Florian Henkel (The Life of Others), and Oliver Hirschbiegel (Downfall).

3-5 units, not given this year

**GERLIT 151. German Underworlds**

(Same as GERLIT 251) German theories about what lies beneath: is it hell or the subterranean foundations that keep the world from collapsing? Cosmic architecture and the question of the inferno in Kant, Novalis, Wagner, Marx, Freud, Kafka, and the films of Fritz Lang.

3-5 units, not given this year

**GERLIT 163. Readings in 19th-Century German Literature**

(Same as GERLIT 263) Works by Goethe, Tieck, Kleist, Hoffmann, Heine, Büchner, Grillparzer, Droste-Hülshoff, Stifter, and Keller. Their divergent responses to artistic, ethical, and political challenges of modernity. Prerequisite: GERLANG 3 or equivalent. In German. GER:DB-Hum

4 units, not given this year

**GERLIT 189A. Honors Research**

Senior honors students enroll for 5 units in Winter while writing the honors thesis, and may enroll in 189B for 2 units in Spring while revising the thesis. Prerequisite: DLCL 189.

5 units, *Win (Staff)*

**GERLIT 189B. Honors Research**

Open to juniors with consent of adviser while drafting honors proposal. Open to senior honors students while revising honors thesis. Prerequisites for seniors: 189A, DLCL 189.

2 units, *Spr (Staff)*

**GERLIT 190. German Capstone: Reading Franz Kafka**

This class will address major works by Franz Kafka and consider Kafka as a modernist writer whose work reflects on modernity. We will also examine the role of Kafka's themes and poetics in the work of contemporary writers. WIM

3-5 units, *Win (Eshel, A)*

**GERLIT 197. Theories of Art after Idealism**

(Same as GERLIT 297) Key responses to the failure of idealism to integrate artistic creation and aesthetic experience into a philosophical system. Works by Schopenhauer, Kierkegaard, Nietzsche, Dilthey, and Lukács.

3-5 units, not given this year

**GERLIT 199. Independent Reading**

36 hours of reading per unit, weekly conference with instructor. May be repeated for credit. Prerequisite: consent of instructor.

1-10 units, *Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**GERLIT 206. Narrative, Visuality, Memory**

(Same as GERLIT 306) Moments in the history of the relationship between verbal and visual: the classical *ars memoriae*; the ekphrasis debates of the 18th century; and the emergence of a new visuality and mnemonic art as structuring principles for modernist narrative. Authors include Plato, Aristotle, Cicero, Augustine, Winkelmann, Lessing, Diderot, Goethe, Moritz, Flaubert, Rilke, and Proust. GER:DB-Hum

3-5 units, not given this year

**GERLIT 210. Dionysus - Mythology and Poetry of a Nietzschean Inspiration**

(Same as COMPLIT 256A, COMPLIT 356A, GERLIT 310) The Greek god Dionysus became, like Apollo, the symbol of poetic imagination. In the modern era he substituted the Apolline tradition, while Apollo assumed the characteristics of Dionysus. We will examine this central poctological motif in texts by authors including Euripides, Keats, Nietzsche, Pound, and Eliot. Open to advanced undergraduates.

3-5 units, *Aut (Bohrer, C)*

**GERLIT 223. Literary Diaries of Classic Modernity**

(Same as COMPLIT 223) Focus is on self-analysis in works of key modern writers. Since Montaigne's *Essais* and Rousseau's *Confessions*, analysis of the self has been a central topic for modern literature. Texts include Baudelaire's *Intimate Journals*, Kafka's *Diaries*, Gide's *Journals*, Woolf's *Moments of Being*, Benjamin's *Berlin Childhood*, and Pavese's *Diaries*. Analysis of the self as polarizing between the imagination of a utopian childhood and self-deprivation.

3-5 units, not given this year

**GERLIT 241. Deutsche Geistesgeschichte I: German Aesthetic Thought, 1790-1872**

The seminal tradition of writing about art including the German idealists (Kant, Schelling, Hegel, and Schiller), romantics (Schlegel, Novalis, and Hoffmann), and Schopenhauer, Kierkegaard, and Nietzsche. In English. GER:DB-Hum

4 units, not given this year

**GRADUATE COURSES IN GERMAN LITERATURE**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**GERLIT 217. Hölderlin's Poetry**

(Same as COMPLIT 217) A discussion of key poems by Friedrich Hölderlin with regard to themes including the utopian fatherland as mythological landscape; the idea of the Greek gods; the concept of poetry as event; and the emphatic now. The seminar also explores the relationship between the philosophy of history and poetic metaphor.

3-5 units, not given this year

**GERLIT 218. Introduction to the Germanic Languages**

(Same as GERLIT 118) A comparative survey of the seven oldest Germanic languages (Gothic, Old Norse, Old Saxon, Old English, Old Frisian, Old Low Franconian, Old High German). Lectures on comparative linguistics, runology, old Germanic poetry, historical syntax and more.

3-5 units, *Spr (Robinson, O)*

**GERLIT 219. German Utopias and Dystopias in the 20th Century**

This course investigates the fraught relationship of Geist and politics in 20th century visions of a utopian republic of letters, mostly from Germany's conservative intellectuals: The George-circle's idea of a "secret Germany," the "conservative revolution" of Hugo von Hofmannsthal, Mann's Reflections of a Non-Political Man are the most influential such attempts at an aesthetic politics. Other texts instead interrogate and at times parody their attempts, for instance Hesse's Glass Bead Game and Arno Schmidt's Egghed Republic.

*3-5 units, not given this year*

**GERLIT 224. Introduction to German Poetry**

(Same as GERLIT 124) Introduction to the reading and interpretation of lyrical poetry from the 18th century to present. Major poets writing in German including Gryphius, Goethe, Hölderlin, Novalis, Eichendorff, Heine, Rilke, Lasker-Schüler, Trakl, Benn, Celan, Brecht, Enzensberger, and Falkner. Close reading technique. Interpretive tools and theoretical concepts. Poetic form, voice, figural language, and the interaction of sensory registers. In German.

*4 units, not given this year*

**GERLIT 232. Realistic Fictions**

(Same as COMPLIT 239) Realistic narratives in nineteenth-century literature. Structures of representation, temporality, and closure. Realism, history and political economy. Realism, modernism, and twentieth-century revisions. Texts by authors such as Keller, Stifter, Fontane, Seghers, Lukacs, and Adorno.

*3-5 units, not given this year*

**GERLIT 234. The Bildungsroman and Other Biographical Fictions**

Life hermeneutics practiced in the psychological novel, Bildungsroman, and autobiography. Intersections and contrasts among these genres. The origins of the notion of progress and its fictional translations; possibilities of historical and fictional closure; and the emergence of the novel's protagonist as a disciplinary subject. Authors include Augustine, Rousseau, Goethe, Moritz, and Keller.

*3-5 units, Spr (Douvaldizi, C)*

**GERLIT 246. Memory, History, and the Contemporary Novel**

(Same as COMPLIT 221, JEWISHST 241) How the watershed events of the 20th century, the philosophic linguistic turn, and the debate regarding the end of history left their mark on the novel. How does the contemporary novel engage with the past? How does its interest in memory and history relate to late- or postmodern culture of time or to political and ethical concerns? Novels by Toni Morrison, W. G. Sebald, J. M. Coetzee, Kazuo Ishiguro, and A. B. Yehoshua; theoretical works by Nietzsche, Freud, Heidegger, Hannah Arendt, Walter Benjamin, Fredric Jameson, Paul Ricoeur, Avishai Margalit, and Walter Benn Michaels.

*3-5 units, Spr (Eshel, A)*

**GERLIT 248. Heart to Heart: Theories of Expression at the Turns of Two Centuries**

(Same as GERLIT 148) Paradigms of expression around 1800 and 1900, from Empfindsamkeit (sensitivity) to German Expressionism. The heart that overflows into speech in the works of Klopstock, Goethe, Tieck, and Kleist, and the reformulation a century later of this idea as avant garde practice and modernist credo. Readings of poets, philosophers, and artists on relationships between inside and out, heart and voice, emotion and language, and self and art. Discussion in English.

*3-5 units, not given this year*

**GERLIT 250A. Modern Drama**

Problems of drama as genre, especially in relationship to problems of modernism. Transitions from classical and popular theater. New structures of action and conflict; epic theater; competition with film; transformed theatrical practices. Authors: Nestroy, Hauptmann, Hofmannsthal, Brecht, and Horvath. (Satisfied by enrollment in GERLIT 369 in 2008-09.)

*3-5 units, not given this year*

**GERLIT 250B. German Romanticism and Its Repercussions**

Works by Novalis, the Schlegel brothers, Tieck, Wackenroder, Hoffmann, Klingemann. Theory of the subject; transformative politics and conservative-religious retreat into inwardness; the

fragment form and the novel; reflection, play, irony; the productive self-movement of language; the hieroglyph of nature; animating effects of Romantic desire and its impasses; interactions among literature, music, and painting. Ambivalent and critical responses to Romanticism (Hegel, Heine, Nietzsche) and recent revivals (Benjamin, Lacoue-Labarthe, Nancy, and Frank). Readings in German, discussion in English.

*3-5 units, not given this year*

**GERLIT 250C. Postwar German Culture and Thought: 1945 to the Present**

(Same as GERLIT 150C) How German culture and thought confronted the legacy of National Socialism, German guilt, and the possibility of a new beginning. German culture and the memory of communism (the German Democratic Republic) after 1989. Fiction of Thomas Mann, Gunter Grass, Alexander Kluge, and Hans Ulrich Treichel; poetry of Paul Celan and Ingeborg Bachmann; philosophical essays of Martin Heidegger, Theodor Adorno, Jürgen Habermas; films of Rainer Werner Fassbinder, Florian Henkel (The Life of Others), and Oliver Hirschbiegel (Downfall).

*3-5 units, not given this year*

**GERLIT 251. German Underworlds**

(Same as GERLIT 151) German theories about what lies beneath: is it hell or the subterranean foundations that keep the world from collapsing? Cosmic architecture and the question of the inferno in Kant, Novalis, Wagner, Marx, Freud, Kafka, and the films of Fritz Lang.

*3-5 units, not given this year*

**GERLIT 255. Middle High German**

Introduction to medieval German language and culture. Readings include Hartmann von Aue and Gottfried von Strassburg; genres include Minnesang, epic, and romance. Grammar review; emphasis is on rapid and accurate reading.

*3-5 units, not given this year*

**GERLIT 256. Old High German**

Introduction to the grammar and the texts of the earliest attested stage of high German

*3-4 units, not given this year*

**GERLIT 258. German Dialects**

A survey of major dialects of the German speaking areas. Lectures on comparative linguistics, the history and nature of German dialect geography, sociolinguistic approaches. Prerequisite: GERLANG 3 or equivalent

*4 units, Win (Robinson, O)*

**GERLIT 262. Theodor Storm and the Problem of Poetic Realism**

The short fiction of nineteenth-century realism in relation to genre, audience, and cultural change. Survey of Storm's oeuvre and its development. Questions of narrative form, lyrical mood, memory and plot. Reception in social theory and cinema.

*3-5 units, Win (Berman, R)*

**GERLIT 263. Readings in 19th-Century German Literature**

(Same as GERLIT 163) Works by Goethe, Tieck, Kleist, Hoffmann, Heine, Büchner, Grillparzer, Droste-Hülshoff, Stifter, and Keller. Their divergent responses to artistic, ethical, and political challenges of modernity. Prerequisite: GERLANG 3 or equivalent. In German.

*4 units, not given this year*

**GERLIT 272. Modern German Poetry: Rilke, George, Trakl**

This course explores three seminal German poets of the early 20th century, Rainer Maria Rilke, Stefan George, and Georg Trakl. While focused on their work, the course will all also explore each poet's intellectual and social context, their relationship to the tradition, and their poetic politics. This course is taught entirely in German

*3-5 units, Win (Staff)*

**GERLIT 297. Theories of Art after Idealism**

(Same as GERLIT 197) Key responses to the failure of idealism to integrate artistic creation and aesthetic experience into a philosophical system. Works by Schopenhauer, Kierkegaard, Nietzsche, Dilthey, and Lukács.

*3-5 units, not given this year*

**GERLIT 298. Individual Work**

Open only to German majors and to students working on special projects, including written reports for internships. Honors students use this number for the honors essay. May be repeated for credit.

*1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**GERLIT 306. Narrative, Visuality, Memory**

(Same as GERLIT 206) Moments in the history of the relationship between verbal and visual: the classical *ars memoriae*; the ekphrasis debates of the 18th century; and the emergence of a new visuality and mnemonic art as structuring principles for modernist narrative. Authors include Plato, Aristotle, Cicero, Augustine, Winkelmann, Lessing, Diderot, Goethe, Moritz, Flaubert, Rilke, and Proust.

*3-5 units, not given this year*

**GERLIT 310. Dionysus - Mythology and Poetry of a Nietzschean Inspiration**

(Same as COMPLIT 256A, COMPLIT 356A, GERLIT 210) The Greek god Dionysus became, like Apollo, the symbol of poetic imagination. In the modern era he substituted the Apolline tradition, while Apollo assumed the characteristics of Dionysus. We will examine this central poetological motif in texts by authors including Euripides, Keats, Nietzsche, Pound, and Eliot. Open to advanced undergraduates.

*3-5 units, Aut (Bohrer, C)*

**GERLIT 339. Love, Marriage and Passion in German Literature of the 19th and 20th Centuries**

(Same as GERLIT 139) The thesis that love relationships, in shifting social, cultural, and communication contexts, reflect and determine the dominant value system of a society. How the concepts of romantic, passionate, and pragmatic love evolved and competed with one another in texts by Goethe, Schlegel, Keller, Sacher-Masoch, Fontane, and Böll. In German.

*3-5 units, not given this year*

**GERLIT 369. Introduction to Graduate Studies: Criticism as Profession**

(Same as COMPLIT 369, FRENGEN 369, ITALGEN 369) Based on a survey of (and a conversation about) the history of academic Literary Criticism, and on presentation (and discussion) of contemporary theoretical positions, this seminar will try to enhance a reflection on the conditions, difficulties, and rewards of Literary Criticism as a profession and as an intellectual life form. Attention will be paid to the most relevant (and most pressing) institutional frame-conditions but this attention will not prevent us from trying to explore a (seldom used) potential of eccentricity and freedom that has always been inherent to (although sometimes dormant in) Literary Criticism.

*5 units, Aut (Gumbrecht, H)*

**GERLIT 399. Independent Study**

*1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**GERLIT 400. Dissertation Research**

For graduate students in German working on dissertations only.

*1-12 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**GERLIT 802. TGR Dissertation**

*0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

## HEALTH RESEARCH AND POLICY (HRP) COURSES

### UNDERGRADUATE COURSES IN HEALTH RESEARCH AND POLICY

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**HRP 89Q. Introduction to Cross Cultural Issues in Medicine**

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Introduction to social factors that impact health care delivery, such as ethnicity, immigration, language barriers, and patient service expectations. Focus is on developing a framework to understand culturally unique and non-English speaking populations in the health care system. GER:EC-AmerCul

*3 units, Win (Corso, I)*

**HRP 199. Undergraduate Research**

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

*1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

## GRADUATE COURSES IN HEALTH RESEARCH AND POLICY

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**HRP 206. Meta-research: Appraising Research Findings, Bias, and Meta-analysis**

(Same as MED 206, STATS 211) Open to graduate, medical, and undergraduate students. Appraisal of the quality and credibility of research findings; evaluation of sources of bias. Meta-analysis as a quantitative (statistical) method for combining results of independent studies. Examples from medicine, epidemiology, genomics, ecology, social/behavioral sciences, education. Collaborative analyses. Project involving generation of a meta-research project or reworking and evaluation of an existing published meta-analysis. Prerequisite: knowledge of basic statistics.

*3 units, Win (Olkin, I; Ioannidis, J)*

**HRP 207. Introduction to Concepts and Methods in Health Services and Policy Research I**

Primarily for medical students in the Health Services and Policy Research scholarly concentration. Topics include health economics, statistics, decision analysis, study design, quality measurement, cost benefit and effectiveness analysis, and evidence based guidelines.

*2 units, Aut (Haberland, C)*

**HRP 208. Introduction to Concepts and Methods in Health Services and Policy Research II**

Primarily for medical students in the Health Services and Policy Research scholarly concentration; continuation of 207. Topics include health economics, statistics, decision analysis, study design, quality measurement, cost benefit and effectiveness analysis, and evidence based guidelines. Recommended: 207.

*2 units, Win (Haberland, C)*

**HRP 209. FDA's Regulation of Health Care**

(Same as LAW 458) Open to law and medical students; other graduate students by consent of instructor. The FDA's regulatory authority over drugs, biologics, medical devices, and dietary supplements. The nature of the pharmaceutical, biotech, medical device, and nutritional supplement industries.

*2-3 units, not given this year*

**HRP 210. Health Law and Policy**

(Same as Law 313) Open to law, medicine, business, and graduate students. Focus is on the physician/patient relationship, medical ethics, and public health law.

*3 units, Spr (Staff)*

**HRP 211. Law and the Biosciences**

(Same as LAW 368) Legal, social, and ethical issues arising from advances in neuroscience, including effects upon law and society through improvements in predicting illnesses and behaviors, reading minds through neuroimaging, understanding responsibility and consciousness, treating criminal behavior, and cognitive enhancement. May be repeated for credit.

*3 units, not given this year*

**HRP 212. Cross Cultural Medicine**

Developing interviewing and behavioral skills needed to facilitate culturally relevant health care across all population groups. Discussions focus on explicit and implicit cultural influences operating in formal and informal medical contexts.

*3 units, Spr (Staff)*

**HRP 214. Scientific Writing**

Step-by-step through the process of writing and publishing a scientific manuscript. How to write effectively, concisely, and clearly. Preparation of an actual scientific manuscript. Students are encouraged to bring a manuscript on which they are currently working to develop and polish throughout the course.

*2-3 units, Win (Sainani, K)*

**HRP 215. Scientific Writing for Basic and Translational Scientists**

Teaches students in the basic sciences how to write clearly, concisely, and effectively. Focuses on the process of writing and publishing a scientific manuscript. 3 unit option requires work on a manuscript. Not intended for epidemiology graduate students.

2-3 units, Aut (Sainani, K)

**HRP 216. Analytical and Practical Issues in the Conduct of Clinical and Epidemiologic Research**

Topics include: advanced aspects of study design and data analyses; development of health measurement instruments; methods of summarizing literature and quantifying effect sizes; and multivariable nature of health events in human populations. 3 units requires a term paper. Prerequisites: 225, and 258 or 261, or consent of instructor.

2-3 units, Spr (Staff)

**HRP 220. BIOTECHNOLOGY LAW AND POLICY**

(Same as LAW 440) Open to all law or medical students; other graduate students by consent of the instructor. Focuses on the biotechnology industry, with some discussion of the med tech or medical device industry and the pharmaceutical industry. The life cycle of a biotech firm, from a good idea to a start-up company to FDA approval and beyond. Guest speakers. In addition to a final exam, students are required to participate in a group project during the term, making law and business recommendations about a biotech firm.

3 units, Spr (Staff)

**HRP 221. Law and the Biosciences: Genetics**

(Same as LAW 480) Open to all law or medical students; other graduate students by consent of the instructor. Ethical, legal, and social issues arising primarily from advances in knowledge of human genetics. May also include a section on stem cell research.

3 units, Spr (Staff)

**HRP 223. Epidemiologic Analysis: Data Management and Statistical Programming**

The skills required for management and analysis of biomedical data. Topics include importing and exporting data from multiple database systems, visualizing and cleaning data, data management for multicenter projects, and data security. Introduction to applied statistical programming relevant to epidemiologic and clinical research. No previous programming experience required.

2-3 units, Aut (Balise, R)

**HRP 225. Design and Conduct of Clinical and Epidemiologic Studies**

Intermediate-level. The skills to design, carry out, and interpret epidemiologic studies, particularly of chronic diseases. Topics: epidemiologic concepts, sources of data, cohort studies, case-control studies, cross-sectional studies, sampling, estimating sample size, questionnaire design, and the effects of measurement error. Prerequisite: A basic/introductory course in statistics or consent of instructor.

3-4 units, Aut (Popat, R)

**HRP 226. Advanced Epidemiologic and Clinical Research Methods**

The principles of measurement, measures of effect, confounding, effect modification, and strategies for minimizing bias in clinical and epidemiologic studies. Prerequisite: 225 or consent of instructor.

3-4 units, Win (Popat, R)

**HRP 228. Genetic Epidemiology**

Provides framework for physicians, epidemiologists, and other scientists to interpret the literature and incorporate genetic information into human disease research. Topics include: common genetic measures, approaches to finding disease genes, study design and analysis issues, genome-wide association studies, and applications of new genomic technologies. Includes reading seminal papers in genetic epidemiology.

2 units, alternate years, not given this year

**HRP 230. Cancer Epidemiology**

Descriptive epidemiology and sources of incidence/mortality data; the biological basis of carcinogenesis and its implications for epidemiologic research; methodological issues relevant to cancer research; causal inference; major environmental risk factors;

genetic susceptibility; cancer control; examples of current research; and critique of the literature. 3 units requires paper or project. Prerequisite: 225, or consent of instructor.

2-3 units, alternate years, not given this year

**HRP 231. Epidemiology of Infectious Diseases**

Principles of the transmission of the infectious agents (viruses, bacteria, rickettsiae, mycoplasma, fungi, and protozoan and helminth parasites). The role of vectors, reservoirs, and environmental factors. Pathogen and host characteristics that determine the spectrum of infection and disease. Endemicity, outbreaks, and epidemics of selected infectious diseases. Principles of control and surveillance.

3 units, Win (Maldonado, Y; Parsonnet, J)

**HRP 236. Epidemiology Research Seminar**

Weekly forum for ongoing epidemiologic research by faculty, staff, guests, and students, emphasizing research issues relevant to disease causation, prevention, and treatment. May be repeated for credit.

1 unit, Aut (Henderson, V), Win (Sieh, W), Spr (Staff)

**HRP 238. Genes and Environment in Disease Causation: Implications for Medicine and Public Health**

(Same as HUMBIO 159) The historical, contemporary, and future research and practice among genetics, epidemiology, clinical medicine, and public health as a source of insight for medicine and public health. Genetic and environmental contributions to multifactorial diseases; multidisciplinary approach to enhancing detection and diagnosis. The impact of the Human Genome Project on analysis of cardiovascular and neurological diseases, and cancer. Ethical and social issues in the use of genetic information. Prerequisite: basic course in genetics; for undergraduates, Human Biology core or equivalent or consent of instructor.

2-3 units, not given this year

**HRP 239. Understanding Statistical Models and their Social Science Applications**

(Same as EDUC 260X, STATS 209) Critical examination of statistical methods in social science applications, especially for cause and effect determinations. Topics: path analysis, multilevel models, matching and propensity score methods, analysis of covariance, instrumental variables, compliance, longitudinal data, mediating and moderating variables. See <http://www-stat.stanford.edu/~rag/stat209>. Prerequisite: intermediate-level statistical methods

3 units, Win (Rogosa, D)

**HRP 240. Rethinking Global Health**

(Same as MED 230) Challenges for those seeking to improve global health include contending with: a dynamic balance between infectious and chronic non-communicable disease that differs across and within countries; issues relating to the proximate and more removed causes of disease and illness, including nutrition, infrastructure, governance, economic development, and environmental changes; diverse proposed responses with arguments for particular courses of action appealing to cost-effectiveness, egalitarian, and rights-based principles. The course goal is to begin to make sense of these challenging issues, requiring data and evidence derived via multiple methodologies, critical thinking, and sound reasoning. Prerequisite: a course dealing with global health, such as HUMBIO 129S, or consent of instructor.

3 units, Spr (Staff)

**HRP 241. Measuring Global Health**

(Same as MED 231) Open to MD, graduate, and undergraduate students. Assessing the global burden of disease, its distribution among and within countries, its causes, and appropriate interventions requires rigorous quantitative approaches. This course develops skills in these areas by critically examining questions like: How do we know who is sick and where? How are risk factors incorporated into our projections of future disease trends? How do we combine mortality and morbidity in a meaningful way? What works for improving health efficiently? Workshops build familiarity with relevant data and their analysis. Prerequisite: Course in statistics, biostatistics, econometrics, or equivalent.

4 units, Spr (Bendavid, E; Goldhaber-Fiebert, J)



**HRP 251. Design and Conduct of Clinical Trials**

The rationale for phases 1-3 clinical trials, the recruitment of subjects, techniques for randomization, data collection and endpoints, interim monitoring, and reporting of results. Emphasis is on the theoretical underpinnings of clinical research and the practical aspects of conducting clinical trials.

3 units, Spr (Staff)

**HRP 252. Outcomes Analysis**

(Same as BIOMEDIN 251) Methods of conducting empirical studies which use large existing medical, survey, and other databases to ask both clinical and policy questions. Econometric and statistical models used to conduct medical outcomes research. How research is conducted on medical and health economics questions when a randomized trial is impossible. Problem sets emphasize hands-on data analysis and application of methods, including re-analyses of well-known studies. Prerequisites: one or more courses in probability, and statistics or biostatistics.

3 units, Spr (Staff)

**HRP 256. Economics of Health and Medical Care**

(Same as BIOMEDIN 156, BIOMEDIN 256, ECON 126) Institutional, theoretical, and empirical analysis of the problems of health and medical care. Topics: demand for medical care and medical insurance; institutions in the health sector; economics of information applied to the market for health insurance and for health care; measurement and valuation of health; socioeconomic status and epidemiology; economics of obesity. Graduate students with research interests should take ECON 248. Prerequisites: ECON 50 and ECON 102A or Stats 116 or the equivalent. Recommended: ECON 51.

5 units, Aut (Bhattacharya, J)

**HRP 258. Introduction to Probability and Statistics for Clinical Research**

Open to medical and graduate students; required of medical students in the Clinical Research Scholarly Concentration. Tools to evaluate medical literature. Topics include random variables, expectation, variance, probability distributions, the central limit theorem, sampling theory, hypothesis testing, confidence intervals, correlation, regression, analysis of variance, and survival analysis.

3 units, Spr (Staff)

**HRP 259. Introduction to Probability and Statistics for Epidemiology**

Topics: random variables, expectation, variance, probability distributions, the central limit theorem, sampling theory, hypothesis testing, confidence intervals. Correlation, regression, analysis of variance, and nonparametric tests. Introduction to least squares and maximum likelihood estimation. Emphasis is on medical applications. Differential between 3 and 4 units is the amount of out-of-class work required.

3-4 units, Aut (Sainani, K)

**HRP 260A. Workshop in Biostatistics**

(Same as STATS 260A) Applications of statistical techniques to current problems in medical science.

1-2 units, Aut (Olshen, R; Sabatti, C)

**HRP 260B. Workshop in Biostatistics**

(Same as STATS 260B) Applications of statistical techniques to current problems in medical science.

1-2 units, Win (Olshen, R; Sabatti, C)

**HRP 260C. Workshop in Biostatistics**

(Same as STATS 260C) Applications of statistical techniques to current problems in medical science.

1-2 units, Spr (Staff)

**HRP 261. Intermediate Biostatistics: Analysis of Discrete Data**

(Same as BIOMEDIN 233, STATS 261) Methods for analyzing data from case-control and cross-sectional studies: the 2x2 table, chi-square test, Fisher's exact test, odds ratios, Mantel-Haenzel methods, stratification, tests for matched data, logistic regression, conditional logistic regression. Emphasis is on data analysis in SAS. Special topics: cross-fold validation and bootstrap inference.

3 units, Win (Sainani, K)

**HRP 262. Intermediate Biostatistics: Regression, Prediction, Survival Analysis**

(Same as STATS 262) Methods for analyzing longitudinal data. Topics include Kaplan-Meier methods, Cox regression, hazard

ratios, time-dependent variables, longitudinal data structures, profile plots, missing data, modeling change, MANOVA, repeated-measures ANOVA, GEE, and mixed models. Emphasis is on practical applications. Prerequisites: basic ANOVA and linear regression.

3 units, Spr (Staff)

**HRP 263. Advanced Decision Science Methods and Modeling in Health**

(Same as MED 263) Advanced methods currently used in published model-based cost-effectiveness analyses in medicine and public health, both theory and technical applications. Topics include: Markov and microsimulation models, model calibration and evaluation, and probabilistic sensitivity analyses. Prerequisites: a course in probability, a course in statistics or biostatistics, a course on cost-effectiveness such as HRP 392, a course in economics, and familiarity with decision modeling software such as TreeAge.

3 units, Spr (Staff)

**HRP 268. Genetics and Reproductive Technologies**

(Same as LAW 568) Examines the complex interrelationship among legal, political, ethical, and social issues shaping the intersection of genetics, reproductive technologies and reproductive rights. Issues discussed may include, but are not limited to: the commercialization and sale of reproductive materials like sperm, ovum, and surrogacy services; genetic technologies, prenatal genetic screening, and diagnostic testing of offspring; criminalization of reproductive decision-making such as sex-selection and genetic enhancement; stem cells, cloning, and abortion; DNA databanks and collection of genetic information; in vitro fertilization and other emerging reproductive technologies.

2 units, Aut (Farahany, N)

**HRP 274. Design for Service Innovation**

(Same as MED 274) (Same as OIT 344) Open to graduate students from all schools and departments. An experiential course in which students work in multidisciplinary teams to design new services (including, but not limited to, web services) to address the needs of an underserved population of users. Students learn to identify the key needs of the target population and to design services to address these needs. Projects in 2012 will focus on services for young adult survivors of severe childhood diseases such as cystic fibrosis, rheumatoid arthritis, major cardiac repairs, organ transplants, genetic metabolic disorders, and cancer. The first wave of survivors is reaching young adulthood (ages 18-25). Many aspects of the young adult world are not yet user-friendly for them: applying to and entering college, adherence to required medication and diet, prospects for marriage and parenthood, participation in sports, driving, drinking, drugs, and more. The aspiration is to develop services to improve these young

4 units, Spr (Staff)

**HRP 280. Spanish for Medical Students**

(Same as SPANLANG 121M) First quarter of three-quarter series. Goal is a practical and culturally appropriate command of spoken Spanish. Emphasis is on taking the medical history. Topics include the human body, hospital procedures, diagnostics, food, and essential doctor-patient phrases when dealing with Spanish-speaking patients. Series can be taken independently, depending on the level of prior knowledge.

2 units, Aut (Corso, J)

**HRP 281. Spanish for Medical Students**

(Same as SPANLANG 122M) Second quarter of three-quarter series. Goal is a practical and culturally appropriate command of spoken Spanish. Emphasis is on performing a physical examination. Topics include the human body, hospital procedures, diagnostics, food, and essential doctor-patient phrases when dealing with Spanish-speaking patients. Series can be taken independently, depending on the level of prior knowledge.

2 units, Win (Corso, J)

**HRP 282. Spanish for Medical Students**

(Same as SPANLANG 123M) Third quarter of three-quarter series. Goal is a practical and culturally appropriate command of spoken Spanish. Emphasis is on different specialties and medical conditions. Topics include the human body, hospital procedures, diagnostics, food, and essential doctor-patient phrases when dealing with Spanish-speaking patients. Series can be taken



independently, depending on the level of prior knowledge.

2 units, Spr (Staff)

**HRP 283. Health Services Research Core Seminar**

Presentation of research in progress and tutorials in the field of health services research.

1 unit, Aut (Haberland, C), Win (Haberland, C), Spr (Staff)

**HRP 290. Advanced Medical Spanish Oral Communication**

Enrollment limited to medical students. Designed to further develop linguistic skills, covering all medical specialties according to student needs. Sessions also include topics on patient education and diseases, such as diabetes, asthma, TB, and CVDs.

2 units, Aut (Corso, I), Win (Corso, I), Spr (Staff)

**HRP 296. Current Topics in Bioethics**

(Same as LAW 596) Explores the ethical, legal, and public policy issues arising from recent advances in biomedicine and the biosciences. Approaches to bioethical reasoning including casuistry, social justice, resource allocation, and individual rights in areas such as refusal of treatment conception. Topics include: the use of forensic genetics in criminal law, neuroscience and national security, race and ethnicity in genetic research, experimentation on human subjects and prisoners, privacy of medical and genetic information in the information age, synthetic biology, and do-it-yourself medical and genetic testing. No prior knowledge in science, medicine, philosophy or related disciplines is required.

3 units, Spr (Staff)

**HRP 299. Directed Reading in Health Research and Policy**

Epidemiology, health services research, preventive medicine, medical genetics, public health, economics of medical care, occupational or environmental medicine, international health, or related fields. May be repeated for credit. Prerequisite: consent of instructor.

1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**HRP 351. Health Care Technology: From Innovators to Providers to Patients**

(Same as GSBGEN 351) How health care businesses use biotechnology, medical technology and information technology to improve patient outcomes and manage costs. New technologies commercialized by innovator biotech and pharmaceutical companies, device manufacturers, diagnostics developers, and health IT companies, and adopted by hospitals and physicians in patient care and paid for by third-party payers. Case studies: how innovators finance and manage new product development; clinical trial management and gaining regulatory approval; strategies to drive product adoption; business models to drive innovation; clinical and business models for adopting new technology; organizational change; criteria for reimbursement and coverage decisions; selective provider network design to manage added costs; and IT-intensive business models. Guest speakers and panels.

4 units, not given this year

**HRP 370. Medical Scholars Research**

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

4-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**HRP 391. Health Care Regulation, Finance and Policy**

(Same as PUBLPOL 231) (SAME AS LAW 348, MGTECON 331) Provides the legal, institutional, and economic background necessary to understand the financing and production of health services in the U.S. Potential topics include: health reform, health insurance (Medicare and Medicaid, employer-sponsored insurance, the uninsured), medical malpractice and quality regulation, pharmaceuticals, the corporate practice of medicine, regulation of fraud and abuse, and international comparisons.

3 units, Win (Bundorf, M; Kessler, D)

**HRP 392. Analysis of Costs, Risks, and Benefits of Health Care**

(Same as BIOMEDIN 432) (Same as MGTECON 332) For graduate students. How to do cost/benefit analysis when the output is difficult or impossible to measure. How do M.B.A. analytic tools apply in health services? Literature on the principles of cost/benefit analysis applied to health care. Critical review of actual studies. Emphasis is on the art of practical application.

4 units, Aut (Owens, D; Goldhaber-Fiebert, J)

**HRP 399. Graduate Research**

Investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**HRP 801. TGR Project**

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**HRP 802. TGR Dissertation**

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

## HISTORY (HISTORY) COURSES

### UNDERGRADUATE COURSES IN HISTORY

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**HISTORY 4N. A World History of Genocide**

(F,Sem) Stanford Introductory Seminar. Reviews the history of genocide from ancient times until the present. Defines genocide, both in legal and historical terms, and investigates its causes, consequences, and global dimensions. Issues of prevention, punishment, and interdiction. Main periods of concern are the ancient world, Spanish colonial conquest; early modern Asia; settler genocides in America, Australia, and Africa; the Armenian genocide and the Holocaust; genocide in communist societies; and late 20th century genocide. GER:DB-SocSci

3-5 units, Win (Naimark, N)

**HISTORY 5S. Disciplining the Colonial Body: Violence, Sex, and Resistance in Europe's Empires, 1830-2011**

How did Europe maintain control over its vast empires? Explores how colonial institutions, law, hierarchies of race, class, and sex, and the practice of sciences like anthropology functioned as tools of imperial control. We will use primary sources such as novels, films, maps, memoirs, legal documents, and personal correspondence, as well as theorists of power such as Foucault and Said, to study the effects of imperial violence and control, resistance to it, and its continued importance in contemporary society.

5 units, Spr (Slobodkin, Y), ONCEONLY

**HISTORY 8N. How We Remember the Past: Historical, Legal and Artistic Interpretation**

(F,Sem) Stanford Introductory Seminar. Examines the similarities and differences between three different methods to remember (and interpret) the past: historical research, legal proceedings, and culture (mainly literature, cinema and the plastic arts). Looking at theoretical debates first, a historical specific example next (Spanish civil war and dictatorship, 1936-1975), we will ask under which circumstances is each method used to remember the past, and how do the results vary? Why do certain societies prefer one method to others? Does this preference depend on what is being recorded, on the availability of sources, on the conditions of those engaged in examining the past, their aim at doing so, etc.? The goal is not to learn about a specific event, time or place, but to think about the past in pluralistic ways. Students will each choose an example of their own to analyze and share with the class. Examples can refer to any moment in the past, or any region or human group as long as the student GER:DB-Hum

4-5 units, Aut (Herzog, T)

**HISTORY 9. Human Rights and Humanitarianism: A Global History**

(SAME AS HISTORY 109. History majors and others taking 5 units, enroll in HISTORY 109.) Do human beings have certain inalienable rights? Are we obliged to help those in need? Examines the historical origins as well as the political, social, economic, legal, and cultural contexts of ideas about human rights and humanitarianism from the time of the Old Testament to the International Criminal Court. Class time will blend short lectures with town hall style discussions of subjects including slavery, torture, colonialism, genocide, and the work of NGO's.

3 units, Win (Daughton, J)

**HISTORY 10A. Europe from Antiquity to 1500**

(Same as History 110A. History majors and others taking 5 units, register for 110A.) Focus is on religion and politics. Issues include: the rise of Christianity and its impact on Rome; transformations of Catholicism and its institutions including the impact of barbarian tribes and the struggle between church and state; antisemitism, heresy, Crusades, and inquisition; courtly love; and scholasticism. GER:DB-Hum

*3 units, Aut (Miner, J)*

**HISTORY 10B. Early Modern Europe**

(Same as HISTORY 110B. History majors and others taking 5 units, register for 110B.) Survey of early modern European history from the Reformation through the Enlightenment. Topics include sovereignty and the state, courtly life and manners, science and technology, the print and military revolutions, piety and religious practice, popular culture and village life, women and gender, witchcraft and sexual deviance, the rise of international trade, the history of consumption and material things, encounters with non-Western peoples and colonialism, and scholarship and the republic of letters. GER:DB-SocSci, EC-GlobalCom

*3 units, Win (Fredona, R)*

**HISTORY 10C. Introduction to Modern Europe**

(SAME as HISTORY 110C. History majors and others taking 5 units, register for 110C.) From the late 18th century to the present. How Europeans responded to rapid social changes caused by political upheaval, industrialization, and modernization. How the experience and legacy of imperialism and colonialism both influenced European society and put in motion a process of globalization that continues to shape international politics today.

*3 units, Spr (Daughton, J)*

**HISTORY 11N. The Roman Empire: Its Grandeur and Fall**

(Same as CLASSHIS 24N) Preference to Freshmen. Prerequisite: IHUM 69A. Explore themes on the Roman Empire and its decline from the 1st through the 5th centuries C.E.. What was the political and military glue that held this diverse, multi-ethnic empire together? What were the bases of wealth and how was it distributed? What were the possibilities and limits of economic growth? How integrated was it in culture and religion? What were the causes and consequences of the conversion to Christianity? Why did the Empire fall in the West? How suitable is the analogy of the U.S. in the 21st century? GER:IHUM-3

*4 units, not given this year*

**HISTORY 11SC. How Is a Buddhist**

Buddhism as a system of thought, a culture, a way of life, a definition of reality, a method for investigating it, and a mental, physical, and social practice. Buddhism as a total phenomenon. Readings, films, music, and art. How Buddhist practices constitute the world of the Buddhist.

*2 units, not given this year*

**HISTORY 13N. Slavery and Rebellion in Ancient Rome: Spartacus in Legend and History**

(F,Sem) (Same as CLASSHIS 23N) Stanford Introductory Seminar. Preference to freshmen. Spartacus and his army of slaves resisted the power of the Roman legions for two years and became the stuff of legend. Introduction to Roman history. Slavery in ancient Rome in its psychological, social, and economic dimensions. Causes of Spartacus' rebellion; how the traumatic end of the rebellion gave rise to a legend popularized in Stanley Kubrick's 1960 film.

*3 units, Aut (Saller, R)*

**HISTORY 13S. The Politics of Food in Early Modern England**

A chronological and thematic look at the century of revolutions in England via case studies surrounding the purchase, consumption, and production of food, as well as culinary puns, metaphors, and allusions. Charts England's transition from an early modern monarchy and economy; through the Civil War and Interregnum of the 1640s and 1650s, when royalists, Ranters, and radicals contended over the nature of the ideal society; to the 1690s, when the Glorious Revolution ushered in a modernized commercialized society.

*5 units, Spr (Chou, C), ONCEONLY*

**HISTORY 22S. Big Brother is Watching: The History of the Communist Secret Police**

Who were the secret police, and what was their role in communist

states and societies? How did they understand their most important tasks: political repression, surveillance, and preventative policing? Examines the secret police in the Eastern Bloc from the Bolshevik Cheka to the East German Stasi. Sources include interviews with secret police agents, photographs taken with hidden cameras, victims' memoirs, films, court records, and literature. Topics include totalitarianism, defection, surveillance technologies, interrogations, communist culture, and state enemies.

*5 units, Aut (Pucci, M), ONCEONLY*

**HISTORY 22SC. A Tale of Two Cities: London and San Francisco**

San Francisco and London are two of the world's best-loved and most-visited cities. They have certain things in common: both are ports, situated on the edge of continents; both are major commercial and cultural centres; and both have been shaped by immigration. Their differences are more obvious than their similarities, however, and these differences are to a large extent explained by their very different histories. London was founded by the Romans and was, for a period in its recent history, the capital of an Empire on which the sun famously never set; San Francisco did not emerge as a city until well into the 19th century and even now has something of the character of a city state rather than a national or state capital. Though often considered one of the most European of American cities, San Francisco is in fact laid out on the typically American grid plan; the planning of London is, by contrast, chaotic, reflecting its long evolution and the lack of any effective central plan.

*2 units, not given this year*

**HISTORY 30C. Culture and Society in Reformation England**

(Same as History 130C. History majors and others taking 5 units, register for 130C.) Focuses on the appeal of both Reformed and Catholic ideas in the political and cultural contexts of early modern Europe. Topics include: the Lutheran revolt; the spread of Protestant ideas; Calvin's Geneva; the English Reformation; Tridentine reform and the Jesuits; toleration and the underground churches; wars and religious violence; and the making of European confessional identities. Sources include sermons, religious polemic, autobiographies, graphic prints, poetry, and music.

*3 units, not given this year*

**HISTORY 30Q. English Society Through Fiction**

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. England from the eighteenth century to the twentieth century through the reading of seven novels ranging from Henry Fielding's Joseph Andrews, to Evelyn Waugh's A Handful of Dust. Focus is on the novels themselves and the historical context of the novels to acquire a knowledge of British history over two hundred years. GER:DB-Hum

*4 units, Spr (Stansky, P)*

**HISTORY 31. Science, Technology and Art: The Worlds of Leonardo da Vinci**

(Same as ARTHIST 113, ARTHIST 113A, HISTORY 131) (Same as HISTORY 31. History majors and others taking 5 units, register for 131.) What did Leonardo actually know? How did he acquire that knowledge? Explores Leonardo's interests and accomplishments in such fields as painting, architecture, engineering, physics, mathematics, geology, anatomy, and physiology, and more generally the nature of Renaissance science, art, and technology. Considers the relationship between the society of fifteenth century Italy and the work of the man from Vinci: why did this world produce a Leonardo? How might we use him to understand creativity, innovation, and invention in the Renaissance and beyond? What was his legacy and how did he become a myth? Designed both for students interested in the history of science, medicine, and technology and for students interested in the history and art of Renaissance Italy. GER:DB-Hum

*3-5 units, not given this year*

**HISTORY 32A. Enlightenment and the Arts**

(Same as HISTORY 132A. History majors and others taking 5 units, enroll in 132A.) Novels, poetry, music, paintings, and architecture, and what they reveal about the society that produced them.

*3 units, Spr (Lougee Chappell, C)*

**HISTORY 33A. Blood and Roses: The Age of the Tudors**

(Same as HISTORY 133A. History majors and others taking 5

units, register for 133A.) English society and state from the Wars of the Roses to the death of Elizabeth. Political, social, and cultural upheavals of the Tudor period and the changes wrought by the Reformation. The establishment of the Tudor monarchy; destruction of the Catholic church; rise of Puritanism; and 16th-century social and economic changes. GER:DB-Hum

*3 units, not given this year*

**HISTORY 33B. Revolutionary England: The Stuart Age**

(Same as HISTORY 133B. History majors and others taking 5 units, register for 133B.) From the accession of King James I in 1603 to the death of Queen Anne in 1714: a brutal civil war, the execution of one anointed king, and the deposition of another. Topics include the causes and consequences of the English Revolution, the origins of Anglo-American democratic thought, the rise and decline of Puritanism, and the emergence of England as an economic and colonial power. (Como)

*3 units, not given this year*

**HISTORY 33S. The France of Louis XIV**

Louis XIV's reign as the foundation of France's modern global eminence despite the imposition of governing practices that undermined France's chance of effective modernization. Sources include 17th-century documents and a computer simulation in game format to define the problems faced by the Sun King and his contemporaries in an era of economic, political, and social change. GER:DB-Hum

*5 units, not given this year*

**HISTORY 34A. European Witch Hunts**

(Same as HISTORY 134A. History majors and others taking 5 units, register for 134A.) After the Reformation, in the midst of state building and scientific discovery, Europeans conducted a series of deadly witch hunts, violating their own laws and procedures in the process. What was it about early modernity that fueled witch hunting? Witch trials and early modern demonology as well as historians' interpretations of events to seek answers to this question. GER:DB-Hum

*3 units, Spr (Stokes, L)*

**HISTORY 36N. Gay Autobiography**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Gender, identity, and solidarity as represented in nine autobiographies: Isherwood, Ackerley, Duberman, Monette, Louganis, Barbin, Cammermeyer, Gingrich, and Lorde. To what degree do these writers view sexual orientation as a defining feature of their selves? Is there a difference between the way men and women view identity? What politics follow from these writers' experiences? GER:DB-Hum, EC-Gender

*4 units, Spr (Robinson, P)*

**HISTORY 38A. Germany and the World Wars, 1870-1990**

(Same as HISTORY 138A. Majors and others taking 5 units, enroll in 138A.) Germany's history from Bismarck's wars of unification through the end of the Cold War. The radicalizing relationship between international conflict, social upheaval, and state transformation with a focus on the clashes of the Second Empire, the road to WW I, interwar instability, the rise of Nazism, WW II, the Holocaust, the division of communist E. and capitalist W. Germany, and the fall of the Iron Curtain.

*3 units, not given this year*

**HISTORY 39. Modern Britain and the British Empire**

(Same as HISTORY 139. History majors and others taking 5 units, register in 139.) From American Independence to the latest war in Iraq. Topics include: the rise of the modern British state and economy; imperial expansion and contraction; the formation of class, gender, and national identities; mass culture and politics; the world wars; and contemporary racial politics. Focus is on questions of decline, the fortunes and contradictions of British liberalism in an era of imperialism, and the weight of the past in contemporary Britain. GER:EC-GlobalCom

*3 units, Win (Satia, P)*

**HISTORY 40. World History of Science, Technology and Medicine: From Prehistory to the Scientific Revolution**

(Same as HISTORY 140. History majors and others taking 5 units, register for 140.) The earliest developments in science, the prehistoric roots of technology, the scientific revolution, and global voyaging. Theories of human origins and the oldest known tools and symbols. Achievements of the Mayans, Aztecs, and

native N. Americans. Science and medicine in ancient Greece, Egypt, China, Africa, and India. Science in medieval and Renaissance Europe and the Islamic world including changing cosmologies and natural histories. Theories of scientific growth and decay; how science engages other factors such as material culture and religions. GER:DB-SocSci

*3 units, Win (Proctor, R)*

**HISTORY 41A. The Emergence of Medicine: The Middle Ages and Renaissance**

(Same as HISTORY 141A. History majors and others taking 5 units, register for 141A.) How did medicine emerge as a distinctive body of knowledge and a profession? The history of medicine from ca. 1000 to 1750. Topics: new ways of examining and treating the body; the religious and cultural significance of disease; the development of hospitals; and the rise of public health systems. Comparison of the status of medicine in Europe and the Islamic world. The work of key figures such as Vesalius and Harvey. GER:DB-SocSci

*3 units, not given this year*

**HISTORY 41Q. Mad Women: Women and Mental Illness in U.S. History**

(S,Sem) Stanford Introductory Seminar. Explores how gender and historical context have shaped the experience and treatment of mental illness in U.S. history. Why have women been the witches and hysterics of the past, and why have there historically been more women than men among the mentally ill? Topics include the relationship between historical ideas of femininity and insanity, the ways that notions of gender influence the definition and treatment of mental disorder, and the understanding of the historically embedded nature of medical ideas, diagnoses, and treatments. GER:DB-SocSci

*3 units, Aut (Horn, M)*

**HISTORY 41S. Speed and Power and Work by the Hour: The Revolution of Western Industry**

What was revolutionary about the Industrial Revolution? Did eighteenth and nineteenth century Europeans and Americans recognize radical changes in the way they personally lived? Or, are such historical phenomena only appreciated in hindsight? Examines the scope and meaning of the Industrial Revolution culturally, economically, and technically through paintings, news articles, novels, photographs, technical treatises, and production statistics from the era in question. Might today's techno cultural changes be interpreted in the future as revolutionary?

*5 units, Aut (Harris, B)*

**HISTORY 42. Darwin in the History of Life**

(Same as HISTORY 142. History majors and others taking 5 units, register for 142.) Origins and impact of evolutionary theory from the nineteenth century to the present. Early theories of fossils, the discovery of deep time and uniformitarian geology, debates over evolution vs. extinction, the origin of life, and human origins; the rise of anthropology and racial theory; the changing challenge of creationism, the abuse of evolution in eugenics and Nazi racial hygiene; and new discoveries in the realm of extreme life, evodevo, neocatastrophism, and the new technological frontier of biomimicry. GER:DB-SocSci

*3 units, Spr (Proctor, R)*

**HISTORY 44Q. The History of Women and Gender in Science, Medicine, and Engineering**

(S,Sem) Stanford Introductory Seminar. Preference to freshmen. Section 1 focuses on the history of women in science, medicine, and engineering. Section 2 looks at transforming research institutions so that both men and women can flourish. Section 3 explores how sex and gender analysis can enhance creativity. We discuss concrete examples of how taking gender into account has yielded new research results. Stanford University currently has a multiple year collaboration with the European Commission for Gendered Innovations, and this class will be part of that project. This course fulfills the second level Writing and Rhetoric Requirement (WRITE 2) and will emphasize oral and multimedia presentation. GER:DB-Hum, EC-Gender

*4-5 units, Win (Schiebinger, L)*

**HISTORY 45B. Africa in the Twentieth Century**

(Same as HISTORY 145B. History majors and others taking 5 units, register for 145B.) The challenges facing Africans from

when the continent fell under colonial rule until independence. Case studies of colonialism and its impact on African men and women drawn from West, Central, and Southern Africa. Novels, plays, polemics, and autobiographies written by Africans. GER:DB-SocSci, EC-GlobalCom

3 units, Spr (Roberts, R)

#### **HISTORY 47. History of South Africa**

(Same as AFRICAAM 47) (Same as HISTORY 147. History majors and others taking 5 units, register for 147.) Introduction, focusing particularly on the modern era. Topics include: precolonial African societies; European colonization; the impact of the mineral revolution; the evolution of African and Afrikaner nationalism; the rise and fall of the apartheid state; the politics of post-apartheid transformation; and the AIDS crisis. GER:DB-SocSci

3 units, Aut (Campbell, J)

#### **HISTORY 47S. Saints and Sorcerer-Kings: History and the Epic in West Africa**

Combining historical memory with myth and folklore, West African historical epics tell the stories of fallen empires, great cities besieged by heroic warriors, conquering holy men, tyrants and sorcerers. What can these oral traditions tell us about West African history? How should we read them against other forms of evidence? Readings will include translations of epic poetry, medieval travelers' accounts and West African chronicles, tomb inscriptions, and other sources.

5 units, Aut (McPherson, W)

#### **HISTORY 48N. African History through Literature and Film**

Literary and cinematic works as a window into the history of sub-Saharan Africa.; and the difficulty of using artistic works as historical sources, the value of art as representation and artifact of the past. Premodern traditions of political narrative; art in the era of the slave trade; the impact of colonialism on African intellectuals; the political uses of art by nationalists; and the struggle to represent rapidly changing social and culture norms. GER:DB-Hum

4-5 units, not given this year

#### **HISTORY 48Q. South Africa: Contested Transitions**

(S,Sem) (Same as AFRICAAM 48Q) Stanford Introductory Seminar. Preference to sophomores. The inauguration of Nelson Mandela as president in May 1994 marked the end of an era and a way of life for S. Africa. The changes have been dramatic, yet the legacies of racism and inequality persist. Focus: overlapping and sharply contested transitions. Who advocates and opposes change? Why? What are their historical and social roots and strategies? How do people reconstruct their society? Historical and current sources, including films, novels, and the Internet. GER:DB-Hum, EC-GlobalCom

3 units, Win (Samoff, J)

#### **HISTORY 49C. THE SLAVE TRADE**

(Same as HISTORY 149C. History majors and others taking 5 units, enroll in 149C.) Slave trades and forms of slavery in W. Africa from 1000 to 1885; impacts on lives, social organization, and political structures. Slavery in Islam, the slave market in the Mediterranean and Middle East, and the Saharan slave trade. Slavery within Africa, growth of the Atlantic trade, the Middle Passage, and war and trade that produced slaves. Impact of the Industrial Revolution and European abolition movements on the use of slaves and warfare in Africa. The relationship between slaving and the European conquest of Africa.

3 units, not given this year

#### **HISTORY 50A. Colonial and Revolutionary America**

(Same as HISTORY 150A. History majors and others taking 5 units, register for 150A.) Survey of the origins of American society and polity in the 17th and 18th centuries. Topics: the migration of Europeans and Africans and the impact on native populations; the emergence of racial slavery and of regional, provincial, Protestant cultures; and the political origins and constitutional consequences of the American Revolution. GER:DB-SocSci, EC-AmerCul

3 units, Aut (Winterer, C)

#### **HISTORY 50B. 19th Century America**

(Same as AFRICAAM 50B) (Same as HISTORY 150B. History majors and others taking 5 units, register in 150B.) Territorial expansion, social change, and economic transformation. The

causes and consequences of the Civil War. Topics include: urbanization and the market revolution; slavery and the Old South; sectional conflict; successes and failures of Reconstruction; and late 19th-century society and culture. GER:DB-SocSci, EC-AmerCul

3 units, Win (White, R)

#### **HISTORY 50C. The United States in the Twentieth Century**

(Same as HISTORY 150C. History majors and others taking 5 units, register for 150C.) Major political, economic, social, and diplomatic developments in the U.S. Themes: the economic and social role of government (Progressive, New Deal, Great Society, and Reagan-Bush eras); ethnic and racial minorities in society (mass immigration at the turn of the century and since 1965, the civil rights era of the 50s and 60s); the changing status of women since WW II; shifting ideological bases, institutional structures, and electoral characteristics of the political system (New Deal and post-Vietnam); determinants of foreign policy in WW I and II, and the Cold War. GER:DB-SocSci, EC-AmerCul

3 units, Spr (Camarillo, A)

#### **HISTORY 52S. Working for the Man: Historical Approaches to Workers and Business in American History, 1815-1940**

How historians have investigated and interpreted workers and business in 19th and 20th century U.S. Explores subfields of labor/working class history and business history and ponders how to bring them together. Themes include the ideal worker, the modern business enterprise, unions, technology and work, the role of the state, and the interaction of work, class, and culture. Primary sources include diaries, letters, newspaper and magazine articles, advertisements, photos, films, oral histories, and legal, government, and corporate documents.

5 units, Win (Marine-Street, N), ONCEONLY

#### **HISTORY 53S. Race Riots and Rebellions in 20th Century Urban America**

Race riots and rebellions are central to the story of urban America. The causes and outcomes of race riots and rebellions offer insight into the key themes, debates, and topics in U.S. Urban History. Topics include the Great Migration, immigration, lynching, racial violence, urbanization, civil rights, urban unrest, demographics, and race relations.

5 units, Win (Nichols, C), ONCEONLY

#### **HISTORY 54. American Intellectual and Cultural History to the Civil War**

(Same as HISTORY 154. History majors and others taking 5 units, register for 154.) How Americans considered problems such as slavery, imperialism, and sectionalism. Topics include: the political legacies of revolution; biological ideas of race; the Second Great Awakening; science before Darwin; reform movements and utopianism; the rise of abolitionism and proslavery thought; phrenology and theories of human sexuality; and varieties of feminism. Sources include texts and images. GER:DB-Hum, EC-AmerCul

3 units, Spr (Winterer, C)

#### **HISTORY 54N. African American Women's Lives**

(Same as AFRICAAM 54N) Preference to freshmen. The everyday lives of African American women in 19th- and 20th-century America in comparative context of histories of European, Hispanic, Asian, and Native American women. Primary sources including personal journals, memoirs, music, literature, and film, and historical texts. Topics include slavery and emancipation, labor and leisure, consumer culture, social activism, changing gender roles, and the politics of sexuality. GER:DB-Hum, EC-Gender

4-5 units, not given this year

#### **HISTORY 54S. Prohibition in America**

A case study in the interplay between law, society, and culture in 20th century U.S. history. Topics include the women's temperance movement, the Anti-Saloon League, the 18th Amendment and Volstead Act, Jazz Age night life, Al Capone and the war on crime, policing and civil liberties, the repeal of Prohibition, and origins of the War on Drugs. Sources include Supreme Court opinions, literary novels, mug shots, government reports, oral histories, autobiographies, political cartoons, pamphlets, photographs, and Hollywood films.

5 units, Spr (Mayeux, S), ONCEONLY

**HISTORY 55S. Real Men and Dragon Ladies: Race and Sexuality in America, 1662-1965**

(Same as CSRE 55S) How do race and sexuality mutually construct each other throughout American history? How do historians use primary sources to make historical arguments? Examines a variety of primary sources, including political pamphlets, legal documents, illustrations, and film. The historical trajectory we will follow examines the creation and elaboration of racial and sexual categories, from colonial slave codes and 19th century miscegenation law, through modern urban culture and the GI Bill.

5 units, Aut (Heinz, A), ONCEONLY

**HISTORY 56N. Celluloid America: Explorations in Film and History**

(F,Sem) Stanford Introductory Seminar. Explores the history and culture of the United States through film, examining both the history of this quintessentially American medium and the ways in which American history has been represented in movies. Topics include the invention of the moving picture technology, the creation of cinema language, the rise and fall of the Hollywood studio system, the emergence and evolution of film genres (westerns, romantic comedies, film noir, science fiction, Blaxploitation, etc.) the quest for overseas markets for American movies, race and film, and the future of movies in the digital age. Includes weekly class discussions and required screenings. Students will also complete short papers as well as final research projects on topics of their own choosing. GER:DB-Hum

3 units, Win (Campbell, J)

**HISTORY 57. The Constitution: A Short History**

(Same as POLISCI 128F) (Same as HISTORY 157. History majors and others taking 5 units, enroll in 157.) A broad survey of the Constitution, from its Revolutionary origins to the contemporary disputes over interpretation. Topics include the invention of the written constitution and interpretative canons; the origins of judicial review; the Civil War and Reconstruction as constitutional crises; the era of substantive due process; the rights revolution; and the Constitution in wartime. GER:DB-SocSci, EC-AmerCul

3 units, Win (Rakove, J)

**HISTORY 59. Introduction to Asian American History**

(Same as ASNAMST 59) (Same as HISTORY 159. History majors and others taking 5 units, register for 159.) The historical experience of people of Asian ancestry in the U.S. Immigration, labor, community formation, family, culture and identity, and contemporary social and political controversies. Readings: interpretative texts, primary material, and historical fiction. GER:DB-SocSci, EC-AmerCul

3 units, Aut (Chang, G)

**HISTORY 64C. From Freedom to Freedom Now!: African American History, 1865-1965**

(Same as AFRICAAM 64C) (Same as HISTORY 164C. History majors and others taking 5 units, register for 164C.) Explores the working lives, social worlds, political ideologies and cultural expressions of African Americans from emancipation to the early civil rights era. Topics include: the transition from slavery to freedom, family life, work, culture, leisure patterns, resistance, migration and social activism. Draws largely on primary sources including autobiographies, memoirs, letters, personal journals, newspaper articles, pamphlets, speeches, literature, film and music. GER:DB-SocSci, EC-AmerCul

3 units, not given this year

**HISTORY 70. Culture, Politics, and Society in Latin America**

(Same as HISTORY 170B. History majors and others taking 5 units, enroll in HISTORY 170B.) The course of Latin American history from the colonial era to the present day. Key issues such as colonialism, nationalism, democracy, and revolution will be examined critically in light of broad comparative themes in Latin American and world history. Sources include writings in the social sciences as well as primary documents, fiction, and film. GER:DB-SocSci, EC-GlobalCom

3 units, Aut (Iber, P)

**HISTORY 70A. Colonial Latin America**

(Same as HISTORY 170. History majors and others taking 5 units, register for 170.) 16th-19th centuries. Indigenous cultures. The

arrival of Europeans and its impact on native and European societies. Culture, religion and institutions, and everyday life. The independence period and the formation of new nations. Readings include primary and secondary sources. GER:DB-SocSci, EC-GlobalCom

3 units, Spr (Tortorici, Z)

**HISTORY 75. MODERN MEXICO**

(Same as HISTORY 175. History majors and others taking 5 units, enroll in HISTORY 175.) Mexico has produced the world's richest man and wrenching poverty, tremendous drug-related violence and some of the world's best-respected poets and writers. Explores how all this has been possibly by looking at the politics, culture, and economy of Mexico from the time of Porfirio Diaz and the twentieth century's first great modern revolution to the present. Focusing on the problems of democracy and inequality, the course will draw from the social sciences, journalism, fiction, and film. GER:DB-SocSci

3 units, Spr (Iber, P)

**HISTORY 82C. The Making of the Islamic World, 600-1300**

(Same as HISTORY 182C. Majors and other taking 5 units, register for 182C.) The History of Islam and Muslim peoples from 600-1300. Topics include Muhammad and his community; the early Arab conquests and empires; sectarian movements; formation of Islamic belief, thought, legal culture and religious institutions; transregional Sufi and learned networks; family and sexuality; urban, rural and nomadic life; non-Muslim communities; the development of Mediterranean and Indian Ocean trade; relations with Byzantium, the Latin West, China; the Crusades and the Mongols.

3 units, Win (Yaycioglu, A)

**HISTORY 82N. Modern Islamic Movements**

(F,Sem) Stanford Introductory Seminar. Muslim political mobilization in local and global settings. Topics include: Pan-Islam, the Muslim Brothers, Khomeinism, Hezbollah, al-Qaeda, the Taliban, and the geopolitics of social movements. GER:DB-Hum

3 units, Win (Crews, R)

**HISTORY 84N. The American Empire in the Middle East since the Cold War: Afghanistan, Iraq, and Israel/Palestine**

(F,Sem) Stanford Introductory Seminar. What were the traditional objectives of U.S. policy in the Middle East since the end of WW II? What forces shaped U.S. policy towards the Middle East? Did those interests and the means employed to pursue them change substantially after the demise of the Soviet Union? What has been the impact of U.S. policy on the region itself? The three principal cases to be examined are Afghanistan, Iraq, and Israel/Palestine. GER:DB-SocSci, EC-GlobalCom

4-5 units, Aut (Beinin, J)

**HISTORY 85B. Jews in the Modern World**

(Same as HISTORY 185B. History majors and others taking 5 units, register for 185B.) Topics include the restructuring of Jewish existence during the Enlightenment and legal emancipation at the end of the 18th century in W. Europe; the transformation of Jewish life in E. Europe under the authoritarian Russian regime; colonialism in the Sephardic world; new ideologies (Reform Judaism and Jewish nationalisms); the persistence and renewal of antisemitism; the destruction of European Jewry under the Nazis; new Jewish centers in the U.S.; and the State of Israel.

3 units, Aut (Zipperstein, S)

**HISTORY 91C. Early Imperial China**

(Same as HISTORY 191C. History majors and others taking 5 units, register for 191C.) The first millennium of imperial China, what endured over the centuries, and the major changes that took place in the political, social, and intellectual realms. Topics include the evolving geographic and environmental background, cities, the countryside, kinship, relations with the outer world, religion, philosophy, and literature. Also examines the nature of empire as a distinctive political form. GER:DB-Hum

3 units, not given this year

**HISTORY 91D. China: The Northern and Southern Dynasties**

(Same as HISTORY 191D. History majors and others taking 5 units, register for 191D.) Examines one of the most dynamic periods of Chinese history with the emergence of the institutional religions (Buddhism and Daoism), the development of the garden

as an art form, the rise of landscape as a theme of verse and art, the invention of lyric poetry, and the real beginnings of the southward spread of Chinese civilization. GER:DB-Hum

*3 units, not given this year*

**HISTORY 91N. Mao Zedong: The Man Who Would Become China**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. His life, including early anthropological work, reinterpretation of Marxism, ascendance to power in the Chinese Communist Party, theory of guerilla warfare, socioeconomic vision in the early People's Republic, the Great Leap Forward, deification during the Cultural Revolution, and repercussions of his death in 1976. No prior knowledge of Chinese history is necessary. GER:DB-SocSci

*3-5 units, Spr (Mullaney, T)*

**HISTORY 92A. The Historical Roots of Modern East Asia**

(Same as HISTORY 392E) Focus is on China and Japan before and during their transition to modernity. The populous, urbanized, economically advanced, and culturally sophisticated Ming empire and Muromachi shogunate in the 16th century when Europeans first arrived. How the status quo had turned on its head by the early 20th century when European and American steamships dominated the Pacific, China was in social and political upheaval, and Japan had begun its march to empire. GER:DB-SocSci, EC-GlobalCom

*4-5 units, not given this year*

**HISTORY 93. Late Imperial China**

(Same as HISTORY 193.) History majors and others taking 5 units, register for 193.) A survey of Chinese history from the 11th century to the collapse of the imperial state in 1911. Topics include absolutism, gentry society, popular culture, gender and sexuality, steppe nomads, the Jesuits in China, peasant rebellion, ethnic conflict, opium, and the impact of Western imperialism. GER:DB-Hum

*3 units, Spr (Sommer, M)*

**HISTORY 94B. Japan in the Age of the Samurai**

(Same as HISTORY 194B.) History majors and others taking 5 units, register for 194B.) From the Warring States Period to the Meiji Restoration. Topics include the three great unifiers, Tokugawa hegemony, the samurai class, Neoconfucian ideologies, suppression of Christianity, structures of social and economic control, frontiers, the other and otherness, castle-town culture, peasant rebellion, black marketing, print culture, the floating world, National Studies, food culture, samurai activism, black ships, unequal treaties, anti-foreign terrorism, restorationism, millenarianism, modernization as westernization, Japan as imagined community. GER:DB-Hum

*3 units, not given this year*

**HISTORY 94S. Rebels, Boxers and Bandits: Violent Resistance in Late Imperial China**

In the mid-19th century a man claiming to be Jesus Christ's younger brother led a rebellion that killed 20 million. In 1900, the Boxers United in Righteousness staged a bloody uprising. Bandits, something in Western women's clothing, raided across the country. How did these rebels, Boxers and bandits see themselves? How were they represented by others? What were their relations to the state? Do they mean anything? Are they important?

*5 units, not given this year*

**HISTORY 95. Modern Korean History**

(Same as HISTORY 195.) History majors and others taking 5 units, register for 195.) Themes include status, gender, and monarchy in the Choson dynasty; intellectual life and social transformation in the 19th century; the rise of Korean nationalism; Japan's colonial rule and Korean identities; culture, economy, and society in colonial Korea; the Korean War, and the different state building processes in North and South after the Korean War. GER:DB-Hum, EC-GlobalCom

*3 units, not given this year*

**HISTORY 95C. Modern Japanese History**

(Same as History 195C.) History majors and others taking 5 units, register for 195C.) Japan from the Tokugawa to the Heisei periods, including Japan's emergence from civil war into a two century long Great Peace, rapid modernization and imperial expansion from the end of the nineteenth century, war in Asia and the Pacific in the mid-twentieth century, and the postwar economic miracle and its aftermath. Emphasizes not a peculiarly Japanese story that

happened to unfold in an era we call modern, but rather a peculiarly modern story as it unfolded in a place we call Japan. GER:DB-SocSci, EC-GlobalCom

*3 units, Aut (Di Marco, F)*

**HISTORY 95S. Chinese Capitalism in Historical Perspective: Commerce and Society in Early Modern China, 1600-1840**

Explores key themes in China's political and moral economy from the 17th century to the Opium War, and investigates the interplay of geography, sociopolitical structure, ideology, and culture in early modern Chinese commercial development. Offers an in depth introduction to a primary question in Chinese history and global history, why did China not follow the path of the West in early modern times? Sources include traditional Chinese writings on economy, Confucian classics, legal documents, contracts, and fictional writings.

*5 units, Win (Qiao, Z), ONCEONLY*

**HISTORY 96. The Idea of India**

(Same as HISTORY 196.) History majors and others taking 5 units, register for 196.) History and politics of the Indian subcontinent across two centuries of transformation. Topics: interactions among colonial power, nationalism, and modern institutions; S. Asia at the crossroads of world history in an age of empire, capitalism, and war; history and memory through political traditions, social movements, and religious experiences that shaped S. Asian modernity; from Edmund Burke to Gandhi; East India Company's statemaking to origins of nationality; Tagore to Iqbal; peasants and rebels to liberals and revolutionaries; decolonization and Partition. GER:DB-SocSci, EC-GlobalCom

*3 units, not given this year*

**HISTORY 98. The History of Modern China**

(Same as HISTORY 198.) History majors and others taking 5 units, register for 198.) Major historical transformations including the decline of the last imperial dynasty, the formation of the first Chinese republic, WW II, the rise of Communism, China under Mao, post-Mao reforms, and the Beijing Olympics of 2008. GER:DB-SocSci

*3 units, Win (Mullaney, T)*

**HISTORY 98B. The Construction of Modern China in Time and Space**

(SAME as HISTORY 198B.) History majors and others taking 5 units, register for HISTORY 198B.) An analysis of modern China through sequentially examining the diverse regions that constitute it. Beginning from the geographic structures that divided the regions, and those that drew them together it will then study each region under several major rubrics: (1) their economic, cultural, and demographic characteristics; (2) the time and manner in which they were incorporated into China (3) their long-term environmental development (water control, deforestation, desertification, etc.); and (4) how the above features shape many of the issues and tensions that define contemporary China.

*3 units, Aut (Lewis, M)*

**HISTORY 102. The History of the International System since 1914**

After defining the characteristics of the international system at the beginning of the twentieth century, this course reviews the primary developments in its functioning in the century that followed. Topics include the major wars and peace settlements; the emergence of Nazism and Communism; the development of the Cold War and nuclear weapons; the rise of China, India, and the EU; and the impact of Islamic terrorism. The role of international institutions and international society will also be a focus as will the challenge of environment, health, poverty, and climate issues to the functioning of the system. GER:DB-SocSci, EC-GlobalCom

*5 units, Spr (Naimark, N)*

**HISTORY 103D. Human Society and Environmental Change**

(Same as EARTHSYS 112, EESS 112) Interdisciplinary approaches to understanding human-environment interactions with a focus on economics, policy, culture, history, and the role of the state. Prerequisite: ECON 1A

*4 units, Aut (Naylor, R; Frank, Z; Pizarro Gariazzo, R)*

**HISTORY 103E. History of Nuclear Weapons**

(Same as POLISCI 116) The development of nuclear weapons and policies. How existing nuclear powers have managed their relations with each other. How nuclear war has been avoided so far

and whether it can be avoided in the future. GER:DB-SocSci  
5 units, Spr (Holloway, D)

**HISTORY 104A. Revolution! A Global History from 1640 to the Present**

(Same as FRENGEN 146) The modern world was born out of Revolution. To this day, dramatic political change is most often the result of Revolution. This course will explore how Revolution became a model for changing the course of history. From the English revolutions of the 1600's to the current upheavals in the Arab world, passing through the French, Russian, and Chinese revolutions, we will study how Revolution has been conceived, carried out, and re-invented around the world. GER:DB-Hum  
4 units, Aut (Baker, K; Edelstein, D)

**HISTORY 105. Gandhi, King, and Nonviolence**

(Same as RELIGST 118) Lives, times, theory, and practice of Mohandas Gandhi and Martin Luther King, Jr.; their significance to issues of violence and nonviolence today. GER:DB-Hum  
4 units, not given this year

**HISTORY 106A. Global Human Geography: Asia and Africa**

Global patterns of demography, economic and social development, geopolitics, and cultural differentiation, covering E. Asia, S. Asia, S.E. Asia, Central Asia, N. Africa, and sub-Saharan Africa. Use of maps to depict geographical patterns and processes. GER:DB-SocSci, EC-GlobalCom  
5 units, Aut (Lewis, M)

**HISTORY 106B. Global Human Geography: Europe and Americas**

Patterns of demography, economic and social development, geopolitics, and cultural differentiation. Use of maps to depict geographical patterns and processes. GER:DB-SocSci, EC-GlobalCom  
5 units, Win (Lewis, M)

**HISTORY 106C. Global Historical Geography**

The sweep of human history through the medium of maps. The rise, expansion, and fall of kingdoms, empires, and other states; the spread of major religions; the paths of explorers, conquerors, and diseases; and the development and intensification of trade networks. Overview of the prehistoric period and ancient times, but focus is on the modern world. GER:DB-SocSci  
5 units, not given this year

**HISTORY 107. Introduction to Feminist Studies**

(Same as AMSTUD 107, CSRE 108, FEMST 101) Introduction to interdisciplinary feminist scholarship, which seeks to understand the creation, perpetuation, and critiques of gender inequalities. Topics include the historical emergence of feminist politics and contemporary analyses of work and family, health and sexuality, creativity, and politics. Close attention to the intersections of race, gender, ethnicity, and sexuality and to international, as well as U.S., perspectives. Students learn to think critically about gender in the past, present, and future. GER:DB-SocSci, EC-Gender  
4-5 units, Aut (Freedman, E)

**HISTORY 108. Century of Violence: Mass Violence in the Twentieth Century to the Present**

Explores the evolution, varieties and logic of mass violence in modern history. Examines social, political, ethno national, revolutionary and religious violence, and efforts to curtail them. Begins with the emergence of genocide as an international issue; proceeds with colonial genocides in late 19th century Africa, and moves to the Armenian genocide in the Ottoman Empire; Nazi and Nazi inspired racial murder; Communist induced mass violence in the Soviet Union and Asia; ethnic cleansing in former Yugoslavia; the recent genocides in Rwanda and Sudan; and attempts to confront genocides and crimes against humanity in international courts and institutions. Students may not receive credit for both IHUM 4B and HISTORY 108. GER:DB-SocSci  
5 units, Aut (Weiner, A)

**HISTORY 109. Human Rights and Humanitarianism: A Global History**

(SAME AS HISTORY 9. History majors and others taking 5 units, enroll in HISTORY 109.) Do human beings have certain inalienable rights? Are we obliged to help those in need? Examines the historical origins as well as the political, social, economic, legal, and cultural contexts of ideas about human rights and humanitarianism from the time of the Old Testament to the

International Criminal Court. Class time will blend short lectures with town hall style discussions of subjects including slavery, torture, colonialism, genocide, and the work of NGO's. GER:DB-Hum

5 units, Win (Daughton, J)

**HISTORY 110A. Europe from Late Antiquity to 1500**

(Same as HISTORY 10A. History majors and others taking 5 units, register for 110A.) Focus is on religion and politics. Issues include: the rise of Christianity and its impact on Rome; transformations of Catholicism and its institutions including the impact of barbarian tribes and the struggle between church and state; antisemitism, heresy, Crusades, and inquisition; courtly love; and scholasticism. GER:DB-Hum  
5 units, Aut (Miner, J)

**HISTORY 110B. Early Modern Europe**

(Same as HISTORY 10B. History majors and others taking 5 units, register for 110B.) Survey of early modern European history from the Reformation through the Enlightenment. (Same as HISTORY 110B. History majors and others taking 5 units, register for 110B.) Survey of early modern European history from the Reformation through the Enlightenment. Topics include sovereignty and the state, courtly life and manners, science and technology, the print and military revolutions, piety and religious practice, popular culture and village life, women and gender, witchcraft and sexual deviance, the rise of international trade, the history of consumption and material things, encounters with non-Western peoples and colonialism, and scholarship and the republic of letters. GER:DB-SocSci, EC-GlobalCom  
5 units, Win (Fredona, R)

**HISTORY 110C. Introduction to Modern Europe**

(SAME AS HISTORY 10C. History majors and others taking 5 units, register for 110C.) From the late 18th century to the present. How Europeans responded to rapid social changes caused by political upheaval, industrialization, and modernization. How the experience and legacy of imperialism and colonialism both influenced European society and put in motion a process of globalization that continues to shape international politics today. GER:DB-Hum  
5 units, Spr (Daughton, J)

**HISTORY 120B. The Russian Empire**

From Peter the Great to the Bolsheviks. Russia as an empire; its varied regions, including the Caucasus, Central Asia, Ukraine, Poland, and the Baltics. Focus is on the politics and cultures of empire. Sources include novels, political tracts, paintings, music, and other primary sources. GER:DB-Hum  
5 units, not given this year

**HISTORY 120C. 20th-Century Russian and Soviet History**

The Soviet polity from the 1917 Revolution to its collapse in 1991. Essentials of Marxist ideology; the Russian Empire in 1917. Causation in history; interpretations of the Revolution; state building in a socialist polity; social engineering through collectivization of agriculture, force-paced industrialization, and cultural revolution; terror as concept and practice; nationality policies in a multiethnic socialist empire; the routinization, decline, and collapse of the revolutionary ethos; and the legacy of the Soviet experiment in the new Russia. GER:DB-Hum  
5 units, not given this year

**HISTORY 125. Dark Century: Eastern Europe After 1900**

Major historical trends in 20th-century E. European history. Empires and national movements. The creation of independent Eastern Europe after WW I; social movements and the emergence of dictatorships and fascism in the inter-war period. WW II, Stalinism, and destalinization in contemporary E. Europe. GER:DB-SocSci, EC-GlobalCom  
5 units, Win (Jolluck, K)

**HISTORY 130A. The Rise of Scientific Medicine in the United States, 1825-Present**

Explores the history of medical institutions, ideas and practices in the United States from the early nineteenth century to the present. How are ideas of illness and health historically rooted and socially constructed? How did scientific and medical discoveries lead to the risk of scientific medicine, and how were these innovations adopted within the American cultural landscape? Topics include the transformation of therapeutics and technologies, medicine and



the scientific ideal in the U.S., gender and race and medicine, the history of public health, and the professionalization and specialization of American medical practice. GER:DB-SocSci  
4-5 units, Spr (Horn, M)

**HISTORY 131. Science, Technology and Art: The Worlds of Leonardo da Vinci**

(Same as ARTHIST 113, ARTHIST 113A, HISTORY 31) (Same as HISTORY 31. History majors and others taking 5 units, register for 131.) What did Leonardo actually know? How did he acquire that knowledge? Explores Leonardo's interests and accomplishments in such fields as painting, architecture, engineering, physics, mathematics, geology, anatomy, and physiology, and more generally the nature of Renaissance science, art, and technology. Considers the relationship between the society of fifteenth century Italy and the work of the man from Vinci: why did this world produce a Leonardo? How might we use him to understand creativity, innovation, and invention in the Renaissance and beyond? What was his legacy and how did he become a myth? Designed both for students interested in the history of science, medicine, and technology and for students interested in the history and art of Renaissance Italy. GER:DB-Hum

3-5 units, not given this year

**HISTORY 132. Ordinary Lives: A Social History of the Everyday in Early Modern Europe**

What war meant for foot soldiers and the peasants across whose fields they marched. Ordinary people's lives in the eras of Machiavelli, Shakespeare, the Reformation, and the scientific revolution. Topics include: birth, marriage, and death; city life and peasant culture; lay encounters with religious and intellectual ideas; war and crime; and gender and sexuality. GER:DB-Hum

5 units, not given this year

**HISTORY 132A. Enlightenment and the Arts**

(Same as HISTORY 32A. History majors and others taking 5 units enroll in 132A.) Gateway course for the History, Literature, and the Arts track of the History major. Novels, poetry, music, paintings, and architecture, and what they reveal about the society that produced them. GER:DB-Hum

5 units, Spr (Lougee Chappell, C)

**HISTORY 133A. Blood and Roses: The Age of the Tudors**

English society and state from the Wars of the Roses to the death of Elizabeth. Political, social, and cultural upheavals of the Tudor period and the changes wrought by the Reformation. The establishment of the Tudor monarchy; destruction of the Catholic church; rise of Puritanism; and 16th-century social and economic changes. GER:DB-Hum

5 units, not given this year

**HISTORY 133B. Revolutionary England: The Stuart Age**

(Same as HISTORY 33B. History majors and others taking 5 units, register for 133B.) From the accession of King James I in 1603 to the death of Queen Anne in 1714: a brutal civil war, the execution of one anointed king, and the deposition of another. Topics include the causes and consequences of the English Revolution, the origins of Anglo-American democratic thought, the rise and decline of Puritanism, and the emergence of England as an economic and colonial power. (Como) GER:DB-Hum

5 units, not given this year

**HISTORY 134A. The European Witch Hunts**

(Same as HISTORY 34A. History majors and others taking 5 units, register for 134A.) After the Reformation, in the midst of state-building and scientific discovery, Europeans conducted a series of deadly witch hunts, violating their own laws and procedures in the process. What was it about early modernity that fueled witch hunting? Examines witch trials and early modern demonology as well as historians' interpretations of events to seek answers to this question. GER:DB-Hum

5 units, Spr (Stokes, L)

**HISTORY 135. History of European Law, Medieval to Contemporary**

(Same as HISTORY 335) From the fall of the Roman Empire to the establishment of the EU. How law changed over time. Sources and nature of law, organization of legal systems, and relationships between law and society, law and lawmaker, law and the legal professions. GER:DB-SocSci

4-5 units, Win (Herzog, T)

**HISTORY 137A. Europe, 1945-2002**

Europe's transformation from the end of WW II to an expanded EU. Political, cultural, economic, and social history. Topics: postwar reconstruction, Cold War, consumer versus socialist culture, collapse of Communism, postcommunist integration. GER:DB-SocSci

5 units, not given this year

**HISTORY 138A. Germany and the World Wars, 1870-1990**

(Same as HISTORY 38A. Majors and others taking 5 units, enroll in 138A.) Germany's history from Bismarck's wars of unification through the end of the Cold War. The radicalizing relationship between international conflict, social upheaval, and state transformation with a focus on the clashes of the Second Empire, the road to WW I, interwar instability, the rise of Nazism, WW II, the Holocaust, the division of communist E. and capitalist W. Germany, and the fall of the Iron Curtain. GER:DB-SocSci

5 units, not given this year

**HISTORY 139. Modern Britain and the British Empire**

(Same as HISTORY 39. History majors and others taking 5 units, register in 139.) From American Independence to the latest war in Iraq. Topics include: the rise of the modern British state and economy; imperial expansion and contraction; the formation of class, gender, and national identities; mass culture and politics; the world wars; and contemporary racial politics. Focus is on questions of decline, the fortunes and contradictions of British liberalism in an era of imperialism, and the weight of the past in contemporary Britain. GER:DB-Hum, EC-GlobalCom, EC-GlobalCom

5 units, Win (Satia, P)

**HISTORY 140. World History of Science: From Prehistory to the Scientific Revolution**

(Same as HISTORY 40. History majors and others taking 5 units, register for 140.) The earliest developments in science, the prehistoric roots of technology, the scientific revolution, and global voyaging. Theories of human origins and the oldest known tools and symbols. Achievements of the Mayans, Aztecs, and native N. Americans. Science and medicine in ancient Greece, Egypt, China, Africa, and India. Science in medieval and Renaissance Europe and the Islamic world including changing cosmologies and natural histories. Theories of scientific growth and decay; how science engages other factors such as material culture and religions. GER:DB-SocSci

5 units, Win (Proctor, R)

**HISTORY 140A. The Scientific Revolution**

What do people know and how do they know it? What counts as scientific knowledge? In the 16th and 17th centuries, understanding the nature of knowledge engaged the attention of individuals and institutions including Copernicus, Galileo, Descartes, Newton, the early Royal Society, and less well-known contemporaries. New meanings of observing, collecting, experimenting, and philosophizing, and political, religious, and cultural ramifications in early modern Europe. GER:DB-Hum

5 units, not given this year

**HISTORY 141A. The Emergence of Medicine: The Middle Age and the Renaissance**

(Same as HISTORY 41A. History majors and others taking 5 units, register for 141A.) How did medicine emerge as a distinctive body of knowledge and a profession? The history of medicine from ca. 1000 to 1750. Topics: new ways of examining and treating the body; the religious and cultural significance of disease; the development of hospitals; and the rise of public health systems. Comparison of the status of medicine in Europe and the Islamic world. The work of key figures such as Vesalius and Harvey. GER:DB-SocSci

5 units, not given this year

**HISTORY 142. Darwin in the History of Life**

(Same as HISTORY 42. History majors and others taking 5 units, register for 142.) Origins and impact of evolutionary theory from the nineteenth century to the present. Early theories of fossils, the discovery of deep time and uniformitarian geology, debates over evolution vs. extinction, the origin of life, and human origins; the rise of anthropology and racial theory; the changing challenge of creationism, the abuse of evolution in eugenics and Nazi racial hygiene; and new discoveries in the realm of extreme life, evo-



devo, neocatastrophism, and the new technological frontier of biomimicry. GER:DB-SocSci

5 units, Spr (Proctor, R)

**HISTORY 144. Gender in Science, Medicine and Engineering**  
(Same as HISTORY 344) Men's and women's roles in science, medicine, and engineering over the past 200 years with a focus on the present. What are the efforts underway globally to transform science, medicine, and engineering into fields where women can flourish? How have science and medicine studied and defined males and females? Can gender analysis spark creativity in human knowledge? GER:DB-SocSci, EC-Gender

4-5 units, not given this year

**HISTORY 145A. Africa Until European Conquest**

Episodes in African history from the earliest records up until European partition of the continent, focusing on how knowledge about the natural, social, and spiritual worlds was linked to the exercise of power. The effects of technological innovations on states and other forms of social complexity; use of religious beliefs and practices to legitimate or critique authority. The effects of slave trades and imperial conquest on these forms of authority. GER:DB-Hum, EC-GlobalCom

5 units, not given this year

**HISTORY 145B. Africa in the 20th Century**

(Same as HISTORY 45B. History majors and others taking 5 units, register for 145B.) The challenges facing Africans from when the continent fell under colonial rule until independence. Case studies of colonialism and its impact on African men and women drawn from West, Central, and Southern Africa. Novels, plays, polemics, and autobiographies written by Africans. GER:DB-SocSci, EC-GlobalCom

5 units, Spr (Roberts, R)

**HISTORY 147. History of South Africa**

(Same as AFRICAAM 147) (Same as HISTORY 47. History majors and others taking 5 units, register for 147.) Introduction, focusing particularly on the modern era. Topics include: precolonial African societies; European colonization; the impact of the mineral revolution; the evolution of African and Afrikaner nationalism; the rise and fall of the apartheid state; the politics of post-apartheid transformation; and the AIDS crisis. GER:DB-SocSci

5 units, Aut (Campbell, J)

**HISTORY 149C. The Slave Trade**

(Same as HISTORY 49C. History majors and others taking 5 units, enroll in 149C.) Slave trades and forms of slavery in W. Africa from 1000 to 1885; impacts on lives, social organization, and political structures. Slavery in Islam, the slave market in the Mediterranean and Middle East, and the Saharan slave trade. Slavery within Africa, growth of the Atlantic trade, the Middle Passage, and war and trade that produced slaves. Impact of the Industrial Revolution and European abolition movements on the use of slaves and warfare in Africa. The relationship between slaving and the European conquest of Africa. GER:DB-SocSci

5 units, not given this year

**HISTORY 150A. Colonial and Revolutionary America**

(Same as AMSTUD 150A) (Same as HISTORY 50A. History majors and others taking 5 units, register for HISTORY 150A.) Survey of the origins of American society and polity in the 17th and 18th centuries. Topics: the migration of Europeans and Africans and the impact on native populations; the emergence of racial slavery and of regional, provincial, Protestant cultures; and the political origins and constitutional consequences of the American Revolution. GER:DB-SocSci, EC-AmerCul

5 units, Aut (Winterer, C)

**HISTORY 150B. 19th-Century America**

(Same as AFRICAAM 150B, AMSTUD 150B) (Same as HISTORY 50B. History majors and others taking 5 units, register for 150B.) Territorial expansion, social change, and economic transformation. The causes and consequences of the Civil War. Topics include: urbanization and the market revolution; slavery and the Old South; sectional conflict; successes and failures of Reconstruction; and late 19th-century society and culture. GER:DB-SocSci, EC-AmerCul, WIM

5 units, Win (White, R)

**HISTORY 150C. The United States in the Twentieth Century**

(Same as AMSTUD 150C) (Same as HISTORY 50C. History majors and others taking 5 units, register for 150C.) Major political, economic, social, and diplomatic developments in the U.S. Themes: the economic and social role of government (Progressive, New Deal, Great Society, and Reagan-Bush eras); ethnic and racial minorities in society (mass immigration at the turn of the century and since 1965, the civil rights era of the 50s and 60s); the changing status of women since WW II; shifting ideological bases, institutional structures, and electoral characteristics of the political system (New Deal and post-Vietnam); determinants of foreign policy in WW I and II, and the Cold War. GER:DB-SocSci, EC-AmerCul

5 units, Spr (Camarillo, A)

**HISTORY 154. American Intellectual and Cultural History to the Civil War**

(Same as AMSTUD 154) (Same as HISTORY 54. History majors and others taking 5 units, register for 154.) How Americans considered problems such as slavery, imperialism, and sectionalism. Topics include: the political legacies of revolution; biological ideas of race; the Second Great Awakening; science before Darwin; reform movements and utopianism; the rise of abolitionism and proslavery thought; phrenology and theories of human sexuality; and varieties of feminism. Sources include texts and images. GER:DB-Hum, EC-AmerCul

5 units, Spr (Winterer, C)

**HISTORY 157. The Constitution: A Brief History**

(Same as POLISCI 128S) (Same as HISTORY 57. History majors and others taking 5 units, register for 157.) A broad survey of the Constitution, from its Revolutionary origins to the contemporary disputes over interpretation. Topics include the invention of the written constitution and interpretative canons; the origins of judicial review; the Civil War and Reconstruction as constitutional crises; the era of substantive due process; the rights revolution; and the Constitution in wartime. GER:DB-SocSci, EC-AmerCul

5 units, Win (Rakove, J)

**HISTORY 158. The United States Since 1945**

Focus is on foreign policy and politics with less attention to social and intellectual history. Topics include nuclear weapons in WW II, the Cold War, the Korean and Vietnam wars, Eisenhower revisionism, the Bay of Pigs and Cuban missile crisis, civil rights and the black freedom struggle, the women's movement, the Great Society and backlash, welfare policy, conservatism and liberalism, the 60s anti-war movement, Watergate and the growth of executive power, Iran-Contra and Reagan revisionism, Silicon Valley, the Gulf War, the Clinton impeachment controversy, 2004 election, and 9/11 and Iraq war. GER:DB-SocSci, EC-AmerCul

4-5 units, not given this year

**HISTORY 159. Introduction to Asian American History**

(Same as AMSTUD 159) (Same as HISTORY 59. History majors and others taking 5 units, register for 159.) The historical experience of people of Asian ancestry in the U.S. Immigration, labor, community formation, family, culture and identity, and contemporary social and political controversies. Readings: interpretative texts, primary material, and historical fiction. (Chang)

5 units, Aut (Chang, G)

**HISTORY 161. WOMEN IN MODERN AMERICA**

(Same as AMSTUD 161, CSRE 162) Considers the political, economic, and social development of women in the United States during a long twentieth century. How have women been shaped or constrained by gendered conceptions of work, reproduction, education, family, and culture? Have all women reacted similarly to wars and depression or domestic and foreign policy? Through personal narratives and historical accounts, the course will answer these questions, observing how women negotiated gender, race, sexuality, and class difference to achieve greater opportunity and citizenship rights. GER:DB-SocSci, EC-Gender

4-5 units, Spr (Sbardellati, L)

**HISTORY 163. A History of North American Wests**

The history, peoples, and natural systems of a region that has never been contained within a single empire or nation state, but has been united by the movement of peoples, species, and things. Topics include smallpox, horses, gold, salmon, rivers, coal, and oil.

GER:DB-SocSci

*5 units, not given this year*

**HISTORY 164C. From Freedom to Freedom Now: African American History, 1865-1965**

(Same as AMSTUD 164C.) (Same as HISTORY 64C. History majors and others taking 5 units, register for 164C.) Explores the working lives, social worlds, political ideologies and cultural expressions of African Americans from emancipation to the early civil rights era. Topics include: the transition from slavery to freedom, family life, work, culture, leisure patterns, resistance, migration and social activism. Draws largely on primary sources including autobiographies, memoirs, letters, personal journals, newspaper articles, pamphlets, speeches, literature, film and music. GER:DB-SocSci, EC-AmerCul

*5 units, not given this year*

**HISTORY 165. Mexican American History through Film**

Focus is on the 20th century. Themes such as immigration, urbanization, ethnic identity, the role of women, and the struggle for civil rights. GER:DB-Hum, EC-AmerCul

*4-5 units, not given this year*

**HISTORY 166. Introduction to African American History: The Modern African American Freedom Struggle**

(Same as AFRICAAM 166, AMSTUD 166) Focus is on political thought and protest movements after 1930. Individuals who have shaped and been shaped by modern African American struggles for freedom and justice. Sources include audiovisual materials. Research projects required for fifth unit. GER:DB-SocSci, EC-AmerCul

*4-5 units, not given this year*

**HISTORY 166B. Immigration Debates in America, Past and Present**

(Same as CSRE 166B, HISTORY 366B) Examines the ways in which the immigration of people from around the world and migration within the United States shaped American nation-building and ideas about national identity in the twentieth century. Focuses on how conflicting ideas about race, gender, ethnicity, and citizenship with respect to particular groups led to policies both of exclusion and integration. Part One begins with the ways in which the American views of race and citizenship in the colonial period through the post-Reconstruction Era led to the passage of the Chinese Exclusion Act in 1882 and subsequently to broader exclusions of immigrants from other parts of Asia, Southern and Eastern Europe, and Mexico. Explores how World War II and the Cold War challenged racial ideologies and led to policies of increasing liberalization culminating in the passage of the 1965 Immigration Act, which eliminated quotas based on national origins and opened the door for new waves of immigrants, especially from Asia and Latin America. GER:DB-SocSci

*3-5 units, Win (McKibben, C), Sum (Staff)*

**HISTORY 168. American History in Film: Since World War II**

U.S. society, culture, and politics since WW II through feature films. Topics include: McCarthyism and the Cold War; ethnicity and racial identity; changing sex and gender relationships; the civil rights and anti-war movements; and mass media. Films include *The Best Years of Our Lives*, *Salt of the Earth*, *On the Waterfront*, *Raisin in the Sun*, *Medium Cool*, and *Broadcast News*. GER:DB-Hum

*3-4 units, Sum (Staff)*

**HISTORY 169. The Environmental History of North America**

(Same as EARTHSYS 145) Concentrates on anthropogenic environmental change and its consequences for both the natural environment and human society. Human alteration of the continent began well before the arrival of Europeans, and many developments usually considered as only human history are embedded in a wider environmental history. Begins with the Columbian Exchange and the demographic disaster that followed and ends with global climate change. GER:DB-SocSci

*4-5 units, Spr (White, R)*

**HISTORY 170. Colonial Latin America**

(Same as HISTORY 70A. History majors and others taking 5 units, register for 170.) 16th-19th centuries. Indigenous cultures. The arrival of Europeans and its impact on native and European societies. Culture, religion and institutions, and everyday life. The independence period and the formation of new nations. Readings

include primary and secondary sources. GER:DB-SocSci, EC-GlobalCom

*5 units, Spr (Tortorici, Z)*

**HISTORY 170B. Culture, Society and Politics in Latin America**

(Same as HISTORY 70. History majors and others taking 5 units, enroll in HISTORY 170B.) The course of Latin American history from the colonial era to the present day. Key issues such as colonialism, nationalism, democracy, and revolution will be examined critically in light of broad comparative themes in Latin American and world history. Sources include writings in the social sciences as well as primary documents, fiction, and film.

*5 units, Aut (Iber, P)*

**HISTORY 175. Modern Mexico**

(Same as HISTORY 75. History majors and others taking 5 units, enroll in HISTORY 175.) Mexico has produced the world's richest man and wrenching poverty, tremendous drug-related violence and some of the world's best-respected poets and writers. Explores how all this has been possibly by looking at the politics, culture, and economy of Mexico from the time of Porfirio Diaz and the twentieth century's first great modern revolution to the present. Focusing on the problems of democracy and inequality, the course will draw from the social sciences, journalism, fiction, and film. GER:DB-SocSci

*3 units, Spr (Iber, P)*

**HISTORY 181B. Formation of the Contemporary Middle East**

(Formerly 187B.) The history of the Middle East since WW I, focusing on the eastern Arab world, Egypt, the Fertile Crescent, and the Arabian Peninsula, with attention to Turkey, Iran, and Israel. GER:DB-SocSci, EC-GlobalCom

*5 units, Spr (Beinin, J)*

**HISTORY 182C. The Making of the Islamic World, 600-1300**

(Same as HISTORY 82C. Majors and other taking 5 units, register for 182C.) The History of Islam and Muslim peoples from 600-1300. Topics include Muhammad and his community; the early Arab conquests and empires; sectarian movements; formation of Islamic belief, thought, legal culture and religious institutions; transregional Sufi and learned networks; family and sexuality; urban, rural and nomadic life; non-Muslim communities; the development of Mediterranean and Indian Ocean trade; relations with Byzantium, the Latin West, China; the Crusades and the Mongols. GER:DB-SocSci

*5 units, Win (Yaycioglu, A)*

**HISTORY 183. Modern Iran**

Topics include: the Safavid and Qajar empires, European imperialism in Iran, the Iranian revolutions, Khomeinism, the Islamic Republic, recent film and literature, and the politics of Ahmadinejad. GER:DB-Hum

*5 units, Aut (Crews, R)*

**HISTORY 185B. Jews in the Modern World**

(Same as HISTORY 385C, JEWISHST 185B) (Same as HISTORY 85B. History majors and others taking 5 units, register for 185B.) Topics include the restructuring of Jewish existence during the Enlightenment and legal emancipation at the end of the 18th century in W. Europe; the transformation of Jewish life in E. Europe under the authoritarian Russian regime; colonialism in the Sephardic world; new ideologies (Reform Judaism and Jewish nationalisms); the persistence and renewal of antisemitism; the destruction of European Jewry under the Nazis; new Jewish centers in the U.S.; and the State of Israel. GER:DB-Hum, EC-GlobalCom

*5 units, Aut (Zipperstein, S)*

**HISTORY 187D. Zionism and Its Critics**

(Same as JEWISHST 187D) Zionism from its genesis in the 1880s up until the establishment of the state of Israel in May, 1948, exploring the historical, ideological and political dimensions of Zionism. Topics include: the emergence of Zionist ideology in connection to and as a response to challenges of modernity; emancipation; Haskalah (Jewish enlightenment); other national and ideological movements of the period; the ideological crystallization of the movement; and the immigration waves to Palestine.

*4-5 units, not given this year*

**HISTORY 191C. Early Imperial China**

(Same as HISTORY 91C. History majors and others taking 5 units, register for 191C.) The first millennium of imperial China, what endured over the centuries, and the major changes that took place in the political, social, and intellectual realms. Topics include the evolving geographic and environmental background, cities, the countryside, kinship, relations with the outer world, religion, philosophy, and literature. Also examines the nature of empire as a distinctive political form. GER:DB-Hum

*5 units, not given this year*

**HISTORY 191D. China: The Northern and Southern Dynasties**

(Same as HISTORY 91D. History majors and others taking 5 units, register for 191D.) Examines one of the most dynamic periods of Chinese history with the emergence of the institutional religions (Buddhism and Daoism), the development of the garden as an art form, the rise of landscape as a theme of verse and art, the invention of lyric poetry, and the real beginnings of the southward spread of Chinese civilization. GER:DB-Hum

*5 units, not given this year*

**HISTORY 192. China: The Early Empires**

How China was transformed as a consequence of its political unification by the Qin dynasty. The geographical reorganization of China in the process of unification. The changing nature of rulership, cities, rural society, military organization, kinship structure, religion, literary practice, law, and relations to the outside world. The nature of empire as a political system. GER:DB-Hum

*3-5 units, not given this year*

**HISTORY 193. Late Imperial China**

(Same as HISTORY 93. History majors and others taking 5 units, register for 193.) A survey of Chinese history from the 11th century to the collapse of the imperial state in 1911. Topics include absolutism, gentry society, popular culture, gender and sexuality, steppe nomads, the Jesuits in China, peasant rebellion, ethnic conflict, opium, and the impact of Western imperialism. GER:DB-Hum

*5 units, Spr (Sommer, M)*

**HISTORY 194B. Japan in the Age of the Samurai**

(Same as HISTORY 94B. History majors and others taking 5 units, register for 194B.) From the Warring States Period to the Meiji Restoration. Topics include the three great unifiers, Tokugawa hegemony, the samurai class, Neoconfucian ideologies, suppression of Christianity, structures of social and economic control, frontiers, the other and otherness, castle-town culture, peasant rebellion, black marketing, print culture, the floating world, National Studies, food culture, samurai activism, black ships, unequal treaties, anti-foreign terrorism, restorationism, millenarianism, modernization as westernization, Japan as imagined community. GER:DB-Hum

*5 units, not given this year*

**HISTORY 195. Modern Korean History**

(Same as HISTORY 95. History majors and others taking 5 units, register for 195.) Themes include status, gender, and monarchy in the Choson dynasty; intellectual life and social transformation in the 19th century; the rise of Korean nationalism; Japan's colonial rule and Korean identities; culture, economy, and society in colonial Korea; the Korean War, and the different state building processes in North and South after the Korean War. GER:DB-Hum, EC-GlobalCom, EC-GlobalCom

*5 units, not given this year*

**HISTORY 195C. Modern Japanese History**

(Same as HISTORY 95C. History majors and others taking 5 units, register for 195C.) Japan from the Tokugawa to the Heisei periods, including Japan's emergence from civil war into a two century long Great Peace, rapid modernization and imperial expansion from the end of the nineteenth century, war in Asia and the Pacific in the mid-twentieth century, and the postwar economic miracle and its aftermath. Emphasizes not a peculiarly Japanese story that happened to unfold in an era we call modern, but rather a peculiarly modern story as it unfolded in a place we call Japan. GER:DB-SocSci, EC-GlobalCom

*5 units, Aut (Di Marco, F)*

**HISTORY 197. Southeast Asia: From Antiquity to the Modern****Era**

The history of S.E. Asia, comprising Indonesia, the Philippines, Malaysia, Singapore, Thailand, Vietnam, Burma, Cambodia, and Laos, from antiquity to the present. The spread of Indian cultural influences, the rise of indigenous states, and the emergence of globally linked trade networks. European colonization, economic transformation, the rise of nationalism, the development of the modern state, and the impact of globalization. GER:DB-Hum

*5 units, not given this year*

**HISTORY 198. The History of Modern China**

(Same as HISTORY 98. History majors and others taking 5 units, register for 198.) Major historical transformations including the decline of the last imperial dynasty, the formation of the first Chinese republic, WW II, the rise of Communism, China under Mao, post-Mao reforms, and the Beijing Olympics of 2008. GER:DB-SocSci, DB-SocSci, EC-GlobalCom

*5 units, Win (Mullaney, T)*

**HISTORY 198B. The Construction of Modern China through Space and Time**

(SAME as HISTORY 98B. History majors and others taking 5 units, register for HISTORY 198B.) An analysis of modern China through sequentially examining the diverse regions that constitute it. Beginning from the geographic structures that divided the regions, and those that drew them together it will then study each region under several major rubrics: (1) their economic, cultural, and demographic characteristics; (2) the time and manner in which they were incorporated into China (3) their long-term environmental development (water control, deforestation, desertification, etc.); and (4) how the above features shape many of the issues and tensions that define contemporary China. GER:DB-SocSci

*5 units, Aut (Lewis, M)*

**HISTORY 198G. Beijing, Shanghai, and the Structure of China**

China's modern history through the rivalry of its two most important cities. The course begins in the nineteenth century, contrasting Beijing, the classic imperial capital and a foreign foundation paradoxically celebrated as the embodiment of traditional China, with Shanghai, a treaty port and demographic/economic center of China, but identified as a foreign city. After following the cities' history through the warlord period, the Shanghai decade of Nationalist rule, and the Japanese occupation, the course examines the two cities' developments under Mao and Deng. The course concludes with a look at their current relations and roles, and the transformed nature of China's cities.

*3-5 units, Sum (Staff)*

**HISTORY 201. Introduction to Public History in the U.S., 19th Century to the Present**

(Same as HISTORY 301) Gateway course for the History and Public Service interdisciplinary track. Topics include the production, presentation, and practice of public history through narratives, exhibits, web sites, and events in museums, historical sites, parks, and public service settings in nonprofit organizations, government agencies, and educational institutions. Service Learning Course (certified by Haas Center). GER:DB-SocSci

*4-5 units, Aut (McKibben, C)*

**HISTORY 201D. The Changing Face of War: An Introduction to Military History**

(Same as HISTORY 301D) Introduces students to the rich history of military affairs and, at the same time, examines the ways in which we think of change and continuity in military history. How did war evolve from ancient times, both in styles of warfare and perceptions of war? What is the nature of the relationship between war and society? Is there such a thing as a Western way of war? What role does technology play in transforming military affairs? What is a military revolution and can it be manufactured or induced? Chronologically following the evolution of warfare from Ancient Greece to present day so-called new wars, we will continuously investigate how the interdependencies between technological advances, social change, philosophical debates and economic pressures both shaped and were influenced by war. GER:DB-SocSci

*4-5 units, Win (Staff)*

**HISTORY 202. International History and International Relations Theory**

(Same as HISTORY 306E, POLISCI 216E, POLISCI 316) The relationship between history and political science as disciplines. Sources include studies by historians and political scientists on topics such as the origins of WW I, the role of nuclear weapons in international politics, the end of the Cold War, nongovernmental organizations in international relations, and change and continuity in the international system. GER:DB-SocSci

5 units, *Win (Holloway, D)*

**HISTORY 202G. Peoples, Armies and Governments of the Second World War**

(Same as HISTORY 302G) Clausewitz conceptualized war as always consisting of a trinity of passion, chance, and reason, mirrored, respectively, in the people, army and government. Following Clausewitz, this course examines the peoples, armies, and governments that shaped World War II. Analyzes the ideological, political, diplomatic and economic motivations and constraints of the belligerents and their resulting strategies, military planning and fighting. Explores the new realities of everyday life on the home fronts and the experiences of non-combatants during the war, the final destruction of National Socialist Germany and Imperial Japan, and the emerging conflict between the victors. How the peoples, armies and governments involved perceived their possibilities and choices as a means to understand the origins, events, dynamics and implications of the greatest war in history. GER:DB-SocSci

4-5 units, *Spr (Staff)*

**HISTORY 203E. Global Catholicism**

Explores the rise of Catholicism as a global phenomenon, and investigates its multiple transformations as it spread to the Americas, Asia, and Africa. Topics will include the Reformation, Tridentine reform and the Jesuits, the underground churches in England and the Dutch Republic, the missions to Asia, the Spanish conquest of Latin America, conversion and indigenous religions, missionary imperialism and new religious movements in the non-European world.

5 units, *Aut (Sena, M)*

**HISTORY 204B. History without Documents**

(Same as HISTORY 304B) Can history be written about places and times for which are no written sources, or for people in literate societies who left no written traces? Practical training in historical methods for non-documentary sources, including oral traditions and history, archaeology, ecological sources, historical linguistics, ethnography, rituals, myths, songs, and art. GER:DB-Hum

4-5 units, *Aut (Hanretta, S)*

**HISTORY 204E. Origins of Totalitarianism**

(Same as HISTORY 307E) Modern revolutionary and totalitarian politics. Sources include monographs on the medieval, Reformation, French Revolutionary, and Great War eras. Topics: the essence of modern ideology, the concept of the body national, state terror, charismatic leadership, gender assignments, private and public spheres, and identities. GER:DB-SocSci, EC-GlobalCom

4-5 units, *Win (Weiner, A)*

**HISTORY 204F. The Modern Tradition of Non-Violent Resistance**

(Same as AFRICAAM 204F, CSRE 104F) During the twentieth century, peasants and menial laborers who comprised the majority of humanity launched liberation movements to secure citizenship rights. Mohandas K. Gandhi, Martin Luther King, Jr., and Nelson Mandela are among the leaders whose ideas continue to influence contemporary movements for global peace with social justice in a sustainable environment.

5 units, *not given this year*

**HISTORY 204G. War, Culture, and Society in the Modern Age**

(Same as HISTORY 304G) How Western societies and cultures have responded to modern warfare. The relationship between its destructive capacity and effects on those who produce, are subject to, and must come to terms with its aftermath. Literary representations of WW I; destructive psychological effects of modern warfare including those who take pleasure in killing; changes in relations between the genders; consequences of

genocidal ideology and racial prejudice; the theory of just war and its practical implementation; and how wars are commemorated. GER:DB-SocSci

5 units, *not given this year*

**HISTORY 205A. The History of Information**

(Same as HISTORY 305A) Examines the history of information from multiple perspectives such as the changing conceptions of facticity and evidence cross-culturally as well as a range of information technologies, from moveable type printing and telegraphy to text messaging and Twitter. Other topics include the ways in which information is shaped by the languages in which it is recorded, stored, and transmitted, and also the ways in which information infrastructures influence what is forgotten and lost. GER:DB-Hum

4-5 units, *Spr (Mullaney, T)*

**HISTORY 206. History and Geography of Contemporary Global Issues**

The historical background and geographical context of contemporary global issues and events. Texts are a world atlas and regular reading of The New York Times and The Economist. Topics vary according to what is happening in the world. Student presentations. GER:DB-SocSci

5 units, *Aut (Lewis, M)*

**HISTORY 207. Biography and History**

(Same as HISTORY 308) The relationship between biographical and historical writing, primarily in Europe and America. Problems of methodology, evidence, dispassion, and empathy. Texts: biographies, critical literature on biographical work, and novels (A. S. Byatt's *Possession*, Bernard Malamud's *Dubin's Lives*) that illuminate the intellectual underpinnings of biographical labor. GER:DB-Hum

4-5 units, *not given this year*

**HISTORY 207C. The Global Early Modern**

(Same as HISTORY 307C) In what sense can we speak of globalization before modernity? What are the characteristics and origins of the economic system we know as capitalism? When and why did European economies begin to diverge from those of other Eurasian societies? With these big questions in mind, the primary focus will be on the history of Europe and European empires, but substantial readings deal with other parts of the world, particularly China and the Indian Ocean.

4-5 units, *not given this year*

**HISTORY 208. Private Lives, Public Stories: Autobiography in Women's History**

Changing contexts of women's lives and how women's actions have shaped and responded to those contexts. GER:DB-Hum, EC-Gender

5 units, *not given this year*

**HISTORY 208A. Science and Law in History**

(Same as HISTORY 308A) How the intertwined modern fields of science and law, since the early modern period, together developed central notions of fact, evidence, experiment, demonstration, objectivity, and proof. GER:DB-SocSci

4-5 units, *not given this year*

**HISTORY 208B. Women Activists' Response to War**

(Same as HISTORY 308B) Theoretical issues, historical origins, changing forms of women's activism in response to war throughout the 20th century, and contemporary cases, such as the Russian Committee of Soldiers Mothers, Bosnian Mothers of Srebrenica, Serbian Women in Black, and the American Cindy Sheehan. Focus is on the U.S. and Eastern Europe, with attention to Israel, England, and Argentina. GER:DB-Hum, EC-Gender

4-5 units, *not given this year*

**HISTORY 208C. History of Death and Dying**

The changing realities of, attitudes towards and ways of coping with death drawing on examples from Europe, Africa, the Caribbean, Latin America and the United States. The role of death in shaping the modern world via the global slave trades, imperial conquest, pandemics, wars and genocides. Changing rituals relating to death, intellectual and philosophical debates about the personal and social meanings of death, and the political and personal consequences of particular ways and patterns of dying.

5 units, *Aut (Hanretta, S)*

**HISTORY 208S. Facing the Past: The Politics of Retrospective Justice**

Forms of injustice in history including slavery, genocide, ethnic cleansing, mass rape, forced religious conversion, and torture of prisoners. Mechanisms developed over the last century to define, deter, and alleviate the effects of such offenses, including war crimes tribunals, truth commissions, national apologies, and monetary reparations. Case studies chart the international field of retrospective justice, exploring the legal, political, and moral implications of confronting traumatic pasts. GER:DB-SocSci

5 units, Win (Campbell, J)

**HISTORY 209C. Liberalism and Violence**

What place does violence have in modern political thought? Liberalism eschews violence, yet condones moral war. Marxism justifies revolutionary violence. Anticolonialism invokes insurgency. Gandhi seeks truth in nonviolent suffering. Can modern politics and life be grasped without reference to violence? How is violence related to law and justice? Is there a theology of violence? Liberalism and its critics: Agamben, Arendt, Benjamin, Derrida, Fanon, Foucault, Gandhi, Heidegger, Nietzsche, Schmitt, and Sorel. Biopolitics, civil society, friend/enemy, sovereignty, terror, and strikes. GER:EC-EthicReas

5 units, not given this year

**HISTORY 209D. Postcolonialism and Universalism**

(Same as HISTORY 309A) Key texts and motifs from postcolonial theory: empire, class, exile, suffering, textuality, archive in juxtaposition to 20th-century philosophical questions about universal history and the relevance of humanist inquiry.

4-5 units, not given this year

**HISTORY 209S. Research Seminar for Majors**

Required of History majors. How to conduct original, historical research and analysis, including methods such as using the libraries and archives at Stanford and elsewhere, and working collaboratively to frame topics, identify sources, and develop analyses. Autumn quarter focuses on European Lit and Arts; winter quarter on U.S. History and Colonialism; spring quarter on modern Europe, ancient China and early modern Europe.

5 units, Aut (Campbell, J), Win (Hanretta, S), Spr (Hobbs, A)

**HISTORY 210. The History of Occupation, 1914-2010**

(Same as HISTORY 310) Examines the major cases of occupation in the twentieth century, from the first World War until the present, and issues of similarities, differences, and implications for contemporary policy making. Topics include European and Asian cases emerging from World War I and World War II, the Israeli occupation of the West Bank; the Soviet and American occupations of Afghanistan; and the American occupation of Iraq. Discussions will revolve around the problems, efficacy, and effects of occupation in historical perspective. GER:DB-SocSci

4-5 units, Win (Naimark, N)

**HISTORY 211C. Saints in the Middle Ages**

Saints were indispensable heroes in the Middle Ages. Explores what specific functions they served in medieval society, and how those roles changed over a millennium. Critical and curious readings of both primary documents and scholarly research will address questions such as what is a saint; what makes a saint; and how can the politicized literary texts that narrated their lives be used as historical documents. Topics include saints and their hagiographers, miracles, relics, marian devotion, profiling the Holy, and gendered sanctity. GER:DB-Hum

5 units, Aut (Kreiner, J)

**HISTORY 211D. Law and Society in Medieval Italy**

(Same as HISTORY 311D) Traces the historical development of law and legal institutions in medieval Italy. Focuses on the interdependence of jurisprudence, legal practice, and social forces. Topics include legal reasoning, citizenship, servitude and dependence, family and kinship, property and inheritance, women and gender, crime and deviance, faction and vendetta.

4-5 units, Win (Fredona, R)

**HISTORY 212G. Economy and Society in Precapitalist Europe**

(Same as HISTORY 312G) What today we might classify as a strictly economic concern, the distribution and circulation of resources, was in the Middle Ages inseparable from ideas about social organization and cultural value. Examines how deeply the economy was connected in material and intellectual ways to

government, religion, and culture in Europe from the fourth to the fourteenth centuries; how those economic structures have been represented and debated in modern scholarship; and how the history of premodern economies might inform the study of capitalism. Topics include the problem of poverty; forms and scales of exchange; slavery and serfdom; visible wealth; warrior, cleric, peasant, medieval microfinance, taxation and representation, and feudal logic. GER:DB-SocSci

4-5 units, Spr (Kreiner, J)

**HISTORY 214D. Mediterranean Crossroads: Power, Culture, and Religion in Medieval Sicily**

Sicily in the Middle Ages was a Mediterranean crossroads, a dynamic and diverse kingdom in which Muslim and Christian, Viking and African, European and Eastern Cultures all came together. Explores the life and times of Frederick II (1194-1250). He claimed universal authority as a Christian emperor, yet ruled multireligious Sicily as king. He promoted crusading, yet was accused of being a heretic and a crypto Muslim. He spoke six languages and actively patronized the arts and sciences. Topics include: structures and influences that made such a figure possible; how he managed the tensions of governing a diverse and disparate empire; how religion and cultural production created and maintained his authority; how contemporaries and later generations reacted to this enigmatic emperor; why has he continued to generate such polarizing reactions; and how did Frederick become a figure revered by Nazis and multiculturalists alike.

5 units, Spr (Miner, J)

**HISTORY 220G. Demons, Witches, and Priests: Religion and Popular Culture in Russia**

(Same as HISTORY 320G) 19th and early 20th centuries. Peasants, parish priests, witches, possessed persons, cults and sects, old believers, saints, and women's religious communities. Nominally Christian, and members of the Orthodox Church, Russians embraced beliefs and customs that combined teaching from Church and folk traditions. GER:DB-Hum

4-5 units, Win (Kollmann, J)

**HISTORY 221A. Men, Women, and Power in Early Modern Russia, 1500-1800**

Social values, gender relations, and social change in an era of rapid change; challenges to established norms by new constructions of deviance (witchcraft, religious reform, and revolt) and new standards of civility; encounters with non-Russians and the construction of national consciousness. Social values as political ethos: patrimonial autocracy and the reality of female rule in the late 17th and 18th century. GER:DB-Hum, DB-Hum, EC-Gender

5 units, not given this year

**HISTORY 221B. The Woman Question in Modern Russia**

Russian radicals believed that the status of women provided the measure of freedom in a society and argued for the extension of rights to women as a basic principle of social progress. The social status and cultural representations of Russian women from the mid-19th century to the present. The arguments and actions of those who fought for women's emancipation in the 19th century, theories and policies of the Bolsheviks, and the reality of women's lives under them. How the status of women today reflects on the measure of freedom in post-Communist Russia. GER:DB-SocSci, EC-Gender

5 units, not given this year

**HISTORY 221D. Historiography of the Soviet Union**

(Same as HISTORY 321C) Major schools of interpretation of the Soviet phenomenon through works representative of a specific school, in chronological order, from the first major interpretation of the Soviet polity by Trotsky to postmodernist theories. GER:DB-SocSci

4-5 units, Aut (Weiner, A)

**HISTORY 222. Honor, Law, and Modernity**

How Europe evolved from medieval to modern; focus is on standards for conflict resolution emphasizing insults to honor. How attitudes towards the self and society, and the state's relationship to individuals, changed from the 16th to 18th centuries in Europe and Russia. Traditional concepts of honor and patterns of settling disputes contrasted to early modern concepts of honor, private life, civility, and crime and punishment. GER:DB-Hum

5 units, not given this year

**HISTORY 223. Art and Ideas in Imperial Russia**

(Same as HISTORY 323) Poetry, novels, symphonic music, theater, opera, painting, design, and architecture: what they reveal about the politics and culture of tsarist Russia. GER:DB-Hum

4-5 units, not given this year

**HISTORY 224A. The Soviet Civilization**

(Same as HISTORY 424A) Socialist visions and practices of the organization of society and messianic politics; the Soviet understanding of mass violence, political and ethnic; and living space. Primary and secondary sources. Research paper or historiographical essay. GER:DB-SocSci

4-5 units, not given this year

**HISTORY 224B. Modern Afghanistan**

(Same as HISTORY 324B) Politics, society, and culture in Afghanistan from the 19th century to the present. Topics include state building, tribal politics, Islamic law, geopolitics, the Taliban, and the post-Taliban disorder. GER:DB-SocSci

4-5 units, Win (Crews, R)

**HISTORY 225C. Leaders and Leadership in Soviet and Post-Soviet Russia**

(Same as HISTORY 325C) Analyzes the role of the supreme leader in the Soviet and post-Soviet systems; the role of personality and career trajectories in the making of Soviet leaders; leadership style, authority building, and power base; the problem of succession; and the impact and legacies of various leaders on the political system and culture. GER:DB-SocSci

4-5 units, Spr (Weiner, A)

**HISTORY 227. East European Women and War in the 20th Century**

(Same as HISTORY 327) Thematic chronological approach through conflicts in the region: the Balkan Wars, WW I, WW II, and the recent wars in the former Yugoslavia. The way women in E. Europe have been involved in and affected by these wars compared to women in W. Europe in the two world wars. Women's involvement in war as members of the military services, the backbone of underground movements, workers in war industries, mothers of soldiers, subjects and supporters of war aims and propaganda, activists in peace movements, and objects of wartime destruction, dislocation, and sexual violation. GER:DB-SocSci, EC-Gender

4-5 units, Aut (Jolluck, K)

**HISTORY 228. Circles of Hell: Poland in World War II**

(Same as HISTORY 328) The experience and representation of Poland's wartime history from the Nazi-Soviet Pact of 1939 to the aftermath of Yalta in 1945. Nazi and Soviet ideology and practice regarding the Poles and the ways Poles responded, resisted, and survived. The self-characterization of Poles as innocent victims, and their involvement or complicity in the Holocaust, thus engaging in a current debate in Polish society. GER:DB-SocSci

5 units, not given this year

**HISTORY 229. Poles and Jews**

(Same as HISTORY 329, JEWISHST 289, JEWISHST 389) Focus is on the period since WW I. The place of the Jews in interwar Poland, WW II, surviving Jews after the war, Polish memorialization of the Holocaust, the reality and mythology of Jews in the communist apparatus, the manipulation of anti-Semitism by the communist government, and post-communist movement toward reconciliation. Memory and national mythology emphasizing Polish wartime behavior and the relationship of Jews to communism. The sources and uses of stereotypes, and the state of Polish-Jewish relations today. GER:DB-Hum, DB-Hum, EC-GlobalCom

4-5 units, Win (Jolluck, K)

**HISTORY 230A. The Witness in Modern History: Memoir, Reportage, Image**

The rise of the witness as icon and debates about its reliability as a historical source. The power of eyewitness accounts to convict accused criminals, inspire indignation about war and genocide, and attract attention to humanitarian crises. Their notorious unreliability due to exaggeration and misapprehension. Sources include reportage, photography, and documentary film. Case studies include criminal cases, war, poverty, and natural disasters. GER:DB-Hum

5 units, not given this year

**HISTORY 230D. Europe in the World, 1789-Present**

(Same as HISTORY 330D) The European conquest of parts of Africa, Asia, and the South Pacific by European merchants, missionaries, armies, and administrators had significant, and often cataclysmic, effects on indigenous political alliances, cultural practices, and belief systems. But were the effects of expansion entirely one-sided? What impact did the experiences of colonialism have on European politics, culture, and Europe's relations with the rest of the world? Explores how interaction between Europe and the rest of the world redefined the political, racial, sexual, and religious boundaries of both Europe and its colonies and gave rise to the more globalized society we live in today.

4-5 units, not given this year

**HISTORY 230F. Self-Policing, Denunciation, and Surveillance in Modern Europe**

(Same as HISTORY 330F) How individual actions impact state machineries of power. The motives, pressures, and consequences of everyday collaboration from the French Revolution to Nazi Germany and Soviet bloc police states; popular outrage over such practices in the aftermath of these regimes. The phenomenon of anticipatory compliance, as people tended to perceive less freedom of action than actually existed, and the reciprocal intensification of real and imagined restrictions. The malleability of personal values and interests as represented in diaries, memoirs, secondary sources, and film; variety of individual and national responses.

4-5 units, not given this year

**HISTORY 232A. Power, Art, and Knowledge in Renaissance Italy**

(Same as HISTORY 332A) Provides a fundamental understanding of the cultural and political imagination of the Italian Renaissance, with particular emphasis on Florence between 1300 and 1600 CE. Topics include political and social upheavals, radical shifts in religious practice and devotion, the commercial revolution in trade and banking, the rediscovery of classical philosophy and style, and the flowering of the literary and visual arts. GER:DB-Hum

4-5 units, Aut (Fredona, R)

**HISTORY 232D. Rome: The City and the World, 1350-1750**

(Same as HISTORY 332D) What lies beyond the ruins of an ancient city? The history of Rome from the Renaissance to the age of the grand tour. Topics include: the political, diplomatic, and religious history of the papacy; society and cultural life; the everyday world of Roman citizens; the relationship between the city and the surrounding countryside; the material transformation of Rome as a city; and its meaning for foreigners. GER:DB-Hum

4-5 units, not given this year

**HISTORY 233. Reformation, Political Culture, and the Origins of the English Civil War**

(Same as HISTORY 333) English political and religious culture from the end of the Wars of the Roses to the Civil War of the 1640s. Themes include the growth of the size and power of the state, Reformation, creation of a Protestant regime, transformation of the political culture of the ruling elite, emergence of Puritanism, and causes of the Civil War. GER:DB-Hum

4-5 units, not given this year

**HISTORY 233A. From Bacon to Hegel: Introduction to Early Modern Intellectual History**

(Same as HISTORY 333A) Over the past three centuries, European culture, society and politics have experienced a series of dramatic transformations, changes that unleashed a myriad of intellectual theories and debates. From politics and science to justice and religion, new ideas altered all fields of European thought, as intellectuals sought to understand the turmoil around them. Examines the rise of scientific thought and utopias, the emergence of new visions of politics, the differences between key Enlightenment thinkers, the development of Romanticism, Liberalism, Hegelianism, and more. Readings include Bacon, Descartes, Hobbes, Vico, Voltaire, Rousseau, Burke, Tocqueville and others. GER:DB-Hum

4-5 units, Aut (Dubnov, A)

**HISTORY 233B. Early Modern Sexualities**

(Same as HISTORY 333B) History of sexuality in early modern Europe. Normative sexuality, heterosexual transgressions, and minority sexualities. Theoretical approaches to and debates about

the history of sexuality, in particular prior to the 19th century. Tools for critiquing the heteronormativity of early modern sources and for reading those sources for evidence of sexual diversity. Readings include monographs and primary sources. GER:DB-SocSci, EC-Gender

*4-5 units, not given this year*

#### **HISTORY 233C. Two British Revolutions**

(Same as HISTORY 333C) Current scholarship on Britain, 1640-1700, focusing on political and religious history. Topics include: causes and consequences of the English civil war and revolution; rise and fall of revolutionary Puritanism; the Restoration; popular politics in the late 17th century; changing contours of religious life; the crisis leading to the Glorious Revolution; and the new order that emerged after the deposing of James II. GER:DB-Hum

*4-5 units, not given this year*

#### **HISTORY 233E. From the Left Hegelians to Freud:**

##### **Introduction to Late Modern Intellectual History**

(Same as HISTORY 333E) Ever since the Napoleonic Wars, European culture, society and politics have experienced a series of dramatic transformations, changes that unleashed a myriad of intellectual theories and debates. Focuses on the nineteenth century, the age of grand theories such as Liberalism, Positivism, Nationalism, Socialism, and Marxism and examines them historically. Readings include French Utopian Socialists and members of the Russian intelligentsia, J.S. Mill, Marx, Durkheim, Weber, Freud, and others. GER:DB-Hum

*4-5 units, Win (Dubnov, A)*

#### **HISTORY 233F. Political Thought in Early Modern Britain**

1500 to 1700. Theorists include Hobbes, Locke, Harrington, the Levellers, and lesser known writers and schools. Foundational ideas and problems underlying modern British and American political thought and life. GER:DB-Hum

*5 units, not given this year*

#### **HISTORY 233G. Catholic Politics in Europe, 1789-1992**

What led to the creation of a specifically Catholic mass politics? How did these parties and movements interact with the Vatican and the wider Church? What accounts for political Catholicism's involvement in clerical-fascist states and its important role in shaping the EU? Sources focus on monographs. Research paper using primary sources. GER:DB-SocSci

*5 units, not given this year*

#### **HISTORY 233K. The Invention of the Modern Republic**

(Same as HISTORY 333K) Examines the history of republican thinking in the Atlantic World from the Renaissance to the French Revolution.

*4-5 units, not given this year*

#### **HISTORY 236. The Ethics of Imperialism**

Can a commitment to liberty, progress, and universal rights be reconciled with imperialism? The ethical underpinnings of empire; how modern Europeans provided ethical and political justifications for colonial expansion. How European ideals were used to defend and justify inequality, violence, and genocide. The ethics of American-driven globalization and humanitarianism. Texts include primary sources, philosophical treatises, and historical studies. GER:DB-Hum

*5 units, not given this year*

#### **HISTORY 236B. The Idea of Society**

(Same as HISTORY 336B) Classic texts in social theory from the seventeenth century to the present. Readings include Locke, Smith, Hegel, Comte, and Durkheim, and Weber. GER:DB-Hum

*4-5 units, Win (Baker, K; Sheehan, J)*

#### **HISTORY 236D. Cold War Europe**

(Same as HISTORY 336D) Much more than a military and diplomatic confrontation, the Cold War was lived experience in Europe - shaping politics, society, culture and personal identity. Beginning at the end of World War II, traces the continent's division into eastern and western blocs, and ends with the fall of the Iron Curtain. Sources include memoirs, propaganda, novels, and film, as well as new scholarship on the Cold War. GER:DB-Hum

*4-5 units, Spr (Sheffer, E)*

#### **HISTORY 237. The Holocaust**

(Same as HISTORY 337, JEWISHST 183, JEWISHST 383) The

emergence of modern racism and radical anti-Semitism. The Nazi rise to power and the Jews. Anti-Semitic legislation in the 30s. WW II and the beginning of mass killings in the East. Deportations and ghettos. The mass extermination of European Jewry. GER:DB-Hum

*4-5 units, Aut (Zipperstein, S)*

#### **HISTORY 239D. Capital and Empire**

(Same as HISTORY 339D) Can empire be justified with balance sheets of imperial crimes and boons, a calculus of racism versus railroads? The political economy of empire through its intellectual history from Adam Smith to the present; the history of imperial corporations from the East India Company to Wal-mart; the role of consumerism; the formation of the global economy; and the relationship between empire and the theory and practice of development. GER:DB-SocSci

*4-5 units, Spr (Satia, P)*

#### **HISTORY 239F. Empire and Information**

(Same as HISTORY 339F) How do states see? How do they know what they know about their subjects, citizens, economies, and geographies? How does that knowledge shape society, politics, identity, freedom, and modernity? Focus is on the British imperial state activities in S. Asia and Britain: surveillance technologies and information-gathering systems, including mapping, statistics, cultural schemata, and intelligence systems, to render geographies and social bodies legible, visible, and governable. GER:DB-Hum, EC-GlobalCom

*4-5 units, not given this year*

#### **HISTORY 239H. Colonialism and Empire in Modern Europe**

To better understand the history of modern Europe within a global context, explores the following questions: What impact did more than a century of colonialism have on the social lives, cultural attitudes, political loyalties, and intellectual world views of European women and men during the nineteenth century? What accounts for the resiliency of empire during a period of rapid global change that witnessed the rise of modern democracy, economic liberalism, ethnic nationalism, and international socialism? GER:DB-SocSci

*5 units, not given this year*

#### **HISTORY 242G. Einstein: Science, Technology, and Culture**

(Same as HISTORY 342G) Explores how Albert Einstein, a theoretical physicist who dealt with highly abstruse matters, could come to be named the Person of the Century. In addition to the specifics of Einstein's life and work, topics will include the origins and reception of scientific ideas, the nature of scientific revolutions, science in popular culture, nationalism vs. internationalism in science, science and war, debates over the nature of reality, and the quest for the theory of everything. GER:DB-Hum

*4-5 units, Win (Lagerstrom, L)*

#### **HISTORY 243C. 18th-Century Colonial Science and Medicine**

(Same as HISTORY 343C) Explores the global exchange of knowledge, technologies, plants, peoples, disease, and medicines. Colonial sciences and medicines were important militarily and strategically for positioning emerging nation states in global struggles for land and resources. Considers primarily French, British, and Dutch in the West Indies, but also takes examples from Iberian, Jesuit, and other traditions in China and India. Readings treat science and medicine in relation to voyaging, colonialism, slavery, plants, and environmental exchange. GER:DB-SocSci

*4-5 units, Spr (Schiebinger, L)*

#### **HISTORY 243G. Tobacco and Health in World History**

(Same as HISTORY 343G) GER:DB-SocSci

*4-5 units, Aut (Proctor, R)*

#### **HISTORY 243J. Climate Change in the West: A History of the Future**

(Same as EARTHSYS 143J) Global warming is changing the American West. But this region is no stranger to environmental change and human adaption to harsh environments. How can history create more clear thinking about the current crisis and choices for the future? The long history of climate change in the West, as well as current warming, through scientific research, historical sources, environmental histories, and visions for the future, including plans for mitigation and adaption, scientific



predictions, and science fiction.

*5 units, not given this year*

**HISTORY 243S. Human Origins: History, Evidence, and Controversy**

(Same as HISTORY 443A) Research seminar. Debates and controversies include: theories of human origins; interpretations of fossils, early art, and the oldest tools; the origin and fate of the Neanderthals; evolutionary themes in literature and film; visual rhetoric and cliché in anthropological dioramas and phyletic diagrams; the significance of hunting, gathering, and grandmothing; climatological theories and neocatastrophic geologies; molecular anthropology; the impact of racial theories on human origins discourse. Background in human evolution not required. GER:DB-SocSci

*4-5 units, not given this year*

**HISTORY 244C. The History of the Body in Science, Medicine, and Culture**

(Same as HISTORY 444C) The human body as a natural and cultural object, historicized. The crosscultural history of the body from the 18th century to the present. Topics include: sciences of sex and race; medical discovery of particular body parts; human experimentation, foot binding, veiling, and other bodily coverings; thinness and obesity; notions of the body politic. GER:DB-SocSci, EC-Gender

*4-5 units, not given this year*

**HISTORY 245E. Health and Society in Africa**

(Same as HISTORY 347E) The history of disease, therapeutic and diagnostic systems, and the definition of health in precolonial, colonial, and postcolonial Africa. The social and political histories of specific epidemics, including sleeping sickness, influenza, TB, mental illness, and AIDS. The colonial contexts of epidemics and the social consequences of disease. GER:DB-SocSci, EC-GlobalCom

*4-5 units, not given this year*

**HISTORY 245G. Law and Colonialism in Africa**

(Same as HISTORY 348D) Law in colonial Africa provides an opportunity to examine the meanings of social, cultural, and economic change in the anthropological, legal, and historical approaches. Court cases as a new frontier for the social history of Africa. Topics: meanings of conflicts over marriage, divorce, inheritance, property, and authority. GER:DB-SocSci

*4-5 units, Spr (Roberts, R)*

**HISTORY 248S. African Societies and Colonial States**

(Same as HISTORY 448A) The encounter between African societies and European colonialism in the colony or region of their choice. Approaches to the colonial state; tours of primary source collections in the Hoover Institution and Green Libraries. Students present original research findings and may continue research for a second quarter. GER:DB-SocSci

*4-5 units, not given this year*

**HISTORY 250A. History of California Indians**

(Same as CSRE 117S, NATIVEAM 117S) Demographic, political, and economic history of California Indians, 1700s-1950s. Processes and events leading to the destruction of California tribes, and their effects on the groups who survived. Geographic and cultural diversity. Spanish, Mexican, and Anglo-American periods. The mission system. GER:EC-AmerCul

*5 units, not given this year*

**HISTORY 251C. The American Enlightenment**

(Same as AMSTUD 251C) Eighteenth century America was like a laboratory for exciting new social, political, religious, scientific, and artistic theories that we collectively call the Enlightenment. With readings in original texts and studies of material culture, examines ways in which eighteenth century Americans applied Enlightenment thinking to some of the most important problems and questions of their time. What was the best kind of government, and how could this be known? Was the new world of America fundamentally different or the same as Europe, and did animals, plants, and people improve or worsen there? What creatures (children, apes, women, slaves) were considered unreasonable in the Age of Reason, and why? What was the place of religion and passion in the Age of Reason? GER:DB-Hum

*5 units, not given this year*

**HISTORY 253D. Approaches to American Legal History**

(Same as POLISCI 226U) Legal history, once primarily devoted to exploring legal doctrines and key judicial opinions and thus of interest mainly to legal scholars and lawyers, now resembles historical writing more generally; the study of legal ideas and practices is increasingly integrated with social, intellectual, cultural, and political history. Recent writings in American legal history; how the field reflects developments in historical writing; and how the use of legal materials affects understanding of American history.

*5 units, Win (Rakove, J)*

**HISTORY 254. Popular Culture and American Nature**

Despite John Muir, Aldo Leopold, and Rachel Carson, it is arguable that the Disney studios have more to do with molding popular attitudes toward the natural world than politicians, ecologists, and activists. Disney as the central figure in the 20th-century American creation of nature. How Disney, the products of his studio, and other primary and secondary texts see environmentalism, science, popular culture, and their interrelationships. GER:DB-Hum

*5 units, Aut (White, R)*

**HISTORY 255. Martin Luther King, Jr.: The Social Gospel and the Struggle for Justice**

The religious and political thought of Martin Luther King, Jr., using the documentary resources of the King Institute at Stanford. His social gospel Christianity and prophetic message of radical social transformation. Readings include the forthcoming *The Papers of Martin Luther King, Jr., Volume VI: Advocate of the Social Gospel*. GER:DB-Hum

*5 units, not given this year*

**HISTORY 255D. Racial Identity in the American Imagination**

(Same as AFRICAAM 255, AMSTUD 255D, CSRE 255D, HISTORY 355D) Major historical transformations shaping the understanding of racial identity and how it has been experienced, represented, and contested in American history. Topics include: racial passing and racial performance; migration, immigration, and racial identity in the urban context; the interplay between racial identity and American identity; the problems of class, gender, and sexuality in the construction of racial identity. Sources include historical and legal texts, memoirs, photography, literature, film, and music. GER:DB-SocSci, EC-AmerCul

*4-5 units, Win (Hobbs, A)*

**HISTORY 256. U.S.-China Relations: From the Opium War to Tiananmen**

(Same as HISTORY 356) The history of turbulent relations, military conflict, and cultural clashes between the U.S. and China, and the implications for the domestic lives of these increasingly interconnected countries. Diplomatic, political, social, cultural, and military themes from early contact to the recent past. GER:DB-SocSci, EC-GlobalCom

*4-5 units, not given this year*

**HISTORY 257C. LGBT History in the United States**

(Same as FEMST 140D) An introductory course on LGBT social, cultural, and political history in the United States. This course explores how categories of sexuality have changed over time, with particular emphasis on the relationship among homosexuality, heterosexuality, and transgenderism. Students will analyze how the intersections of race, class, and sexuality influenced the constitution of these categories and the politics of social relations. Historical and literary sources will be used to examine changes in LGBT experiences and identities, primarily in the twentieth century.

*4-5 units, Spr (Davies Henderson, A)*

**HISTORY 258. Topics in the History of Sexuality: Sexual Violence**

(Same as AMSTUD 258, CSRE 192E, HISTORY 358) Recent historical interpretations of sexual violence, with particular attention to the intersections of gender and race in the construction of rape, from early settlement through the twentieth century. Topics include the legal prosecution of rape in Early America; the racialization of rape in the U.S.; lynching and anti-lynching in the U.S.; and feminist responses to sexual violence. GER:DB-SocSci, EC-Gender

*4-5 units, not given this year*



**HISTORY 258G. Women and Race in the American West, 1849-1950**

(Same as CSRE 133) The western myth of the lone white cowboy gives little insight into women and people of color. However, race and gender are crucial to the U.S. West's history, creating complex identities and social structures. The course examines lives of women of diverse races, in addition to the mythology surrounding icons such as pioneer mothers or Sacagawea. Using literature, art work, and film, along with works by historians, to analyze the intersection of race and and the relation between history and myth.

5 units, Win (Frink, B)

**HISTORY 259A. Poverty and Homelessness in America**

Service learning. Students participate in a two quarter internship at a local shelter for homeless individuals or families. Readings include historical, social science, and social commentary literature. Service Learning Course (certified by Haas Center). GER:DB-SocSci

4-5 units, not given this year

**HISTORY 260. California's Minority-Majority Cities**

(Same as CSRE 260, HISTORY 360) Historical development and the social, cultural, and political issues that characterize large cities and suburbs where communities of color make up majority populations. Case studies include cities in Los Angeles, Santa Clara, and Monterey counties. Comparisons to minority-majority cities elsewhere in the U.S. Service Learning Course (certified by Haas Center). GER:DB-SocSci, EC-AmerCul

4-5 units, Spr (McKibben, C)

**HISTORY 261. Race, Gender, and Class in Jim Crow America**

How African American life and labor were redefined from 1890-1954. Topics include family life, work, leisure patterns, transnational relations, cultural expressions emphasizing literature and music, resistance and social activism. Primary sources including visual materials, literature, and film; historical interpretations of the period. GER:DB-SocSci

5 units, not given this year

**HISTORY 262G. The Pivotal Decade in U.S. History: 1960's or 1970's?**

(Same as HISTORY 362G) Which had more lasting impact, the civil war of the 1960s or the conservative revolt of the 1970s? Should the 1970s supersede the 1960s as a pivotal moment when something happened of considerable importance to historians? Considers this debate of the decades comparatively and thematically, addressing topics including civil rights, foreign policy, electoral politics, popular culture, law, economics, labor, and social movement organizing. GER:DB-SocSci

4-5 units, Aut (Sbardellati, L)

**HISTORY 263G. History Through a Life: The Allure of American Biography**

(Same as HISTORY 363G) Considers the possibilities and limitations of exploring U.S. history through the genre of biography. Is a single life too narrow to explain why and how pivotal events in U.S. history, such as war, economic depression, social revolution, unfold? Or can one life illuminate the complexity of historical shifts? Readings will span U.S. history, exploring topics such as labor and racial civil rights, science and culture, women and sexuality, transnationalism and diplomacy, law and presidential politics. The craft of biography will be considered alongside biographical subjects. GER:DB-Hum

4-5 units, Spr (Sbardellati, L)

**HISTORY 265. Writing Asian American History**

(Same as HISTORY 365) Recent scholarship in Asian American history, with attention to methodologies and sources. Topics: racial ideologies, gender, transnationalism, culture, and Asian American art history. Primary research paper. GER:DB-SocSci, EC-AmerCul

5 units, not given this year

**HISTORY 268E. American Foreign Policy and International History since 1941**

(Same as AMSTUD 268E, HISTORY 368E) Major events and interpretations from WW II to the war in Iraq. Issues of race, expansionism and power; nuclear weapons; and war. GER:DB-SocSci

4-5 units, Spr (Bernstein, B)

**HISTORY 272B. Frontiers of Iberian and Latin American****Culture and History**

(Same as HISTORY 372B, ILAC 272B, ILAC 372B) Analyzes the construction and deconstruction of communities and their internal and external frontiers in Iberia and Ibero-America from the early modern period to the early twentieth century by observing both historical and cultural artifacts (historical documents, novels, bibliography, etc.). Topics: the coming of nations, the making of state (or national) territory, the role assigned or taken on by immigrants, minorities and, in the American case, natives, and the persistence of areas now called borderlands or of groups now assigned to such (indeterminate) locations. GER:DB-SocSci

3-5 units, Aut (Surwillo, L; Herzog, T)

**HISTORY 273. The European Expansion**

(Same as HISTORY 373A) The relationship between European monarchies and their colonial domains from the 16th-18th centuries. Reasons for expansion, methods, and results. Case studies include the Spanish, Portuguese, Dutch, French, and English domains in Africa, Asia, and the Americas. Readings include primary and secondary sources.

4-5 units, not given this year

**HISTORY 273G. Geographical Imagination & the Making of Brazil & the Hispanic-American States, 1750-1850**

Explores the connections between geographical representation and the emergence of new independent states in South America by probing the importance of colonial geographic narratives in the making of independent, post-colonial identities. Focusing mainly on Brazil, but also comparing and contrasting Brazil to other Ibero-American republics, we will study maps not only as significant pieces of imperial and patriotic discourse, but also as visual and material objects that allow us to understand the diverse perceptions of territory of different agents and groups such as native peoples, maroon societies, settlers, missionaries, traders, bureaucrats, and nationalists. Topics include the continuities and discontinuities of territory, the influence of enlightened ideals, and the idealization of Amerindians as elements of the landscape. Provides a case study of how politics, printed culture, and the representation of native peoples were intertwined during a period of global imperial transformati GER:DB-SocSci

5 units, Win (Staff)

**HISTORY 275G. Religion in Colonial Latin America and the Iberian World**

(Same as HISTORY 375G) Examines the spiritual conquest of Latin America, the gap between ideal and lived behavior, and the nature of personal/shared experiences of piety by looking at instances of forced conversion, catechism and sacraments, mysticism and apparitions, funerary rituals, baroque piety, witchcraft, and ideas about marriage, sexuality, and religious tolerance. GER:DB-Hum

4-5 units, Aut (Tortorici, Z)

**HISTORY 276E. Gender and Sexuality in Early Modern Iberian World**

(Same as HISTORY 376E) Examines major theoretical approaches, methodological developments, and debates that have shaped the history of sexuality. We will use criminal/Inquisition cases and confessional manuals to better understand gender and sexuality in the early modern Iberian world. Focuses on European/African/indigenous conceptions of gender, marriage and bigamy, witchcraft and popular religious practices, convent life and mysticism, abortion and infanticide, gendered violence, solicitation, sodomy and bestiality, and the punishments meted out for illicit acts. GER:DB-Hum

4-5 units, Spr (Tortorici, Z)

**HISTORY 279. Latin American Development: Economy and Society, 1800-2000**

(Same as HISTORY 379) The newly independent nations of Latin America began the 19th century with economies roughly equal to, or even ahead of, the U.S. and Canada. What explains the economic gap that developed since 1900? Why are some Latin American nations rich and others poor? Marxist, dependency, neoclassical, and institutionalist interpretive frameworks. The effects of globalization on Latin American economic growth, autonomy, and potential for social justice. GER:DB-SocSci, EC-GlobalCom

4-5 units, not given this year

**HISTORY 281. Economic and Social History of the Modern Middle East**

(Same as HISTORY 381) The integration of the Middle East into the world capitalist market on a subordinate basis and the impact on economic development, class formation, and politics. Alternative theoretical perspectives on the rise and expansion of the international capitalist market are combined with possible case studies of Egypt, Iraq, and Palestine. GER:DB-SocSci

4-5 units, Aut (Beinin, J)

**HISTORY 281A. Twentieth-Century Iraq: A Political and Social History**

The colonial experience, creation of the modern Iraqi state, and transition to military dictatorship. Political movements, religious and tribal elements, and their relation to the state. Geopolitical context. GER:DB-SocSci

5 units, not given this year

**HISTORY 281B. Modern Egypt**

(Same as HISTORY 381B) From the mid-nineteenth century to the present. Topics: European imperialism, the political economy of cotton, rise of nationalism, gender and the nation, minorities, the coup of 1952, positive neutralism and the Cold War, and the neo-liberal reconstruction of Egypt. GER:DB-SocSci

4-5 units, Spr (Beinin, J)

**HISTORY 282. The United States and the Middle East since 1945**

(Same as HISTORY 382) Since the end of WW II, U.S. interests in the Middle East have traditionally been defined as access to oil at a reasonable price, trade and markets, containing the influence of the Soviet Union, and the security of Israel. Is this the full range of U.S. interests? How has the pursuit of these interests changed over time? What forces have shaped U.S. policy? What is the impact of U.S. policy on the region itself? GER:DB-SocSci, EC-GlobalCom

4-5 units, not given this year

**HISTORY 283. The New Global Economy, Oil, and Islamic Movements in the Middle East**

(Same as HISTORY 383) The integration of the Middle East into the world capitalist market on a subordinate basis and the impact on economic development, class formation, and politics. Alternative theoretical perspectives on the rise and expansion of the international capitalist market combined with case studies of Egypt, Iraq, and Palestine. GER:DB-SocSci

4-5 units, not given this year

**HISTORY 284F. Empires, Markets and Networks: Early Modern Islamic World and Beyond, 1500-1800**

(Same as HISTORY 384F) Focuses on political regimes, economic interactions and sociocultural formations in the early modern Balkans and Middle East to Central and South Asia. Topics include complex political systems of the Ottoman, Safavid and Mughal empires; experiences of various Muslim, Christian, Jewish and Hindu, as well as urban, rural and nomadic communities; consolidation of transregional commerce and cultural exchange; incorporation of the Islamic world in the global economy; transimperial networks of the Muslim and Non-Muslim merchants, scholars and sufis. GER:DB-SocSci

4-5 units, Spr (Yaycioglu, A)

**HISTORY 287D. Tel Aviv: Site, Symbol, City**

(Same as HISTORY 387D, JEWISHST 287D, JEWISHST 387D) Tel Aviv, the first Israeli/Hebrew city, from a cultural history perspective combining high and low cultural artifacts, examining the symbolic constructions of the city as a site of Hebrew modernism and postmodernism. Topics include: the utopian origins behind the establishment of Tel Aviv in Zionist texts; artists, poets, and writers in Tel Aviv's coffee houses; as the capital of Bauhaus architecture; the emergence of Israeli pop culture in Tel Aviv of the late 60s and 70s; the effects of contemporary globalization and the reconstruction of Tel Aviv as the symbolic site of Israeli post-nationalism. Sources include art, cinema, and literature, pop music and archival materials from Green Library's Eliasaf Robinson Collection. Hebrew reading knowledge, although helpful, is not required. GER:DB-Hum

4-5 units, Spr (Dubnov, A)

**HISTORY 287E. Jewish Intellectuals and the Crisis of Modernity**

(Same as HISTORY 387E, JEWISHST 287E, JEWISHST 387E)

Intellectual responses of Jewish political thinkers, historians and authors to the age of extremes. Readings include Theodor Adorno, Herbert Marcuse, Eric Fromm, Hannah Arendt, Leo Strauss, Karl Popper, Isaiah Berlin, Tony Judt, and George Steiner. Analyses of enlightenment, nationalism, socialism and totalitarianism; their life stories, and their direct and indirect role in creating a transatlantic political discourse in postwar years. Contextualizes historically the fundamental features of Jewish intellectual activity after 1945. No prior knowledge of political science, philosophy and/or Jewish studies is required. GER:DB-Hum

4-5 units, Spr (Dubnov, A)

**HISTORY 287S. Research Seminar in Middle East History**

(Same as HISTORY 481, JEWISHST 287S, JEWISHST 481) Student-selected research topics. GER:DB-SocSci

4-5 units, not given this year

**HISTORY 288. Palestine and the Arab-Israeli Conflict**

(Same as HISTORY 388, IPS 388, JEWISHST 288, JEWISHST 388) 1882 to the present. Comparison of representative expressions of competing historical interpretations. U.S. policy towards the conflict since 1948. (Beinin) GER:DB-Hum

4-5 units, not given this year

**HISTORY 290G. Dilemmas of Modernity in Twentieth Century Japan**

(Same as HISTORY 390G) Introduction to the historiography of twentieth century Japan and thereby a basis for further research. Explores the Japanese experience of the twentieth century in its local and regional context and explains Japan as a compelling case study of both the broader logic and process of modernization and the tensions endemic to modernity that are thereby produced.

4-5 units, Spr (Di Marco, F)

**HISTORY 291A. Archaeology and Modernity in Asia: The Excavation of Ancient Civilizations in Modern Times**

(Same as HISTORY 391A) The interplay in Asia between antiquity and modernity, civilization and nation state, and national versus colonial science. The recent excavation of artifacts and places associated with Asian civilization such as the terracotta warriors in China and Angkor Wat in Cambodia. How Asian states have grappled with modernity and colonialism as they simultaneously dug up their ancient pasts. GER:DB-SocSci

4-5 units, not given this year

**HISTORY 291B. The City in Imperial China**

(Same as HISTORY 391B) The evolution of cities in the early imperial, medieval, and early modern periods. Topics include physical structure, social order, cultural forms, economic roles, relations to rural hinterlands, and the contrast between imperial capitals and other cities. Comparative cases from European history. Readings include primary and secondary sources, and visual materials.

3-5 units, not given this year

**HISTORY 291D. Colonialism and Collaboration in East Asia**

(Same as HISTORY 391D) The roles and problems of collaboration in the rise, sustenance, and fall of empires. Themes include conceptual definitions of collaboration and empire, collaboration of traditional elites, accommodation of religious communities, assimilation and collaboration, local intermediaries, and class and empire. Regional focus is East Asia; also cases from other colonial situations. GER:DB-SocSci

4-5 units, not given this year

**HISTORY 291E. Maps, Borders, and Conflict in East Asia**

(Same as HISTORY 391E) The nature of borders and border conflicts in N.E. Asia from the 17th to the early 20th century. Focus is on contact zones between China, Russia, Korea, and Japan. The geopolitical imperatives that drove states to map their terrain in variable ways. Cultural, diplomatic, and imperial contexts. European pressures and contributions to E. Asian cartography; the uses of maps in surveillance, diplomacy, identity, and war. Student projects focus on a contested border zone. GER:DB-SocSci

4-5 units, not given this year

**HISTORY 292. The Two Koreas**

(Same as HISTORY 392) Examines major themes and scholarly works to understand the origins, outbreak, and consequences of the Korean War. One focus will be the division of Korea into ROK and DPRK and their subsequent developments. Themes include

World War II in East Asia; Korean communist movements during Japanese colonial rule; the Cold War in East Asia; the roles of the US, China, and USSR in the Korean War; the ideas of key North and South Korean leaders, and the consolidation of the two Koreas after the Korean War. GER:DB-SocSci

4-5 units, not given this year

#### **HISTORY 292D. Japan in Asia, Asia in Japan**

(Same as HISTORY 392D) How Japan and Asia mutually shaped each other in the late 19th and 20th centuries. Focus is on Japanese imperialism in Asia and its postwar legacies. Topics include: pan-Asianism and orientalism; colonial modernization in Korea and Taiwan; collaboration and resistance; popular imperialism in Manchuria; total war and empire; comfort women and the politics of apology; the issue of resident Koreans; and economic and cultural integration of postwar Asia. GER:DB-SocSci, DB-SocSci, EC-GlobalCom

4-5 units, not given this year

#### **HISTORY 292F. Traditional Korea: History and Culture**

(Same as HISTORY 392F) Korea before 1800 and how iconic features of Korean tradition were created and reinvented. Themes include Korea's ancient kingdoms, the aristocracy and military in the Koryo dynasty, the print culture and Korean alphabet, ideologies and religions, the social status system and the life of women, the kingship and court culture of the Choson dynasty, and Korea's place in premodern East Asia. The modern and contemporary debates.

4-5 units, not given this year

#### **HISTORY 293B. Homosexuality in Historical and Comparative Perspective**

(Same as HISTORY 393B) Comparative history of homoerotic desire, relations, and identity through scholarship on different historical periods and parts of the world: the classical Mediterranean, early modern European cities, late imperial and modern China, Tokugawa and modern Japan, and the U.S. GER:EC-Gender

4-5 units, not given this year

#### **HISTORY 293D. Empire and Cosmopolitanism: Traveling Ideas in Global Political Thought**

(Same as HISTORY 393D) GER:DB-SocSci

4-5 units, not given this year

#### **HISTORY 295F. Race and Ethnicity in East Asia**

(Same as ASNAMST 295F, HISTORY 395F) Historical, cultural, political and theoretical perspectives. Commonly misunderstood as an ethnically homogeneous country, the People's Republic of China is home to 55 officially recognized minority groups, many of whom inhabit the strategic border regions of the country. How similar assumptions of ethnic and racial homogeneity in Taiwan, Japan, and Korea are being reexamined by scholars in disciplines including anthropology, history, and political science. GER:DB-SocSci

4-5 units, Aut (Mullaney, T)

#### **HISTORY 295J. Chinese Women's History**

The lives of women in the last 1,000 years of Chinese history. Focus is on theoretical questions fundamental to women's studies. How has the category of woman been shaped by culture and history? How has gender performance interacted with bodily disciplines and constraints such as medical, reproductive, and cosmetic technologies? How relevant is the experience of Western women to women elsewhere? By what standards should liberation be defined? GER:DB-Hum, EC-Gender

5 units, Win (Sommer, M)

#### **HISTORY 296. Communism and Revolution in China**

From the formation of the Chinese Communist Party (CCP) in 1921 through the 1949 founding of the People's Republic of China (PRC). Topics include: early theories of socialism in China; the relationship between Chinese communism and the Communist International and Soviet Union; agrarian reformulation of communism by Mao; the communist-nationalist civil war; the Communist Revolution of 1949; and the consolidation of communist power in the PRC. GER:DB-Hum

5 units, not given this year

#### **HISTORY 298E. China-Taiwan-U.S. Triangular Relations from WW II through the Cold War**

(Same as HISTORY 398E) The historical origins and evolution of

the complex relations between China, Taiwan, and the U.S. Topics include Stilwell and his conflict with Chiang Kai-shek, the Chinese Civil War, the loss of China or the lost chance in China, the 228 Incident, the Korean War, Taiwan's undetermined status, Kinmen Bombardment, contests over China's UN seat, Nixon's visit to China, Taiwan's economic take-off and democratization under Chiang Ching-kuo. Emphasis is on extensive reading of declassified archival sources and new interpretations. GER:DB-SocSci

4-5 units, Aut (Staff)

#### **HISTORY 299A. Senior Research I**

1-5 units, Aut (Staff), Win (Staff), Spr (Staff)

#### **HISTORY 299B. Senior Research II**

1-5 units, Aut (Staff), Win (Staff), Spr (Staff)

#### **HISTORY 299C. Senior Research III**

1-5 units, Aut (Staff), Win (Staff), Spr (Staff)

#### **HISTORY 299D. Tooling Up for Digital Humanities**

(Same as ENGLISH 299D, ENGLISH 399D, HISTORY 399D) What are the digital humanities? The twenty-first century presents new opportunities in the humanities, such as unprecedented access to millions upon millions of digitized sources along with powerful technological tools to study those sources. Yet it also raises new challenges, such as the responsible and effective use of technology, and defining the nature of digital scholarship and communication. This workshop offers an introduction to fundamental concepts, methods, and issues within the growing field of digital humanities, including managing your online identity, digitizing sources, managing databases, text mining, spatial analysis, visualization, and pedagogy.

1 unit, not given this year

#### **HISTORY 299H. Junior Honors Colloquium**

Required of junior History majors planning to write a History honors thesis during senior year. Meets twice during quarter, including the first Friday class day of the quarter.

1 unit, Win (Sommer, M)

#### **HISTORY 299M. Undergraduate Directed Research: Martin Luther King, Jr., Research and Education Institute**

May be repeated for credit.

1-4 units, Aut (Staff), Win (Staff), Spr (Staff)

#### **HISTORY 299S. Undergraduate Directed Research and Writing**

May be repeated for credit.

1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

#### **HISTORY 299W. Undergraduate Directed Writing**

May be repeated for credit.

1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

#### **HISTORY 299X. Design and Methodology for International Field Research**

(Same as HISTORY 399A) Problems involved in research abroad: ethical issues; safety; security and conduct; human subjects protocol. Methodologies of research: interviewing, networking, case studies, participant observation, large surveys.

1 unit, Spr (Kollmann, N; Roberts, R)

## **GRADUATE COURSES IN HISTORY**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

#### **HISTORY 158B. History of Education in the United States**

(Same as AMSTUD 201, EDUC 201) How education came to its current forms and functions, from the colonial experience to the present. Focus is on the 19th-century invention of the common school system, 20th-century emergence of progressive education reform, and the developments since WW II. The role of gender and race, the development of the high school and university, and school organization, curriculum, and teaching. (SSPEP)

3-5 units, not given this year

#### **HISTORY 158C. History of Higher Education in the U.S.**

(Same as AMSTUD 165, EDUC 165, EDUC 265) Major periods of evolution, particularly since the mid-19th century. Premise: insights into contemporary higher education can be obtained through its antecedents, particularly regarding issues of governance, mission, access, curriculum, and the changing

organization of colleges and universities. (SSPEP-APA)

*3-5 units, Win (Labaree, D)*

**HISTORY 237B. Teaching the Unteachable: Teaching and Representing the Holocaust**

(Same as EDUC 253X) Theodore Adorno asked whether it was possible to write poetry after Auschwitz; whatever the answer, each year witnesses exponential growth in state-sponsored mandates to teach the Holocaust. How and to what end does catastrophe become curriculum? How to assess what students learn from these efforts. The Nazis' efforts to teach for hate, and contemporary parallels. Historical and educational sources, especially films and memoirs.

*3-5 units, not given this year*

**HISTORY 255E. Education, Race, and Inequality in African American History, 1880-1990**

(Same as CSRE 216X, EDUC 216X) Seminar. The relationship among race, power, inequality, and education from the 1880s to the 1990s. How schools have constructed race, the politics of school desegregation, and ties between education and the late 20th-century urban crisis.

*3-5 units, not given this year*

**HISTORY 258D. School: What Is It Good For?**

(Same as EDUC 207X) Focus is on authors who establish claims that the purposes, functions, impacts, and social roles of schooling promote human capital, citizenship, social reproduction, values transmission, social mobility, class equality, racial equality, social stratification, disciplinary power, and the pursuit of individual interests. Historical and sociological approaches.

*3-4 units, Win (Labaree, D)*

**HISTORY 258E. History of School Reform: Origins, Policies, Outcomes, and Explanations**

(Same as EDUC 220D) Required for students in the POLS M.A. program; others welcome. Focus is on 20th-century U.S. Intended and unintended patterns in school change; the paradox of reform that schools are often reforming but never seem to change much; rhetorics of reform and factors that inhibit change. Case studies emphasize the American high school. (SSPEP/APA)

*3-5 units, Aut (Labaree, D)*

**HISTORY 258F. Education Schools: Historical and Sociological Perspectives**

(Same as EDUC 231X) The lowly status of the education school in the United States is the issue that defines the starting point of this course. Topics include an exploration the historical development of this institution, its major social function, and the interaction between the two. The course touches on a variety of scholarly domains, including the history of education, sociology of education, higher education, and educational policy.

*3-4 units, alternate years, not given this year*

**HISTORY 272A. Spanish Nationalist Discourses from Franco to Zapatero: What does 'plural Spain' mean?**

(Same as ILAC 204) Spanish nationalism and 'patriotic affirmation' discourses existing in contemporary Spain. Since the end of Francoism, Spanish nationalism has existed in a de-articulated and diffuse way, rather as a reaction against the challenge of stateless nationalisms than as a substantive doctrine. However, since the mid-1980s there has been a recovery of Spanish nationalist discourse, often labeled as 'Constitutional patriotism', whose main point is the insistence on History as the founding basis for the legitimization of the present Spanish polity, as well as the vindication of the 1978 Constitution as the end-point of decentralization.

*3-5 units, not given this year*

**HISTORY 301. Introduction to Public History in the U.S., 19th Century to the Present**

(Same as HISTORY 201) Gateway course for the History and Public Service interdisciplinary track. Topics include the production, presentation, and practice of public history through narratives, exhibits, web sites, and events in museums, historical sites, parks, and public service settings in nonprofit organizations, government agencies, and educational institutions. Service Learning Course (certified by Haas Center).

*4-5 units, Aut (McKibben, C)*

**HISTORY 301D. The Changing Face of War: An Introduction**

**to Military History**

(Same as HISTORY 201D) Introduces students to the rich history of military affairs and, at the same time, examines the ways in which we think of change and continuity in military history. How did war evolve from ancient times, both in styles of warfare and perceptions of war? What is the nature of the relationship between war and society? Is there such a thing as a Western way of war? What role does technology play in transforming military affairs? What is a military revolution and can it be manufactured or induced? Chronologically following the evolution of warfare from Ancient Greece to present day so-called new wars, we will continuously investigate how the interdependencies between technological advances, social change, philosophical debates and economic pressures both shaped and were influenced by war.

*4-5 units, Win (Staff)*

**HISTORY 302G. Peoples, Armies and Governments of the Second World War**

(Same as HISTORY 202G) Clausewitz conceptualized war as always consisting of a trinity of passion, chance, and reason, mirrored, respectively, in the people, army and government. Following Clausewitz, this course examines the peoples, armies, and governments that shaped World War II. Analyzes the ideological, political, diplomatic and economic motivations and constraints of the belligerents and their resulting strategies, military planning and fighting. Explores the new realities of everyday life on the home fronts and the experiences of non-combatants during the war, the final destruction of National Socialist Germany and Imperial Japan, and the emerging conflict between the victors. How the peoples, armies and governments involved perceived their possibilities and choices as a means to understand the origins, events, dynamics and implications of the greatest war in history.

*4-5 units, Spr (Staff)*

**HISTORY 304. Approaches to History**

Required of first-year History Ph.D. students.

*4-5 units, Aut (Baker, K)*

**HISTORY 304B. History without Documents**

(Same as HISTORY 204B) Can history be written about places and times for which are no written sources, or for people in literate societies who left no written traces? Practical training in historical methods for non-documentary sources, including oral traditions and history, archaeology, ecological sources, historical linguistics, ethnography, rituals, myths, songs, and art.

*4-5 units, Aut (Hanretta, S)*

**HISTORY 304G. War, Culture, and Society in the Modern Age**

(Same as HISTORY 204G) How Western societies and cultures have responded to modern warfare. The relationship between its destructive capacity and effects on those who produce, are subject to, and must come to terms with its aftermath. Literary representations of WW I; destructive psychological effects of modern warfare including those who take pleasure in killing; changes in relations between the genders; consequences of genocidal ideology and racial prejudice; the theory of just war and its practical implementation; and how wars are commemorated.

*5 units, not given this year*

**HISTORY 305. Graduate Workshop in Teaching**

Required of first-year History Ph.D. students. Perspectives on pedagogy for historians: course design, lecturing, leading discussion, evaluation of student learning, use of technology in teaching lectures and seminars. Addressing today's classroom: sexual harassment issues, integrating diversity, designing syllabi to include students with disabilities.

*1 unit, Spr (Kollmann, N)*

**HISTORY 305A. The History of Information**

(Same as HISTORY 205A) Examines the history of information from multiple perspectives such as the changing conceptions of facticity and evidence cross-culturally as well as a range of information technologies, from moveable type printing and telegraphy to text messaging and Twitter. Other topics include the ways in which information is shaped by the languages in which it is recorded, stored, and transmitted, and also the ways in which information infrastructures influence what is forgotten and lost.

*4-5 units, Spr (Mullaney, T)*

**HISTORY 306. Beyond Borders: Approaches to Transnational History**

This core colloquium for the Transnational, International, and Global (TIG) field will introduce students to the major historiographical trends, methodological challenges, and theoretical approaches to studying and writing transnational histories.

*4-5 units, Win (Frank, Z; Daughton, J)*

**HISTORY 306D. World History: Graduate Colloquium**

How do historians engage the global scale in the classroom as well as in research? The world history canon including Toynbee, McNeill, Braudel, Wolf, and Wallerstein; contrasting approaches, recent research, and resources for teaching. Recommended: concurrent enrollment in HISTORY 306K.

*4 units, Spr (Wigen, K; Lewis, M)*

**HISTORY 306E. International History and International Relations Theory**

(Same as HISTORY 202, POLISCI 216E, POLISCI 316) The relationship between history and political science as disciplines. Sources include studies by historians and political scientists on topics such as the origins of WW I, the role of nuclear weapons in international politics, the end of the Cold War, nongovernmental organizations in international relations, and change and continuity in the international system.

*5 units, Win (Holloway, D)*

**HISTORY 306F. Identities and Identification in the Atlantic World**

How identities and processes of identification changed in Europe, Africa, and the Americas during the early modern period and as a result of the engagement of the inhabitants of these three continents in the Atlantic world.

*4-5 units, not given this year*

**HISTORY 306G. Colonial Law**

Examines the relationship between law and colonialism in Latin America, Africa and Asia during both the early modern and the modern period. By reading some of the seminal works that have been published on this issue, we will seek to understand how law both facilitated and limited colonialism and how colonialism, in turn, had modified the legal systems that had existed previously. Attention will also be given to law as an acculturating agent and to the legal arena as a sphere for conflict resolution, negotiation, and identity formation.

*4-5 units, not given this year*

**HISTORY 306K. World History Pedagogy Workshop**

Students draft a syllabus and create a curriculum module for use in a world history lecture course. Corequisite: HISTORY 306D, recommended.

*1 unit, Spr (Wigen, K; Lewis, M)*

**HISTORY 307A. Legal History Workshop**

(Same as LAW 372.) Faculty and students from the Law school and the History department discuss research in the field of legal history. Guest speakers. Secondary literature relevant to the speaker's research. Undergraduates require consent of instructors.

*4-5 units, Win (Herzog, T; Gordon, R)*

**HISTORY 307C. The Global Early Modern**

(Same as HISTORY 207C) In what sense can we speak of globalization before modernity? What are the characteristics and origins of the economic system we know as capitalism? When and why did European economies begin to diverge from those of other Eurasian societies? With these big questions in mind, the primary focus will be on the history of Europe and European empires, but substantial readings deal with other parts of the world, particularly China and the Indian Ocean.

*4-5 units, not given this year*

**HISTORY 307E. Origins of Totalitarianism**

(Same as HISTORY 204E) Modern revolutionary and totalitarian politics. Sources include monographs on the medieval, Reformation, French Revolutionary, and Great War eras. Topics: the essence of modern ideology, the concept of the body national, state terror, charismatic leadership, gender assignments, private and public spheres, and identities.

*4-5 units, Win (Weiner, A)*

**HISTORY 308. Biography and History**

(Same as HISTORY 207) The relationship between biographical and historical writing, primarily in Europe and America. Problems of methodology, evidence, dispassion, and empathy. Texts: biographies, critical literature on biographical work, and novels (A. S. Byatt's *Possession*, Bernard Malamud's *Dubin's Lives*) that illuminate the intellectual underpinnings of biographical labor.

*4-5 units, not given this year*

**HISTORY 308A. Science and Law in History**

(Same as HISTORY 208A) How the intertwined modern fields of science and law, since the early modern period, together developed central notions of fact, evidence, experiment, demonstration, objectivity, and proof.

*4-5 units, not given this year*

**HISTORY 308B. Women Activists' Response to War**

(Same as HISTORY 208B) Theoretical issues, historical origins, changing forms of women's activism in response to war throughout the 20th century, and contemporary cases, such as the Russian Committee of Soldiers Mothers, Bosnian Mothers of Srebrenica, Serbian Women in Black, and the American Cindy Sheehan. Focus is on the U.S. and Eastern Europe, with attention to Israel, England, and Argentina.

*4-5 units, not given this year*

**HISTORY 309A. Postcolonialism and Universalism**

(Same as HISTORY 209D) Key texts and motifs from postcolonial theory: empire, class, exile, suffering, textuality, archive in juxtaposition to 20th-century philosophical questions about universal history and the relevance of humanist inquiry.

*4-5 units, not given this year*

**HISTORY 309E. History Meets Geography**

Focus is on developing competence in GIS computer applications and applying it to historical problems. Previous experience with GIS not required. Recommended: complete the GIS tutorial in Branner Library before the course starts.

*4-5 units, not given this year*

**HISTORY 309F. Historical Geography Colloquium: Maps in the Early Modern World**

The significance of cartographic enterprise across the early modern world. Political, economic, and epistemological imperatives that drove the proliferation of nautical charts, domain surveys, city plans, atlases, and globes; the types of work such artifacts performed for their patrons, viewers, and subjects. Contributions of indigenous knowledge to imperial maps; the career of the map in commerce, surveillance, diplomacy, conquest, and indoctrination. Sources include recent research from Asia, Europe, and the Americas.

*4-5 units, not given this year*

**HISTORY 310. The History of Occupation, 1914-2010**

(Same as HISTORY 210) Examines the major cases of occupation in the twentieth century, from the first World War until the present, and issues of similarities, differences, and implications for contemporary policy making. Topics include European and Asian cases emerging from World War I and World War II, the Israeli occupation of the West Bank; the Soviet and American occupations of Afghanistan; and the American occupation of Iraq. Discussions will revolve around the problems, efficacy, and effects of occupation in historical perspective.

*4-5 units, Win (Naimark, N)*

**HISTORY 311D. Law and Society in Medieval Italy**

(Same as HISTORY 211D) Traces the historical development of law and legal institutions in medieval Italy. Focuses on the interdependence of jurisprudence, legal practice, and social forces. Topics include legal reasoning, citizenship, servitude and dependence, family and kinship, property and inheritance, women and gender, crime and deviance, faction and vendetta.

*4-5 units, Win (Fredona, R)*

**HISTORY 312G. Economy and Society in Precapitalist Europe**

(Same as HISTORY 212G) What today we might classify as a strictly economic concern, the distribution and circulation of resources, was in the Middle Ages inseparable from ideas about social organization and cultural value. Examines how deeply the economy was connected in material and intellectual ways to government, religion, and culture in Europe from the fourth to the fourteenth centuries; how those economic structures have been

represented and debated in modern scholarship; and how the history of premodern economies might inform the study of capitalism. Topics include the problem of poverty; forms and scales of exchange; slavery and serfdom; visible wealth; warrior, cleric, peasant, medieval microfinance, taxation and representation, and feudal logic.

4-5 units, Spr (Kreiner, J)

**HISTORY 313. Graduate Core Colloquium: Religion and the Narration of the Medieval Past, 1000-1500**

Examines reigning interpretations of the transformations of the central Middle Ages and the transition to the Early Modern world in light of recent work on religion. How well do these broad syntheses accommodate new understandings of the institutions, material culture, movements, and spiritualities of western Christianity? Attention will also be given to religious dissidence and interactions with other religious traditions in medieval Europe and the Mediterranean.

4-5 units, Aut (Miller, M)

**HISTORY 319B. Secularity**

Classic theories of secularity. Is a secular world possible? How does, historically seen, the notion of the secular emerge, impose itself, and get challenged? Readings include Max Weber, E. Durkheim, R.A. Markus, Carl Schmitt, and Hans Blumenberg, and studies bearing on the Middle Ages, English monastic secularization, the French Revolution, and 20th-century political religions.

4-5 units, not given this year

**HISTORY 320G. Demons, Witches, and Priests: Religion and Popular Culture in Russia**

(Same as HISTORY 220G) 19th and early 20th centuries. Peasants, parish priests, witches, possessed persons, cults and sects, old believers, saints, and women's religious communities. Nominally Christian, and members of the Orthodox Church, Russians embraced beliefs and customs that combined teaching from Church and folk traditions.

4-5 units, Win (Kollmann, J)

**HISTORY 321A. Classics of Russian Historiography**

Main trends of Russian intellectual history as seen through major historians' treatment of Muscovy: Romanticism, Slavophilism, Hegelianism, Populism, Social Democracy, New Idealism, and Marxism-Leninism.

4-5 units, not given this year

**HISTORY 321B. Imperial Russian Historiography**

4-5 units, not given this year

**HISTORY 321C. Historiography of the Soviet Union**

(Same as HISTORY 221D) Major schools of interpretation of the Soviet phenomenon through works representative of a specific school, in chronological order, from the first major interpretation of the Soviet polity by Trotsky to postmodernist theories.

4-5 units, Aut (Weiner, A)

**HISTORY 322. Early Modern Russia in European Context**

4-5 units, not given this year

**HISTORY 323. Art and Ideas in Imperial Russia**

(Same as HISTORY 223) Poetry, novels, symphonic music, theater, opera, painting, design, and architecture: what they reveal about the politics and culture of tsarist Russia.

4-5 units, not given this year

**HISTORY 323B. Research Methodologies in Early Modern Russian History**

4-5 units, not given this year

**HISTORY 324B. Modern Afghanistan**

(Same as HISTORY 224B) Politics, society, and culture in Afghanistan from the 19th century to the present. Topics include state building, tribal politics, Islamic law, geopolitics, the Taliban, and the post-Taliban disorder.

4-5 units, Win (Crews, R)

**HISTORY 324F. The Caucasus and the Muslim World**

The linkages connecting the societies of the Caucasus to Muslim communities in Iran, Russia, the Ottoman Empire and Turkey, S. Asia, and the Middle East.

4-5 units, not given this year

**HISTORY 325C. Leaders and Leadership in Soviet and Post-**

**Soviet Russia**

(Same as HISTORY 225C) Analyzes the role of the supreme leader in the Soviet and post-Soviet systems; the role of personality and career trajectories in the making of Soviet leaders; leadership style, authority building, and power base; the problem of succession; and the impact and legacies of various leaders on the political system and culture.

4-5 units, Spr (Weiner, A)

**HISTORY 326. Graduate Colloquium on Modern Eastern Europe**

Readings and discussion of the recent historiography of Eastern Europe. Explores new trends and developments and considers topics still awaiting research.

4-5 units, Spr (Jolluck, K)

**HISTORY 326C. Graduate Colloquium on Balkan History**

Designed for History Ph.D. students to develop competence in the history and historiography of the modern Balkans, from the French Revolution to the present. Areas of study include the influence of empires on the region, the rise of nationalism and nation states, the dilemmas of independence, the emergence and decline of communism in the region, and the recurrence of war and ethnic conflict.

4-5 units, not given this year

**HISTORY 327. East European Women and War in the 20th Century**

(Same as HISTORY 227) Thematic chronological approach through conflicts in the region: the Balkan Wars, WW I, WW II, and the recent wars in the former Yugoslavia. The way women in E. Europe have been involved in and affected by these wars compared to women in W. Europe in the two world wars. Women's involvement in war as members of the military services, the backbone of underground movements, workers in war industries, mothers of soldiers, subjects and supporters of war aims and propaganda, activists in peace movements, and objects of wartime destruction, dislocation, and sexual violation.

4-5 units, Aut (Jolluck, K)

**HISTORY 328. Circles of Hell: Poland in World War II**

(Same as HISTORY 228) The experience and representation of Poland's wartime history from the Nazi-Soviet Pact of 1939 to the aftermath of Yalta in 1945. Nazi and Soviet ideology and practice regarding the Poles and the ways Poles responded, resisted, and survived. The self-characterization of Poles as innocent victims, and their involvement or complicity in the Holocaust, thus engaging in a current debate in Polish society.

5 units, not given this year

**HISTORY 329. Poles and Jews**

(Same as HISTORY 229, JEWISHST 289, JEWISHST 389) Focus is on the period since WW I. The place of the Jews in interwar Poland, WW II, surviving Jews after the war, Polish memorialization of the Holocaust, the reality and mythology of Jews in the communist apparatus, the manipulation of anti-Semitism by the communist government, and post-communist movement toward reconciliation. Memory and national mythology emphasizing Polish wartime behavior and the relationship of Jews to communism. The sources and uses of stereotypes, and the state of Polish-Jewish relations today.

4-5 units, Win (Jolluck, K)

**HISTORY 330. Core Colloquium on Early Modern Europe: Ancien Regime**

Topics in the social, political, and religious history of Western Europe, 1550-1789, with an emphasis on France. May be repeated for credit.

4-5 units, not given this year

**HISTORY 330A. Core Colloquium on Early Modern Europe**

Historiographical survey from the Renaissance to the Enlightenment. Topics include the Reformations, European expansion, state and nation building, invention and scientific discovery, intellectual history, and gender. In-depth reviews determined by student interests.

4-5 units, not given this year

**HISTORY 330D. Europe in the World, 1789-Present**

(Same as HISTORY 230D) The European conquest of parts of Africa, Asia, and the South Pacific by European merchants, missionaries, armies, and administrators had significant, and often

cataclysmic, effects on indigenous political alliances, cultural practices, and belief systems. But were the effects of expansion entirely one-sided? What impact did the experiences of colonialism have on European politics, culture, and Europe's relations with the rest of the world? Explores how interaction between Europe and the rest of the world redefined the political, racial, sexual, and religious boundaries of both Europe and its colonies and gave rise to the more globalized society we live in today.

*4-5 units, not given this year*

**HISTORY 330F. Self-Policing, Denunciation, and Surveillance in Modern Europe**

(Same as HISTORY 230F) How individual actions impact state machineries of power. The motives, pressures, and consequences of everyday collaboration from the French Revolution to Nazi Germany and Soviet bloc police states; popular outrage over such practices in the aftermath of these regimes. The phenomenon of anticipatory compliance, as people tended to perceive less freedom of action than actually existed, and the reciprocal intensification of real and imagined restrictions. The malleability of personal values and interests as represented in diaries, memoirs, secondary sources, and film; variety of individual and national responses.

*4-5 units, not given this year*

**HISTORY 331B. Core Colloquium on Modern Europe: The 19th Century**

The major historical events and historiographical debates of the long 19th century from the French Revolution to WW I.

*4-5 units, not given this year*

**HISTORY 331C. Core Colloquium on Modern Europe**

The historiography of 20th-century Europe. Topics include WW I, the Russian Revolution, National Socialism, and the EU.

*4-5 units, Win (Satia, P)*

**HISTORY 331D. Core Colloquium on Modern Europe: Intellectual History**

*4-5 units, not given this year*

**HISTORY 332A. Power, Art, and Knowledge in Renaissance Italy**

(Same as HISTORY 232A) Provides a fundamental understanding of the cultural and political imagination of the Italian Renaissance, with particular emphasis on Florence between 1300 and 1600 CE. Topics include political and social upheavals, radical shifts in religious practice and devotion, the commercial revolution in trade and banking, the rediscovery of classical philosophy and style, and the flowering of the literary and visual arts.

*4-5 units, Aut (Fredona, R)*

**HISTORY 332D. Rome: The City and the World, 1350-1750**

(Same as HISTORY 232D) What lies beyond the ruins of an ancient city? The history of Rome from the Renaissance to the age of the grand tour. Topics include: the political, diplomatic, and religious history of the papacy; society and cultural life; the everyday world of Roman citizens; the relationship between the city and the surrounding countryside; the material transformation of Rome as a city; and its meaning for foreigners.

*4-5 units, not given this year*

**HISTORY 332F. The Scientific Revolution**

What do people know and how do they know it? What counts as scientific knowledge? In the 16th and 17th centuries, understanding the nature of knowledge engaged the attention of individuals and institutions including Copernicus, Galileo, Descartes, Newton, the early Royal Society, and less well-known contemporaries. New meanings of observing, collecting, experimenting, and philosophizing, and political, religious, and cultural ramifications in early modern Europe.

*4-5 units, Aut (Riskin, J)*

**HISTORY 332G. When Worlds Collide: The Trial of Galileo**

In 1633, the Italian mathematician Galileo was tried and condemned for advocating that the sun, not the earth, was the center of the cosmos. The Catholic Church did not formally admit that Galileo was right until 1992. Examines the many factors that led to the trial of Galileo and looks at multiple perspectives on this signal event in the history of science and religion. Considers the nature and definition of intellectual heresy in the sixteenth and early seventeenth centuries, and examines the writings of Galileo's infamous predecessor Giordano Bruno (burned at the stake in

1600). Looks closely at documents surrounding the trial and related literature on Renaissance and Reformation Italy in order to understand the perspectives of various participants in this famous event. Focal point of seminar involves the examination of the many different histories that can be produced from Galileo's trial. What, in the end, were the crimes of Galileo?

*4-5 units, not given this year*

**HISTORY 333. Reformation, Political Culture, and the Origins of the English Civil War**

(Same as HISTORY 233) English political and religious culture from the end of the Wars of the Roses to the Civil War of the 1640s. Themes include the growth of the size and power of the state, Reformation, creation of a Protestant regime, transformation of the political culture of the ruling elite, emergence of Puritanism, and causes of the Civil War.

*4-5 units, not given this year*

**HISTORY 333A. From Bacon to Hegel: Introduction to Early Modern Intellectual History**

(Same as HISTORY 233A) Over the past three centuries, European culture, society and politics have experienced a series of dramatic transformations, changes that unleashed a myriad of intellectual theories and debates. From politics and science to justice and religion, new ideas altered all fields of European thought, as intellectuals sought to understand the turmoil around them. Examines the rise of scientific thought and utopias, the emergence of new visions of politics, the differences between key Enlightenment thinkers, the development of Romanticism, Liberalism, Hegelianism, and more. Readings include Bacon, Descartes, Hobbes, Vico, Voltaire, Rousseau, Burke, Tocqueville and others.

*4-5 units, Aut (Dubnov, A)*

**HISTORY 333B. Early Modern Sexualities**

(Same as HISTORY 233B) History of sexuality in early modern Europe. Normative sexuality, heterosexual transgressions, and minority sexualities. Theoretical approaches to and debates about the history of sexuality, in particular prior to the 19th century. Tools for critiquing the heteronormativity of early modern sources and for reading those sources for evidence of sexual diversity. Readings include monographs and primary sources.

*4-5 units, not given this year*

**HISTORY 333C. Two British Revolutions**

(Same as HISTORY 233C) Current scholarship on Britain, 1640-1700, focusing on political and religious history. Topics include: causes and consequences of the English civil war and revolution; rise and fall of revolutionary Puritanism; the Restoration; popular politics in the late 17th century; changing contours of religious life; the crisis leading to the Glorious Revolution; and the new order that emerged after the deposing of James II.

*4-5 units, not given this year*

**HISTORY 333E. From the Left Hegelians to Freud: Introduction to Late Modern Intellectual History**

(Same as HISTORY 233E) Ever since the Napoleonic Wars, European culture, society and politics have experienced a series of dramatic transformations, changes that unleashed a myriad of intellectual theories and debates. Focuses on the nineteenth century, the age of grand theories such as Liberalism, Positivism, Nationalism, Socialism, and Marxism and examines them historically. Readings include French Utopian Socialists and members of the Russian intelligentsia, J.S. Mill, Marx, Durkheim, Weber, Freud, and others.

*4-5 units, Win (Dubnov, A)*

**HISTORY 333K. The Invention of the Modern Republic**

(Same as HISTORY 233K) Examines the history of republican thinking in the Atlantic World from the Renaissance to the French Revolution.

*4-5 units, not given this year*

**HISTORY 335. History of European Law, Medieval to Contemporary**

(Same as HISTORY 135) From the fall of the Roman Empire to the establishment of the EU. How law changed over time. Sources and nature of law, organization of legal systems, and relationships between law and society, law and lawmaker, law and the legal professions.

*4-5 units, Win (Herzog, T)*



**HISTORY 336. Modern France**

(Daughton)

*4-5 units, not given this year***HISTORY 336B. The Idea of Society**

(Same as HISTORY 236B) Classic texts in social theory from the seventeenth century to the present. Readings include Locke, Smith, Hegel, Comte, and Durkheim, and Weber.

*4-5 units, Win (Baker, K; Sheehan, J)***HISTORY 336D. Cold War Europe**

(Same as HISTORY 236D) Much more than a military and diplomatic confrontation, the Cold War was lived experience in Europe - shaping politics, society, culture and personal identity. Beginning at the end of World War II, traces the continent's division into eastern and western blocs, and ends with the fall of the Iron Curtain. Sources include memoirs, propaganda, novels, and film, as well as new scholarship on the Cold War.

*4-5 units, Spr (Sheffer, E)***HISTORY 336E. Violence in History and Theory**

Methodological challenges associated with defining and analyzing violence in late-19th- and 20th-century contexts. How people witnessed, coped with, and survived violent episodes. Cases of state violence, ethnic and religious conflict, warfare, genocide, and decolonization. The notion of everyday suffering in the contemporary world. Sources include anthropology, sociology, and history.

*4-5 units, not given this year***HISTORY 337. The Holocaust**

(Same as HISTORY 237, JEWISHST 183, JEWISHST 383) The emergence of modern racism and radical anti-Semitism. The Nazi rise to power and the Jews. Anti-Semitic legislation in the 30s. WW II and the beginning of mass killings in the East. Deportations and ghettos. The mass extermination of European Jewry.

*4-5 units, Aut (Zipperstein, S)***HISTORY 337C. Street History: Learning the Past in School and Out**

(Same as EDUC 356) Interdisciplinary. Since Herodotus, history and memory have competed to shape minds: history cultivates doubt and demands interpretation; memory seeks certainty and detests that which thwarts its aims. History and memory collide in modern society, often violently. How do young people become historical amidst these forces; how do school, family, nation, and mass media contribute to the process?

*3-5 units, not given this year***HISTORY 338A. Graduate Colloquium in Modern British History, Part I**

Influential approaches to problems in British, European, and imperial history. The 19th-century British experience and its relationship to Europe and empire. National identity, the industrial revolution, class formation, gender, liberalism, and state building. Goal is to prepare specialists and non-specialists for oral exams.

*4-5 units, not given this year***HISTORY 338B. Modern Britain, Part II**

Themes include empire and racism, the crisis of liberalism, the rise of the welfare state, national identity, the experience of total war, the politics of decline, and modernity and British culture.

*4-5 units, not given this year***HISTORY 339D. Capital and Empire**

(Same as HISTORY 239D) Can empire be justified with balance sheets of imperial crimes and boons, a calculus of racism versus railroads? The political economy of empire through its intellectual history from Adam Smith to the present; the history of imperial corporations from the East India Company to Wal-mart; the role of consumerism; the formation of the global economy; and the relationship between empire and the theory and practice of development.

*4-5 units, Spr (Satia, P)***HISTORY 339F. Empire and Information**

(Same as HISTORY 239F) How do states see? How do they know what they know about their subjects, citizens, economies, and geographies? How does that knowledge shape society, politics, identity, freedom, and modernity? Focus is on the British imperial state activities in S. Asia and Britain: surveillance technologies and information-gathering systems, including mapping, statistics,

cultural schemata, and intelligence systems, to render geographies and social bodies legible, visible, and governable.

*4-5 units, not given this year***HISTORY 339H. Modern European History in a Global Age**

How scholars can write the history of modern Europe in a way that integrates global and transnational perspectives. Discussed the methodological challenges and merits of various approaches and reviews relevant theoretical and interdisciplinary models for how this can best be done. Topics include globalization, migration, internationalism, colonialism, post-colonialism, modern warfare, and the media.

*4-5 units, not given this year***HISTORY 341A. The Emergence of Medicine: The Middle Ages and the Renaissance**

How did medicine emerge as a distinctive body of knowledge and a profession? The history of medicine from ca. 1000 to 1750. Topics: new ways of examining and treating the body; the religious and cultural significance of disease; the development of hospitals; and the rise of public health systems. Comparison of the status of medicine in Europe and the Islamic world. The work of key figures such as Vesalius and Harvey. Students are required to attend the concurrent lectures of HISTORY 141A.

*4-5 units, not given this year***HISTORY 342. Darwin in the History of Life**

Origins and impact of evolutionary theory from the nineteenth century to the present. Early theories of fossils, the discovery of deep time and uniformitarian geology, debates over evolution vs. extinction, the origin of life, and human origins; the rise of anthropology and racial theory; the changing challenge of creationism, the abuse of evolution in eugenics and Nazi racial hygiene; and new discoveries in the realm of extreme life, evo-devo, neocatastrophism, and the new technological frontier of biomimicry. Attendance at the lectures of HISTORY 142 is required.

*4-5 units, Spr (Proctor, R)***HISTORY 342G. Einstein: Science, Technology, and Culture**

(Same as HISTORY 242G) Explores how Albert Einstein, a theoretical physicist who dealt with highly abstruse matters, could come to be named the Person of the Century. In addition to the specifics of Einstein's life and work, topics will include the origins and reception of scientific ideas, the nature of scientific revolutions, science in popular culture, nationalism vs. internationalism in science, science and war, debates over the nature of reality, and the quest for the theory of everything.

*4-5 units, Win (Lagerstrom, L)***HISTORY 343C. 18th-Century Colonial Science and Medicine**

(Same as HISTORY 243C) Explores the global exchange of knowledge, technologies, plants, peoples, disease, and medicines. Colonial sciences and medicines were important militarily and strategically for positioning emerging nation states in global struggles for land and resources. Considers primarily French, British, and Dutch in the West Indies, but also takes examples from Iberian, Jesuit, and other traditions in China and India. Readings treat science and medicine in relation to voyaging, colonialism, slavery, plants, and environmental exchange.

*4-5 units, Spr (Schiebinger, L)***HISTORY 343G. Tobacco and Health in World History**

(Same as HISTORY 243G)

*4-5 units, Aut (Proctor, R)***HISTORY 344. Gender in Science, Medicine and Engineering**

(Same as HISTORY 144) Men's and women's roles in science, medicine, and engineering over the past 200 years with a focus on the present. What are the efforts underway globally to transform science, medicine, and engineering into fields where women can flourish? How have science and medicine studied and defined males and females? Can gender analysis spark creativity in human knowledge?

*4-5 units, not given this year***HISTORY 345A. Africa in the Era of the Slave Trade**

The slave trade, including the trans-Saharan, Indian Ocean, and trans-Atlantic trades, constituted nearly a millennium of interaction with the wider world and set in motion transformations in African societies, politics, and cultures. Topics include the debates about slavery in Africa, the impact of the slave trade on African



societies, state formation, economic change, religious change, and household change in the period before the scramble for Africa in the late 19th century.

*4-5 units, Win (Roberts, R)*

**HISTORY 345B. African Encounters with Colonialism**

*4-5 units, not given this year*

**HISTORY 346. The Dynamics of Change in Africa**

(Same as AFRICAST 301A, POLISCI 246P, POLISCI 346P) Crossdisciplinary colloquium; required for the M.A. degree in African Studies. Open to advanced undergraduates and PhD students. Addresses critical issues including patterns of economic collapse and recovery; political change and democratization; and political violence, civil war, and genocide. Focus on cross-cutting issues including the impact of colonialism; the role of religion, ethnicity, and inequality; and Africa's engagement with globalization.

*4-5 units, Win (Weinstein, J)*

**HISTORY 347E. Health and Society in Africa**

(Same as HISTORY 245E) The history of disease, therapeutic and diagnostic systems, and the definition of health in precolonial, colonial, and postcolonial Africa. The social and political histories of specific epidemics, including sleeping sickness, influenza, TB, mental illness, and AIDS. The colonial contexts of epidemics and the social consequences of disease.

*4-5 units, not given this year*

**HISTORY 348D. Law and Colonialism in Africa**

(Same as HISTORY 245G) Law in colonial Africa provides an opportunity to examine the meanings of social, cultural, and economic change in the anthropological, legal, and historical approaches. Court cases as a new frontier for the social history of Africa. Topics: meanings of conflicts over marriage, divorce, inheritance, property, and authority.

*4-5 units, Spr (Roberts, R)*

**HISTORY 351A. Core in American History, Part I**

*4-5 units, not given this year*

**HISTORY 351B. Core in American History, Part II**

*4-5 units, Aut (Winterer, C)*

**HISTORY 351C. Core in American History, Part III**

*4-5 units, not given this year*

**HISTORY 351D. Core in American History, Part IV**

*4-5 units, Win (White, R)*

**HISTORY 351E. Core in American History, Part V**

Required of all first-year United States History Ph.D. students.

*4-5 units, Spr (Camarillo, A)*

**HISTORY 351F. Core in American History, Part VI**

Required of all first-year Ph.D. students in U.S. History.

*4-5 units, not given this year*

**HISTORY 352B. History of American Law**

(Same as LAW 318.) Modern history of American law, legal thought, legal institutions and the legal profession. Topics include law and regulation of corporate organizations and labor relations in the age of enterprise, law of race relations in the South and North, development of classical legalism, critiques of classical legalism, modern administrative state, organized legal profession, New Deal legal thought and legislation, legal order of the 50s, expansion of enterprise liability, civil rights movements from 1940, rights revolution of the Warren Court and Great Society.

*5 units, Spr (Friedman, L)*

**HISTORY 353D. Approaches to American Legal History**

(Same as LAW 651.) Legal history may once have been primarily devoted to exploring legal doctrines and key judicial opinions, and thus to be of interest mainly to legal scholars and lawyers. Now, the best writing in legal history resembles historical writing more generally, and the study of legal ideas and practices is increasingly integrated with social, intellectual, cultural, and political history. Examines recent writings in American legal history, ranging broadly across time and space to ask how the field reflects developments in historical writing more generally, and how the use of legal materials affects our understanding of major aspects of American history.

*4-5 units, not given this year*

**HISTORY 355D. Racial Identity in the American Imagination**

(Same as AFRICAAM 255, AMSTUD 255D, CSRE 255D, HISTORY 255D) Major historical transformations shaping the understanding of racial identity and how it has been experienced, represented, and contested in American history. Topics include: racial passing and racial performance; migration, immigration, and racial identity in the urban context; the interplay between racial identity and American identity; the problems of class, gender, and sexuality in the construction of racial identity. Sources include historical and legal texts, memoirs, photography, literature, film, and music.

*4-5 units, Win (Hobbs, A)*

**HISTORY 356. U.S.-China Relations: From the Opium War to Tiananmen**

(Same as HISTORY 256) The history of turbulent relations, military conflict, and cultural clashes between the U.S. and China, and the implications for the domestic lives of these increasingly interconnected countries. Diplomatic, political, social, cultural, and military themes from early contact to the recent past.

*4-5 units, not given this year*

**HISTORY 358. Topics in the History of Sexuality: Sexual Violence**

(Same as AMSTUD 258, CSRE 192E, HISTORY 258) Recent historical interpretations of sexual violence, with particular attention to the intersections of gender and race in the construction of rape, from early settlement through the twentieth century. Topics include the legal prosecution of rape in Early America; the racialization of rape in the U.S.; lynching and anti-lynching in the U.S.; and feminist responses to sexual violence.

*4-5 units, not given this year*

**HISTORY 360. California's Minority-Majority Cities**

(Same as CSRE 260, HISTORY 260) Historical development and the social, cultural, and political issues that characterize large cities and suburbs where communities of color make up majority populations. Case studies include cities in Los Angeles, Santa Clara, and Monterey counties. Comparisons to minority-majority cities elsewhere in the U.S. Service Learning Course (certified by Haas Center).

*4-5 units, Spr (McKibben, C)*

**HISTORY 362G. The Pivotal Decade in U.S. History: 1960's or 1970's?**

(Same as HISTORY 262G) Which had more lasting impact, the civil war of the 1960s or the conservative revolt of the 1970s? Should the 1970s supersede the 1960s as a pivotal moment when something happened of considerable importance to historians? Considers this debate of the decades comparatively and thematically, addressing topics including civil rights, foreign policy, electoral politics, popular culture, law, economics, labor, and social movement organizing.

*4-5 units, Aut (Sbardellati, L)*

**HISTORY 363G. History Through a Life: The Allure of American Biography**

(Same as HISTORY 263G) Considers the possibilities and limitations of exploring U.S. history through the genre of biography. Is a single life too narrow to explain why and how pivotal events in U.S. history, such as war, economic depression, social revolution, unfold? Or can one life illuminate the complexity of historical shifts? Readings will span U.S. history, exploring topics such as labor and racial civil rights, science and culture, women and sexuality, transnationalism and diplomacy, law and presidential politics. The craft of biography will be considered alongside biographical subjects.

*4-5 units, Spr (Sbardellati, L)*

**HISTORY 365. Writing Asian American History**

(Same as HISTORY 265) Recent scholarship in Asian American history, with attention to methodologies and sources. Topics: racial ideologies, gender, transnationalism, culture, and Asian American art history. Primary research paper.

*5 units, not given this year*

**HISTORY 366B. Immigration Debates in America, Past and Present**

(Same as CSRE 166B, HISTORY 166B) Examines the ways in which the immigration of people from around the world and migration within the United States shaped American nation-

building and ideas about national identity in the twentieth century. Focuses on how conflicting ideas about race, gender, ethnicity, and citizenship with respect to particular groups led to policies both of exclusion and integration. Part One begins with the ways in which the American views of race and citizenship in the colonial period through the post-Reconstruction Era led to the passage of the Chinese Exclusion Act in 1882 and subsequently to broader exclusions of immigrants from other parts of Asia, Southern and Eastern Europe, and Mexico. Explores how World War II and the Cold War challenged racial ideologies and led to policies of increasing liberalization culminating in the passage of the 1965 Immigration Act, which eliminated quotas based on national origins and opened the door for new waves of immigrants, especially from Asia and Latin America

*3-5 units, Win (McKibben, C), Sum (Staff)*

**HISTORY 368E. American Foreign Policy and International History since 1941**

(Same as AMSTUD 268E, HISTORY 268E) Major events and interpretations from WW II to the war in Iraq. Issues of race, expansionism and power; nuclear weapons; and war.

*4-5 units, Spr (Bernstein, B)*

**HISTORY 370. Graduate Colloquium on Colonial Latin American History**

Sixteenth to nineteenth centuries. Indigenous cultures. The arrival of Europeans and its impact on native and European societies. Culture, religion and institutions, and everyday life. The independence period and the formation of new nations.

*4-5 units, not given this year*

**HISTORY 371. Graduate Colloquium: Explorations in Latin American Social History**

(Same as HISTORY 470) How to use primary sources such as government records, estate inventories, and parish records for social history.

*4-5 units, not given this year*

**HISTORY 372B. Frontiers of Iberian and Latin American Culture and History**

(Same as HISTORY 272B, ILAC 272B, ILAC 372B) Analyzes the construction and deconstruction of communities and their internal and external frontiers in Iberia and Ibero-America from the early modern period to the early twentieth century by observing both historical and cultural artifacts (historical documents, novels, bibliography, etc.). Topics: the coming of nations, the making of state (or national) territory, the role assigned or taken on by immigrants, minorities and, in the American case, natives, and the persistence of areas now called borderlands or of groups now assigned to such (indeterminate) locations.

*3-5 units, Aut (Surwillo, L; Herzog, T)*

**HISTORY 373A. The European Expansion**

(Same as HISTORY 273) The relationship between European monarchies and their colonial domains from the 16th-18th centuries. Reasons for expansion, methods, and results. Case studies include the Spanish, Portuguese, Dutch, French, and English domains in Africa, Asia, and the Americas. Readings include primary and secondary sources.

*4-5 units, not given this year*

**HISTORY 375G. Religion in Colonial Latin America and the Iberian World**

(Same as HISTORY 275G) Examines the spiritual conquest of Latin America, the gap between ideal and lived behavior, and the nature of personal/shared experiences of piety by looking at instances of forced conversion, catechism and sacraments, mysticism and apparitions, funerary rituals, baroque piety, witchcraft, and ideas about marriage, sexuality, and religious tolerance.

*4-5 units, Aut (Tortorici, Z)*

**HISTORY 376E. Gender and Sexuality in Early Modern Iberian World**

(Same as HISTORY 276E) Examines major theoretical approaches, methodological developments, and debates that have shaped the history of sexuality. We will use criminal/Inquisition cases and confessional manuals to better understand gender and sexuality in the early modern Iberian world. Focuses on European/African/indigenous conceptions of gender, marriage and bigamy, witchcraft and popular religious practices, convent life

and mysticism, abortion and infanticide, gendered violence, solicitation, sodomy and bestiality, and the punishments meted out for illicit acts.

*4-5 units, Spr (Tortorici, Z)*

**HISTORY 378A. The Logic of Authoritarian Government, Ancient and Modern**

(Same as POLISCI 346S) If authoritarianism is less economically efficient than democracy, and if authoritarianism is a less stable form of political organization than democracy, then why are there more authoritarian governments than democracies? To address this paradox, focus is on theoretical and empirical literature on authoritarian governments, and related literatures on the microeconomic analysis of property rights and credible commitments.

*5 units, not given this year*

**HISTORY 378E. Political Economy of Development**

(Same as POLISCI 440B) Required of Political Science Ph.D. students with comparative politics as a first or second concentration; others by consent of the instructor. The origins of political and economic institutions and their impact on long run outcomes for growth and democracy. Emphasis is on the analysis of causal models, hypothesis testing, and the quality of evidence.

*5 units, Win (Haber, S)*

**HISTORY 379. Latin American Development: Economy and Society, 1800-2000**

(Same as HISTORY 279) The newly independent nations of Latin America began the 19th century with economies roughly equal to, or even ahead of, the U.S. and Canada. What explains the economic gap that developed since 1900? Why are some Latin American nations rich and others poor? Marxist, dependency, neoclassical, and institutionalist interpretive frameworks. The effects of globalization on Latin American economic growth, autonomy, and potential for social justice.

*4-5 units, not given this year*

**HISTORY 381. Economic and Social History of the Modern Middle East**

(Same as HISTORY 281) The integration of the Middle East into the world capitalist market on a subordinate basis and the impact on economic development, class formation, and politics. Alternative theoretical perspectives on the rise and expansion of the international capitalist market are combined with possible case studies of Egypt, Iraq, and Palestine.

*4-5 units, Aut (Beinin, J)*

**HISTORY 381B. Modern Egypt**

(Same as HISTORY 281B) From the mid-nineteenth century to the present. Topics: European imperialism, the political economy of cotton, rise of nationalism, gender and the nation, minorities, the coup of 1952, positive neutralism and the Cold War, and the neo-liberal reconstruction of Egypt.

*4-5 units, Spr (Beinin, J)*

**HISTORY 382. The United States and the Middle East since 1945**

(Same as HISTORY 282) Since the end of WW II, U.S. interests in the Middle East have traditionally been defined as access to oil at a reasonable price, trade and markets, containing the influence of the Soviet Union, and the security of Israel. Is this the full range of U.S. interests? How has the pursuit of these interests changed over time? What forces have shaped U.S. policy? What is the impact of U.S. policy on the region itself?

*4-5 units, not given this year*

**HISTORY 383. The New Global Economy, Oil, and Islamic Movements in the Middle East**

(Same as HISTORY 283) The integration of the Middle East into the world capitalist market on a subordinate basis and the impact on economic development, class formation, and politics. Alternative theoretical perspectives on the rise and expansion of the international capitalist market combined with case studies of Egypt, Iraq, and Palestine.

*4-5 units, not given this year*

**HISTORY 384F. Empires, Markets and Networks: Early Modern Islamic World and Beyond, 1500-1800**

(Same as HISTORY 284F) Focuses on political regimes, economic interactions and sociocultural formations in the early modern

Balkans and Middle East to Central and South Asia. Topics include complex political systems of the Ottoman, Safavid and Mughal empires; experiences of various Muslim, Christian, Jewish and Hindu, as well as urban, rural and nomadic communities; consolidation of transregional commerce and cultural exchange; incorporation of the Islamic world in the global economy; transimperial networks of the Muslim and Non-Muslim merchants, scholars and sufis.

*4-5 units, Spr (Yaycioglu, A)*

**HISTORY 385A. Core in Jewish History, 17th-19th Centuries**  
(Same as JEWISHST 385A)

*4-5 units, Aut (Rodrigue, A)*

**HISTORY 385B. Core in Jewish History, 20th Century**  
(Same as JEWISHST 385B)

*4-5 units, Win (Zipperstein, S)*

**HISTORY 385C. Jews in the Modern World**

(Same as HISTORY 185B, JEWISHST 185B) (Same as HISTORY 85B.) History majors and others taking 5 units, register for 185B.) Topics include the restructuring of Jewish existence during the Enlightenment and legal emancipation at the end of the 18th century in W. Europe; the transformation of Jewish life in E. Europe under the authoritarian Russian regime; colonialism in the Sephardic world; new ideologies (Reform Judaism and Jewish nationalisms); the persistence and renewal of antisemitism; the destruction of European Jewry under the Nazis; new Jewish centers in the U.S.; and the State of Israel.

*5 units, Aut (Zipperstein, S)*

**HISTORY 387D. Tel Aviv: Site, Symbol, City**

(Same as HISTORY 287D, JEWISHST 287D, JEWISHST 387D) Tel Aviv, the first Israeli/Hebrew city, from a cultural history perspective combining high and low cultural artifacts, examining the symbolic constructions of the city as a site of Hebrew modernism and postmodernism. Topics include: the utopian origins behind the establishment of Tel Aviv in Zionist texts; artists, poets, and writers in Tel Aviv's coffee houses; as the capital of Bauhaus architecture; the emergence of Israeli pop culture in Tel Aviv of the late 60s and 70s; the effects of contemporary globalization and the reconstruction of Tel Aviv as the symbolic site of Israeli post-nationalism. Sources include art, cinema, and literature, pop music and archival materials from Green Library's Eliasaf Robinson Collection. Hebrew reading knowledge, although helpful, is not required.

*4-5 units, Spr (Dubnov, A)*

**HISTORY 387E. Jewish Intellectuals and the Crisis of Modernity**

(Same as HISTORY 287E, JEWISHST 287E, JEWISHST 387E) Intellectual responses of Jewish political thinkers, historians and authors to the age of extremes. Readings include Theodor Adorno, Herbert Marcuse, Eric Fromm, Hannah Arendt, Leo Strauss, Karl Popper, Isaiah Berlin, Tony Judt, and George Steiner. Analyses of enlightenment, nationalism, socialism and totalitarianism; their life stories, and their direct and indirect role in creating a transatlantic political discourse in postwar years. Contextualizes historically the fundamental features of Jewish intellectual activity after 1945. No prior knowledge of political science, philosophy and/or Jewish studies is required.

*4-5 units, Spr (Dubnov, A)*

**HISTORY 388. Palestine and the Arab-Israeli Conflict**

(Same as HISTORY 288, IPS 388, JEWISHST 288, JEWISHST 388) 1882 to the present. Comparison of representative expressions of competing historical interpretations. U.S. policy towards the conflict since 1948. (Beinin)

*4-5 units, not given this year*

**HISTORY 390. Han Chinese and the Global White: The Production of Ethnoracial Majorities, East and West**

*4-5 units, not given this year*

**HISTORY 390A. Major Topics in Modern Chinese History: Qing/Republican Transition**

Continuities and discontinuities in society, economy, politics, culture, and thought during the transition from the Qing dynasty to the republic. May be repeated for credit.

*4-5 units, not given this year*

**HISTORY 390G. Dilemmas of Modernity in Twentieth**

**Century Japan**

(Same as HISTORY 290G) Introduction to the historiography of twentieth century Japan and thereby a basis for further research. Explores the Japanese experience of the twentieth century in its local and regional context and explains Japan as a compelling case study of both the broader logic and process of modernization and the tensions endemic to modernity that are thereby produced.

*4-5 units, Spr (Di Marco, F)*

**HISTORY 391A. Archaeology and Modernity in Asia: The Excavation of Ancient Civilizations in Modern Times**

(Same as HISTORY 291A) The interplay in Asia between antiquity and modernity, civilization and nation state, and national versus colonial science. The recent excavation of artifacts and places associated with Asian civilization such as the terracotta warriors in China and Angkor Wat in Cambodia. How Asian states have grappled with modernity and colonialism as they simultaneously dug up their ancient pasts.

*4-5 units, not given this year*

**HISTORY 391B. The City in Imperial China**

(Same as HISTORY 291B) The evolution of cities in the early imperial, medieval, and early modern periods. Topics include physical structure, social order, cultural forms, economic roles, relations to rural hinterlands, and the contrast between imperial capitals and other cities. Comparative cases from European history. Readings include primary and secondary sources, and visual materials.

*3-5 units, not given this year*

**HISTORY 391C. Early Imperial China**

The first millennium of imperial China, what endured over the centuries, and the major changes that took place in the political, social, and intellectual realms. Topics include the evolving geographic and environmental background, cities, the countryside, kinship, relations with the outer world, religion, philosophy, and literature. Also examines the nature of empire as a distinctive political form.

*4-5 units, not given this year*

**HISTORY 391D. Colonialism and Collaboration in East Asia**

(Same as HISTORY 291D) The roles and problems of collaboration in the rise, sustenance, and fall of empires. Themes include conceptual definitions of collaboration and empire, collaboration of traditional elites, accommodation of religious communities, assimilation and collaboration, local intermediaries, and class and empire. Regional focus is East Asia; also cases from other colonial situations.

*4-5 units, not given this year*

**HISTORY 391E. Maps, Borders, and Conflict in East Asia**

(Same as HISTORY 291E) The nature of borders and border conflicts in N.E. Asia from the 17th to the early 20th century. Focus is on contact zones between China, Russia, Korea, and Japan. The geopolitical imperatives that drove states to map their terrain in variable ways. Cultural, diplomatic, and imperial contexts. European pressures and contributions to E. Asian cartography; the uses of maps in surveillance, diplomacy, identity, and war. Student projects focus on a contested border zone.

*4-5 units, not given this year*

**HISTORY 392. The Two Koreas**

(Same as HISTORY 292) Examines major themes and scholarly works to understand the origins, outbreak, and consequences of the Korean War. One focus will be the division of Korea into ROK and DPRK and their subsequent developments. Themes include World War II in East Asia; Korean communist movements during Japanese colonial rule; the Cold War in East Asia; the roles of the US, China, and USSR in the Korean War; the ideas of key North and South Korean leaders, and the consolidation of the two Koreas after the Korean War.

*4-5 units, not given this year*

**HISTORY 392B. Law and Society in Late Imperial China**

Connections between legal and social history. Ideology and practice, center and periphery, and state-society tensions and interactions. Readings introduce the work of major historians on concepts and problems in Ming-Qing history.

*4-5 units, not given this year*

**HISTORY 392D. Japan in Asia, Asia in Japan**

(Same as HISTORY 292D) How Japan and Asia mutually shaped

each other in the late 19th and 20th centuries. Focus is on Japanese imperialism in Asia and its postwar legacies. Topics include: pan-Asianism and orientalism; colonial modernization in Korea and Taiwan; collaboration and resistance; popular imperialism in Manchuria; total war and empire; comfort women and the politics of apology; the issue of resident Koreans; and economic and cultural integration of postwar Asia.

*4-5 units, not given this year*

**HISTORY 392E. The Historical Roots of Modern East Asia**

(Same as HISTORY 92A) Focus is on China and Japan before and during their transition to modernity. The populous, urbanized, economically advanced, and culturally sophisticated Ming empire and Muromachi shogunate in the 16th century when Europeans first arrived. How the status quo had turned on its head by the early 20th century when European and American steamships dominated the Pacific, China was in social and political upheaval, and Japan had begun its march to empire.

*4-5 units, not given this year*

**HISTORY 392F. Traditional Korea: History and Culture**

(Same as HISTORY 292F) Korea before 1800 and how iconic features of Korean tradition were created and reinvented. Themes include Korea's ancient kingdoms, the aristocracy and military in the Koryo dynasty, the print culture and Korean alphabet, ideologies and religions, the social status system and the life of women, the kingship and court culture of the Choson dynasty, and Korea's place in premodern East Asia. The modern and contemporary debates.

*4-5 units, not given this year*

**HISTORY 393. Frontier Expansion and Ethnic Statecraft in the Qing Empire**

The legacy of the Qing dynasty in the territorial boundaries claimed by the People's Republic of China including the frontier zones that lie outside China proper. How the Qing acquired and ruled its frontier territories. Growth and migration of the Han Chinese population. How the dynasty's Manchu rulers managed ethnic difference. Consequences of Qing expansionism and ethnic statecraft for subject peoples and for the dynasty itself. At what point and by what processes did the Qing become China.

*4-5 units, Spr (Sommer, M)*

**HISTORY 393A. State, Society, and Economy in Qing Dynasty China**

Historical scholarship on China during the Qing period, including the gentry, civil examinations, and the debate about social mobility; merchants, cities, and the debate about civil society/public sphere; taxation, local security, and famine relief; heterodoxy, collective violence, and rebellion; and rival approaches (neo-Malthusian, neo-conservative, and neo-Marxist) to understanding the high Qing economy.

*4-5 units, not given this year*

**HISTORY 393B. Homosexuality in Historical and Comparative Perspective**

(Same as HISTORY 293B) Comparative history of homoerotic desire, relations, and identity through scholarship on different historical periods and parts of the world: the classical Mediterranean, early modern European cities, late imperial and modern China, Tokugawa and modern Japan, and the U.S.

*4-5 units, not given this year*

**HISTORY 393C. Late Imperial China**

A survey of Chinese history from the 11th century to the collapse of the imperial state in 1911. Topics include absolutism, gentry society, popular culture, gender and sexuality, steppe nomads, the Jesuits in China, peasant rebellion, ethnic conflict, opium, and the impact of Western imperialism.

*4-5 units, Spr (Sommer, M)*

**HISTORY 393D. Empire and Cosmopolitanism: Traveling Ideas in Global Political Thought**

(Same as HISTORY 293D)

*4-5 units, not given this year*

**HISTORY 395B. Early Modern Japan: Revisiting the Cultural Turn**

*4-5 units, Aut (Wigen, K)*

**HISTORY 395F. Race and Ethnicity in East Asia**

(Same as ASNAMST 295F, HISTORY 295F) Historical, cultural,

political and theoretical perspectives. Commonly misunderstood as an ethnically homogeneous country, the People's Republic of China is home to 55 officially recognized minority groups, many of whom inhabit the strategic border regions of the country. How similar assumptions of ethnic and racial homogeneity in Taiwan, Japan, and Korea are being reexamined by scholars in disciplines including anthropology, history, and political science.

*4-5 units, Aut (Mullaney, T)*

**HISTORY 395J. Gender and Sexuality in Chinese History**

*4-5 units, not given this year*

**HISTORY 396D. Modern Japan**

Introduces students to the major historical problems and historiographic trends in the study of modern Japan from the Meiji period to the present. Themes include approaches to late Meiji culture and politics, the formation of imperial subjects and citizens, agrarian society and politics, gender in modern Japan, empire and modernity, total war and transwar state and society, U.S. occupation, and postwar Japan.

*4-5 units, not given this year*

**HISTORY 398. History of Modern China**

Major historical transformations including the decline of the last imperial dynasty, the formation of the first Chinese republic, WW II, the rise of Communism, China under Mao, post-Mao reforms, and the Beijing Olympics of 2008.

*4-5 units, Win (Mullaney, T)*

**HISTORY 398E. China-Taiwan-U.S. Triangular Relations from WW II through the Cold War**

(Same as HISTORY 298E) The historical origins and evolution of the complex relations between China, Taiwan, and the U.S. Topics include Stilwell and his conflict with Chiang Kai-shek, the Chinese Civil War, the loss of China or the lost chance in China, the 228 Incident, the Korean War, Taiwan's undetermined status, Kinmen Bombardment, contests over China's UN seat, Nixon's visit to China, Taiwan's economic take-off and democratization under Chiang Ching-kuo. Emphasis is on extensive reading of declassified archival sources and new interpretations.

*4-5 units, Aut (Staff)*

**HISTORY 399A. Design and Methodology for International Field Research**

(Same as HISTORY 299X) Problems involved in research abroad: ethical issues; safety; security and conduct; human subjects protocol. Methodologies of research: interviewing, networking, case studies, participant observation, large surveys.

*1 unit, Spr (Kollmann, N; Roberts, R)*

**HISTORY 399D. Tooling Up for Digital Humanities**

(Same as ENGLISH 299D, ENGLISH 399D, HISTORY 299D) What are the digital humanities? The twenty-first century presents new opportunities in the humanities, such as unprecedented access to millions upon millions of digitized sources along with powerful technological tools to study those sources. Yet it also raises new challenges, such as the responsible and effective use of technology, and defining the nature of digital scholarship and communication. This workshop offers an introduction to fundamental concepts, methods, and issues within the growing field of digital humanities, including managing your online identity, digitizing sources, managing databases, text mining, spatial analysis, visualization, and pedagogy.

*1 unit, not given this year*

**HISTORY 399W. Graduate Directed Reading**

*1-10 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**HISTORY 401A. Spatial History: Concepts, Methods, Problems**

Technical training in GIS, with modules taught by Stanford Spatial History Lab staff; conceptual work in the use of these techniques in spatial historical analysis. Students develop their own spatial history projects and produce beta versions of dynamic visualizations.

*4-5 units, Win (Frank, Z)*

**HISTORY 401B. Spatial History, Part II**

Prerequisite: 401A.

*4-5 units, not given this year*

**HISTORY 406. Graduate Research Seminar on Colonial Law**

Prerequisite: HISTORY 306G.

4-5 units, not given this year

**HISTORY 414A. Medieval History**

4-5 units, not given this year

**HISTORY 414B. Medieval History**

4-5 units, not given this year

**HISTORY 421A. Early Modern Russia**

4-5 units, not given this year

**HISTORY 422A. Research Seminar on the History of the Russian Empire**

4-5 units, not given this year

**HISTORY 422B. Research Seminar in Imperial Russia**

4-5 units, not given this year

**HISTORY 424A. The Soviet Civilization**

(Same as HISTORY 224A) Socialist visions and practices of the organization of society and messianic politics; the Soviet understanding of mass violence, political and ethnic; and living space. Primary and secondary sources. Research paper or historiographical essay.

4-5 units, not given this year

**HISTORY 424C. The End of Communism in Europe**

Causes, course, and consequences.

4-5 units, not given this year

**HISTORY 430A. Graduate Research Seminar: Early Modern Europe**

Students will begin a research project on any aspect of early modern European history, 1400-1800, by taking HISTORY 430A in winter quarter as the first quarter of this two-quarter sequence. Enrollment by permission of instructor.

3-5 units, not given this year

**HISTORY 430C. Graduate Research Seminar: Controversies and Sensationalism in Early Modern Print**

Focuses on early modern print sources. In addition to the regular holdings of the library, students will have access to the microfilm collection entitled Witchcraft in Europe and America.

4-5 units, Win (Stokes, L)

**HISTORY 430D. Graduate Research Seminar: Controversies and Sensationalism in Early Modern Print**

Prerequisite: HISTORY 430C.

4-5 units, Spr (Stokes, L)

**HISTORY 433A. European History**

4-5 units, Aut (Sheffer, E)

**HISTORY 433B. European History**

Prerequisite: HISTORY 433A.

4-5 units, Win (Sheffer, E)

**HISTORY 438. European History Workshop**

All European history graduate students in residence register for this weekly workshop, at which dissertation chapters and prospectuses, papers, and grant proposals by students and faculty are read and discussed.

1 unit, Spr (Robinson, P)

**HISTORY 439A. Graduate Research Seminar: Modern Britain and the British Empire**

4-5 units, not given this year

**HISTORY 439B. Graduate Research Seminar: Modern Britain and the British Empire II**

4-5 units, not given this year

**HISTORY 443A. Human Origins: History, Evidence, and Controversy**

(Same as HISTORY 243S) Research seminar. Debates and controversies include: theories of human origins; interpretations of fossils, early art, and the oldest tools; the origin and fate of the Neanderthals; evolutionary themes in literature and film; visual rhetoric and cliché in anthropological dioramas and phyletic diagrams; the significance of hunting, gathering, and grandmothering; climatological theories and neocatastrophic geologies; molecular anthropology; the impact of racial theories on human origins discourse. Background in human evolution not required.

4-5 units, not given this year

**HISTORY 444C. The History of the Body in Science,**

**Medicine, and Culture**

(Same as HISTORY 244C) The human body as a natural and cultural object, historicized. The crosscultural history of the body from the 18th century to the present. Topics include: sciences of sex and race; medical discovery of particular body parts; human experimentation, foot binding, veiling, and other bodily coverings; thinness and obesity; notions of the body politic.

4-5 units, not given this year

**HISTORY 445A. Research Seminar in African History**

Primary sources such as government records and missionary archives. Students present work in progress. Prerequisite: consent of instructor.

4-5 units, not given this year

**HISTORY 445B. Research Seminar in African History**

Primary sources such as government records and missionary archives. Students present work in progress. Prerequisite: consent of instructor.

4-5 units, not given this year

**HISTORY 446A. Grad Research Seminar: African Nationalism, Pan-Africanism & Beyond**

African intellectual, political, social and cultural institutions confronting issues of sovereignty, authority, heterarchy, and power during the 19th and 20th centuries.

4-5 units, Win (Hanretta, S)

**HISTORY 446B. Grad Research Seminar: African Nationalism, Pan-Africanism and Beyond**

Prerequisite: 446A and consent of instructor.

4-5 units, Spr (Hanretta, S)

**HISTORY 448A. African Societies and Colonial States**

(Same as HISTORY 248S) The encounter between African societies and European colonialism in the colony or region of their choice. Approaches to the colonial state; tours of primary source collections in the Hoover Institution and Green Libraries. Students present original research findings and may continue research for a second quarter.

4-5 units, not given this year

**HISTORY 452A. Graduate Research Seminar: American Cultural and Intellectual History, 1750-1900**

Major methods and issues. Goal is to produce a research paper based on primary sources suitable for inclusion in a doctoral dissertation or submission to a peer-reviewed scholarly journal. Topics include: compiling primary and secondary source bibliographies; primary and secondary source issues; and how to articulate an argument. Students produce a prospectus by the end of Winter Quarter. Spring Quarter meetings to discuss outlines, drafts, and problems, culminating in presentation of papers in scholarly conference format.

4-5 units, Win (Winterer, C)

**HISTORY 452B. Graduate Research Seminar: American Cultural and Intellectual History, Part 2**

Prerequisite: HISTORY 452A

4-5 units, Spr (Winterer, C)

**HISTORY 461A. Research Seminar on the Histories of Women, the Family, and Sexuality**

Research design, research methods, and historical writing on topics in the histories of women, the family, or sexuality in the U.S. Prepares graduate students for dissertation work. Workshop model involves exchanging preliminary prospectus, outline, writing sample, and draft for peer responses. Article-length original paper based on primary sources, to be completed by the end of Spring Quarter.

4-5 units, not given this year

**HISTORY 461B. Research Seminar on the Histories of Women, the Family, and Sexuality, Part II**

Prerequisite: 461A.

4-5 units, not given this year

**HISTORY 464E. Research in History and Social Science Education**

(Same as EDUC 496) For doctoral students. Literature on historical learning and teaching and corresponding social sciences research designs, assessment, and curriculum evaluation.

3-5 units, not given this year

**HISTORY 470. Graduate Colloquium: Explorations in Latin American Social History**

(Same as HISTORY 371) How to use primary sources such as government records, estate inventories, and parish records for social history.

4-5 units, not given this year

**HISTORY 470A. Graduate Research Seminar: Latin American Social History**

Students will write a seminar paper. Prerequisite: HISTORY 371.

4-5 units, not given this year

**HISTORY 481. Research Seminar in Middle East History**

(Same as HISTORY 287S, JEWISHST 287S, JEWISHST 481) Student-selected research topics.

4-5 units, not given this year

**HISTORY 481A. Research Seminar in Middle East History**

4-5 units, Sum (Staff)

**HISTORY 486. Research Seminar in History of the Ottoman Empire**

Focuses on some of the major debates and themes of Ottoman studies under the light of current scholarship, major reference sources, and primary material in multiple genres (archival, literary, visual, etc.) and multiple languages (Turkish, Arabic, Greek, etc.) of the Ottoman world. Students are expected to write research seminar papers based on primary sources.

4-5 units, Spr (Yaycioglu, A)

**HISTORY 486A. Graduate Research Seminar in Jewish History**

(Same as JEWISHST 486A)

4-5 units, Win (Zipperstein, S)

**HISTORY 486B. Graduate Research Seminar in Jewish History**

(Same as JEWISHST 486B) Prerequisite: HISTORY 486A.

4-5 units, Spr (Zipperstein, S)

**HISTORY 495A. Qing Legal Documents**

How to use Qing legal documents for research. Winter: sample documents that introduce the main genres including: the Qing code and commentaries; magistrates' handbooks and published case collections; and case records from Chinese archives. Spring: class meets occasionally; students complete research papers. Prerequisite: advanced reading ability in Chinese.

4-5 units, not given this year

**HISTORY 497A. Maps and Gazetteers as Sources for East Asian History**

For graduate students of early modern or modern East Asia. Includes weekend workshop on Chinese historical GIS with Harvard's Peter Bol. Students work with the Stanford Spatial History Lab to develop analytical techniques. Prerequisite: background in GIS.

4-5 units, not given this year

**HISTORY 497B. Maps and Gazetteers as Sources for East Asian History, Part 2**

Prerequisite: HISTORY 497A.

4-5 units, not given this year

**HISTORY 498C. Japanese Colonial Archives**

First part of a two quarter sequence. Graduate seminar on conducting research in modern Japanese history. Focus is on Japanese imperialism and colonialism in Asia, especially Korea. Different types of archives, from national and research libraries to online databases, and methods of research including oral history. Primary sources include government publications, classified police records, and media sources.

4-5 units, not given this year

**HISTORY 499X. Graduate Research**

Units by arrangement. May be repeated for credit.

1-10 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**HISTORY 802. TGR Dissertation**

Units by arrangement.

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

## HISTORY AND PHILOSOPHY OF SCIENCE (HPS) COURSES

### UNDERGRADUATE COURSES IN HISTORY AND PHILOSOPHY OF SCIENCE

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**HPS 60. Introduction to Philosophy of Science**

(Same as PHIL 60) 20th-century views on the nature of scientific knowledge. Logical positivism and Popper; the problem of induction; Kuhn, Feyerabend, and radical philosophies of science; subsequent attempts to rebuild moderate empiricist and realist positions. GER:DB-Hum

5 units, Win (Ryckman, T)

**HPS 61. Science, Religion, and the Birth of Modern Philosophy**

(Same as PHIL 61) Galileo's defense of the Copernican world-system that initiated the scientific revolution of the 17th century, led to conflict between science and religion, and influenced the development of modern philosophy. Readings focus on Galileo and Descartes. GER:DB-Hum

5 units, not given this year

**HPS 154. The History of Scientific Methods, Pythagoras to Popper**

(Same as PHIL 163H) History of scientific methods and associated science from ancient Greece to the 20th century. Case studies include Pythagoras, Plato, and Euclid; Aristotle; medieval science; scientific Renaissance of the 1540s; methodological clashes involving the Church, Galileo, Bacon, and Descartes; Newton; Faraday; Darwin; rise of statistical methods; beginnings of modern physics; Popper. The mutual influences of method and practice. What does and does not qualify as science. Recommended: background in history, philosophy, or a technical field such as mathematics, science, or engineering. GER:DB-Hum

4 units, Spr (McCaskey, J)

**HPS 158. The Social History of Mental Illness**

An Exploration of the variety of meanings of mental illness in the past, and the diagnostic, therapeutic, cultural and policy challenges historically posed by mental illness. The course focuses on the U.S. but is not limited to it. How has mental illness been defined in history? How has the mind been medicalized and managed? Topics include the rise of institutions for the mentally ill, the growth of the psychiatric profession and the relationship between psychiatry, deviance and anti-psychiatry, and gender and psychiatric norms. GER:DB-SocSci

5 units, Win (Horn, M)

**HPS 199. Directed Reading**

(Staff)

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### GRADUATE COURSES IN HISTORY AND PHILOSOPHY OF SCIENCE

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**HPS 299. Graduate Individual Work**

May be repeated for credit. (Staff)

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

## HUMAN BIOLOGY (HUMBIO) COURSES

### UNDERGRADUATE COURSES IN HUMAN BIOLOGY

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**HUMBIO 2A. Genetics, Evolution, and Ecology**

Introduction to the principles of classical and modern genetics, evolutionary theory, and population biology. Topics: micro- and macro-evolution, population and molecular genetics, biodiversity, and ecology, emphasizing the genetics and ecology of the evolutionary process and applications to human populations. Required evening midterm, Monday, 7-9:00 PM. See syllabus for date. GER: DB-NatSci

5 units, Aut (Boggs, C; Durham, W; Francke, U)

**HUMBIO 2B. Culture, Evolution, and Society**

Introduction to the evolutionary study of human diversity. Hominid evolution, the origins of social complexity, social theory, and the emergence of the modern world system, emphasizing the concept of culture and its influence on human differences. Required evening midterm for 2B, Monday, 7-9:00 PM. See syllabus for date. GER:DB-SocSci

5 units, Aut (Klein, R; Wolf, A)

**HUMBIO 3A. Cell and Developmental Biology**

The principles of the biology of cells: principles of human developmental biology, biochemistry of energetics and metabolism, the nature of membranes and organelles, hormone action and signal transduction in normal and diseased states (diabetes, cancer, autoimmune diseases), drug discovery, immunology, and drug addiction. Prerequisite: college chemistry or completion of the HumBio chemistry lecture series during the fall quarter. Required evening midterm for 3A, Monday, 7-9:00 PM. See syllabus for date. GER: DB-NatSci

5 units, Win (Fuller, M; Kaiser, A; Nusse, R; Scott, M; Talbot, W)

**HUMBIO 3B. Behavior, Health, and Development**

Research and theory on human behavior, health, and life span development. How biological factors and cultural practices influence cognition, emotion, motivation, personality, and health in childhood, adolescence, and adulthood. Required evening midterm, Monday, 7-9:00 PM. See syllabus for date. GER:DB-SocSci

5 units, Win (Lyons, D; Fernald, A)

**HUMBIO 3Y. Practicum in Child Development**

Practical experience at Bing Nursery School for 3.5 hours per week. Pre- or corequisite: 3B. (AU)

1 unit, Win (Peters, M)

**HUMBIO 4A. The Human Organism**

Organ system physiology: the principles of neurobiology and endocrinology, and the functions of body organs. The mechanisms of control, regulation, and integration of organ systems function. GER: DB-NatSci

5 units, Spr (Fernald, R; Heller, C)

**HUMBIO 4B. Environmental and Health Policy Analysis**

Connections among the life sciences, social sciences, public health, and public policy. The economic, social, and institutional factors that underlie environmental degradation, the incidence of disease, and inequalities in health status and access to health care. Public policies to address these problems. Topics include pollution regulation, climate change policy, biodiversity protection, health care reform, health disparities, and women's health policy GER:DB-SocSci

5 units, Spr (Goulder, L; Baker, L)

**HUMBIO 6. Human Origins**

(Same as ANTHRO 6, ANTHRO 206) The human fossil record from the first non-human primates in the late Cretaceous or early Paleocene, 80-65 million years ago, to the anatomically modern people in the late Pleistocene, between 100,000 to 50,000 B.C.E. Emphasis is on broad evolutionary trends and the natural selective forces behind them. GER: DB-NatSci

5 units, not given this year

**HUMBIO 21. Introduction to Brain and Behavior**

(Same as BIO 20) Evolutionary principles to understand how the brain regulates behavior physiologically, and is also influenced by behavioral interactions. Topics include neuron structure and function, transmission of neural information, anatomy and physiology of sensory and motor systems, regulation of body states, the biological basis of learning and memory, and behavioral abnormalities. GER: DB-NatSci

3 units, alternate years, not given this year

**HUMBIO 27. Traditional Chinese Medicine**

The philosophy and history behind traditional Chinese medicine. Concepts such as Qi, Yin/Yang, meridians, Chinese organs, and the 5 elements. How these concepts are applied through techniques such as acupuncture, herbal medicine, Qi gong, and massage. How traditional Chinese medicine is understood from a scientific standpoint. Political and socioeconomic implications. Observation of an acupuncturist. Readings on the integration of Eastern and Western medicine and on traditional Chinese medicine.

1 unit, Spr (Golianu, B)

**HUMBIO 82A. Qualitative Research Methodology**

Goal is to develop knowledge and skills for designing and conducting qualitative research studies including purposes, conceptual contexts, research questions, methods, validity issues, and interactions among these facets. Each student designs a qualitative research study.

3 units, Win (Wolf, J), Spr (Wolf, J)

**HUMBIO 82B. Advanced Data Analysis in Qualitative Research**

For students writing up their own qualitative research. Students prepare a complete draft presenting their own qualitative research study including results, with reports drafted section by section, week by week. Class provides feedback, guidance, support.

3 units, Aut (Wolf, J)

**HUMBIO 82Q. The Omnivore's Dilemma - Or Is It?**

(S,Sem) Stanford Introductory Seminar. The omnivore's dilemma-making the right food choices from the vast number possible. The health implications of our food choices. Why we make these choices- the positive and negative influences of the food industry, research in nutritional science, and public health policies and the resulting confusion about what we should eat. Discussion-based class with readings including In Defense of Food by M. Pollan and primary reference materials. Introduction to the scientific literature in human nutrition.

3 units, Aut (Endemann, G)

**HUMBIO 87Q. Women and Aging**

(S,Sem) (Same as MED 87Q) Stanford Introductory Seminar. Preference to sophomores. Biology, clinical issues, social and health policies of aging; relationships, lifestyles, and sexuality; wise women and grandmothers. Sources include scientific articles, essays, poetry, art, and film. Service-learning experience with older women. Service Learning Course (certified by Haas Center). GER:EC-Gender

5 units, Spr (Winograd, C)

**HUMBIO 90Q. Contemporary Issues in Human Experimentation**

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. The guiding principles currently used to protect human subjects in terms of informed consent and protection of privacy; ethical issues relating to compensatory mechanisms for inherent risks; historical perspective and the development of the current mechanisms to safeguard the privacy and integrity of the individual; examples of use/abuse of human experimentation during medieval, Nazi, and modern times. Guest speakers currently performing human experiments or involved in approving such experimentation.

3 units, Aut (Constantinou, C)

**HUMBIO 91Q. Neuroethology: The Neural Control of Behavior**

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Animal behavior offers insights about evolutionary adaptations. The origins of the study of animal behavior and its development to the present. Discussion of original research papers. The use and misuse of parallels between animal and human behavior. Possible field trip to observe animals in their natural habitat. GER: DB-NatSci

3 units, Aut (Fernald, R)

**HUMBIO 96Q. Injustice, Advocacy and Courage: The Path of Everyday Heroes**

(S,Sem) Stanford Introductory Seminar. This course will study the paradigms of people of courage, action and energy who have fought against injustice by advocating for causes against great odds and at personal risk. The focus will be on everyday people who have taken action, often at great personal risk, not for ambition, but because of their convictions and steadfast commitment to their



beliefs.

3 units, Win (Abrams, W)

**HUMBIO 97Q. Sport, Exercise, and Health: Exploring Sports Medicine**

(S,Sem) (Same as ORTHO 97Q) Stanford Introductory Seminar. Preference to sophomores. Sports medicine is the practice of clinical medicine at the interface between health and performance, competition and well-being. While sports medicine had its origins in providing care to athletes, medical advances developed in care of athletes exerted a great effect on the nature and quality of care to the broader community. Topics include sports injuries, medical conditions associated with sport and exercise, ethics, coaching, women's issues, fitness and health, and sports science. Case studies.

3 units, Aut (Matheson, G), Win (Matheson, G), Spr (Matheson, G)

**HUMBIO 99Q. Becoming a Doctor: Readings from Medical School, Medical Training, Medical Practice**

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. For students considering medicine as a career. Goal is to acquaint students with medical school, training in medicine and surgery, and the practice of medicine and surgery. Topics include: how to pick a medical school and a residency; how medicine affects family life, especially children; the differences between surgical and medical specialties; the advantages and disadvantages among academic/teaching, pure research, group practice, HMO, hospital staff, or private practice; malpractice concerns; and financial considerations.

3 units, Aut (Zaroff, L)

**HUMBIO 111. Human Dimensions of Global Environmental Change: Resilience, Vulnerability, and Environmental Justice**

(Same as ANTHRO 173) The complexity of social and political issues surrounding global environmental change. Emphasis is on synergies precipitated by human-induced climatic change. Case studies and scenarios to explore the vulnerability and resilience in households, communities, regions, and nationstates most affected by extreme weather conditions. Their concerns, livelihood changes, and diverse responses of rural smallholders, indigenous communities, the state, and local and regional migrants. Central theme is environmental justice.

3 units, not given this year

**HUMBIO 112. Conservation Biology**

(Same as BIO 144) Principles and application of the science of preserving biological diversity. Topics: sources of endangerment of diversity; the Endangered Species Act; conservation concepts and techniques at the population, community, and landscape levels; reserve design and management; conflict mediation. 4 units if taken with a field trip and discussion component. Satisfies Central Menu Area 4 for Bio majors. Prerequisite: BIO 101, or BIO 43 or HUMBIO 2A with consent of instructor. GER: DB-NatSci

3-4 units, Win (Boggs, C; Launer, A)

**HUMBIO 113. The Biologies of Humans and Plants**

The biological interdependence of humans and plants, particularly the ways in which people have imposed selection pressures and ecological change on one another. Topics include: evolution and basic plant structure; plant characteristics and genetic variants allowing domestication; effects of plant domestication on human biology; plants in traditional and contemporary diets; and human influences on plant biology through genetic manipulation and environmental change. Class meetings center on discussing journal articles.

3 units, Aut (Preston, K)

**HUMBIO 114. Environmental Change and Emerging Infectious Diseases**

(Same as ANTHRO 177, ANTHRO 277) The changing epidemiological environment. How human-induced environmental changes, such as global warming, deforestation and land-use conversion, urbanization, international commerce, and human migration, are altering the ecology of infectious disease transmission, and promoting their re-emergence as a global public health threat. Case studies of malaria, cholera, hantavirus, plague, and HIV. GER:DB-SocSci

3-5 units, Aut (Durham, W; Jones, J)

**HUMBIO 116. Controlling Climate Change in the 21st Century**

(Same as EARTHSYS 147, EARTHSYS 247) Global climate change science, impacts, and response strategies. Topics: scientific understanding of the climate system; modeling future climate change; global and regional climate impacts and vulnerability; mitigation and adaptation approaches; the international climate policy challenge; and decarbonization of energy and transportation systems. GER: DB-NatSci

3 units, not given this year

**HUMBIO 117. Conservation Medicine in Practice**

(Same as ANTHRO 117A) Examination of the interconnectedness of the environment and human and animal health. Investigation of the 'One World-One Health' paradigm, by examining issues such as climate change and human health, ecological perturbation and infectious diseases, and the importance of new conceptual approaches to combat disease emergence and spread. Seminars, from experts working in government, NGOs, public health, medicine and academia, will emphasize the importance of interdisciplinary approaches (medicine, epidemiology, anthropology, ecology, environmental science) in understanding health scenarios, and also upon the importance of using science and policy to improve public health.

4 units, Spr (Salkeld, D)

**HUMBIO 118. Theory of Ecological and Environmental Anthropology**

(Same as ANTHRO 90C) Dynamics of culturally inherited human behavior and its relationship to social and physical environments. Topics include a history of ecological approaches in anthropology, subsistence ecology, sharing, risk management, territoriality, warfare, and resource conservation and management. Case studies from Australia, Melanesia, Africa, and S. America. GER:DB-SocSci

5 units, Win (Bird, D)

**HUMBIO 119. Demography: Health, Development, Environment**

(Same as BIO 102) Demographic methods and their application to understanding and projecting changes in human infant, child, and adult mortality and health, fertility, population, sex ratios, and demographic transitions. Progress in human development, capabilities, and freedoms. Relationships between population and environment. Prerequisites: numeracy and basic statistics; Biology or Human Biology core; or consent of instructor. GER:DB-SocSci

3 units, Spr (Tuljapurkar, S)

**HUMBIO 120. Health Care in America: An Introduction to U.S. Health Policy**

Health policy and health care delivery from a historical and a current policy perspective. Introduces cost, quality, and access as measures of health system performance. Considers institutional aspects of health care reform.

4 units, Aut (Barr, D)

**HUMBIO 120A. AMERICAN HEALTH POLICY**

Issues in health care reform and the policy making process, the evolution of current systems, and theories underlying efforts for change. The national search for solutions to the problems of the uninsured, and the feasibility, options, and ramifications of alternative proposals for health care reform. Student presentations. Prerequisite: Human Biology core or equivalent, Human Biology 120, or consent of instructor.

3 units, Spr (Barr, D)

**HUMBIO 121. Critical Issues in Child Health**

Integrated picture of the physical and psychosocial health factors that result in a healthy child building on principles taught in the Human Biology core. Students apply basic human physiology to the physiology of the child to develop perspective on global pediatric health challenges and how the cultural context influences and defines the child living within it.

4 units, Aut (Adam, M), Spr (Adam, M)

**HUMBIO 121E. Ethnicity and Medicine**

(Same as FAMMED 244) Weekly lecture series. Linguistic, social class, and cultural factors that impact patient care. Culturally sensitive health care services and contemporary research issues involving minority and underserved populations. Topics include health care inequities and medical practices of African Americans,



Asians, Latinos, Native Americans, immigrants, and refugees in both urban and rural settings. Only students taking the course for 3 units may earn a letter grade.

*1-3 units, Spr (Garcia, R)*

**HUMBIO 122. Beyond Health Care: Seeking Health in Society** (Same as PEDS 222) Available evidence at the national and cross-country level linking social welfare interventions and health outcomes. If and how non-health programs and policies could have an impact on positive health outcomes. Evaluation of social programs and policies that buffer the negative health impact of economic instability and unemployment among adult workers and their children. Examination of safety nets, including public health insurance, income maintenance programs, and disability insurance. Prerequisites: HUMBIO 4B or equivalent, and background in research methods and statistics.

*3 units, Aut (Rodriguez, E)*

**HUMBIO 122M. Challenges of Human Migration: Health and Health Care of Migrants and Autochthonous Populations** (Same as PEDS 212) An emerging area of inquiry. Topics include: global migration trends, health Issues/aspects of migration, healthcare and the needs of immigrants in the US, and migrants as healthcare providers: a new area of inquiry in the US. Class is structured to include: lectures lead by the instructor and possible guest speakers; seminar, discussion and case study sessions led by students.

*3 units, Spr (Rodriguez, E)*

**HUMBIO 122S. Social Class, Race, Ethnicity, and Health**

Examines health disparities in the U.S., looking at the patterns of those disparities and their root causes. Explores the intersection of lower social class and ethnic minority status in affecting health status and access to health care. Compares social and biological conceptualizations of race and ethnicity. GER:DB-SocSci, EC-AmerCul

*4 units, Win (Barr, D)*

**HUMBIO 123. Obesity in America: Clinical and Public Health Implications**

Interdisciplinary clinical, research, and policy approaches. The prevalence, predictors, and consequences of obesity and diabetes; biological and physiological mechanisms; clinical treatments including medications and surgery; and the relevance of behavioral, environmental, economic, and policy approaches to obesity prevention and control. Prerequisite: Human Biology core or equivalent, or consent of instructor.

*3-4 units, Win (Stafford, R; Rosas, L)*

**HUMBIO 124. Fat Nutrition and Current Health Concerns**

Relationships between dietary fats and heart disease, cancer, obesity, diabetes, and fitness. Proposed benefits of omega-3 fats and antioxidants. Historical and economic influences on fat nutrition. Prerequisite: 3A; pre- or corequisite: 4A; preference to students who have completed 4A. Recommended: 130.

*4 units, Spr (Endemann, G)*

**HUMBIO 125. Current Controversies in Women's Health**

(Same as OBGYN 256) Interdisciplinary. Focus is on the U.S. Topics include: health research; bioethical, legal, and policy issues; scientific and cultural perspectives; social influences; environmental and lifestyle effects on health; and issues related to special populations. Guest lecturers; student debates. Prerequisite: Human Biology core or equivalent, or consent of instructor. GER:EC-Gender

*2-3 units, Spr (Jacobson, M; Stefanick, M)*

**HUMBIO 126. Promoting Health Over the Life Course: Multidisciplinary Perspectives**

Disease prevention and health promotion topics pertinent to different stages of the life span emphasizing healthy lifestyle and reducing risk factors in both individuals and communities. Focus is on scientific investigation, the application of behavioral science to risk reduction strategies, and the importance of health promotion as a social and economic imperative. Topics include: epidemiology of chronic diseases; social determinants of health, behavior change; obesity, nutrition, and stress; young adult, mid-life and aging health issues; health care delivery and public health system; workplace wellness programs; and environmental and international issues. Prerequisite: Human Biology core or equivalent, or consent of instructor.

*3 units, Aut (Stefanick, M; Alles, W)*

**HUMBIO 127A. Community Health: Assessment and Planning I**

Major determinants of health in a community. Working with community partners to identify health issues and plan programs and policies to prevent disease and promote health. Service learning component involving students in community health assessment techniques. Final grade given upon completion of HUMBIO 127B. Service Learning Course (certified by Haas Center). Prerequisite: 4B or equivalent, or consent of instructor.

*4 units, alternate years, not given this year*

**HUMBIO 127B. Community Health: Assessment and Planning II**

Continuation of 127A. Service learning course with emphasis on conducting community health assessment and planning projects in collaboration with community-based organizations. Service Learning Course (certified by Haas Center). Prerequisite: 4B or equivalent, 127A, or consent of instructor.

*4 units, alternate years, not given this year*

**HUMBIO 128. Community Health Psychology**

(Same as PSYCH 101) Social ecological perspective on health emphasizing how individual health behavior is shaped by social forces. Topics include: biobehavioral factors in health; health behavior change; community health promotion; and psychological aspects of illness, patient care, and chronic disease management. Prerequisites: HUMBIO 3B or PSYCH 1, or equivalent.

*4 units, Win (Heaney, C)*

**HUMBIO 129. Critical Issues in International Women's Health**

Women's lives, from childhood through adolescence, reproductive years, and aging. Economic, social, and human rights factors, and the importance of women's capacities to have good health and manage their lives in the face of societal pressures and obstacles. Emphasis is on life or death issues of women's health that depend on their capacity to negotiate or feel empowered, including maternal mortality, violence, HIV/AIDS, reproductive health, and sex trafficking. Organizations addressing these issues. A requirement of this class is participation in public blogs. Prerequisites: Human Biology core or equivalent or consent of instructor. GER:EC-Gender

*4 units, Aut (Murray, A), Win (Murray, A)*

**HUMBIO 129P. International Health Policy: Comparative Health Care Systems**

Together we will learn how six advanced, capitalist countries developed near-universal health care systems, and how they have been coping with the pressures of costs, aging, and chronicity. My perspective is ironic and anthropological. Each is a tribal nation with deeply held convictions about justice and rationing, dark moments of history, rhetorics, and actual organization & financing of services, not unlike the 7th tribal nation that surrounds and frames our study. These days, countries who outperform the U.S. ironically strain to be more American without compromising equity, efficiency, and budget limits.

*3 units, Aut (Light, D)*

**HUMBIO 129S. Global Public Health**

The class is an introduction to the fields of international public health and global medicine. It focuses on resource poor areas of the world and explores major global health problems and their relation to policy, economic development and human rights. The course is intended for students interested in global health, development studies, or international relations, and provides opportunities for in-depth discussion and interaction with experts in the field.

*4 units, Win (Wise, P)*

**HUMBIO 130. Human Nutrition**

The study of food, and the nutrients and substances therein. Their action, interaction, and balance in relation to health and disease. Emphasis is on the biological, chemical, and physiological processes by which humans ingest, digest, absorb, transport, utilize, and excrete food. Dietary composition and individual choices are discussed in relationship to the food supply, and to population and cultural, race, ethnic, religious, and social economic diversity. The relationships between nutrition and disease; ethnic diets; vegetarianism; nutritional deficiencies;

nutritional supplementation; phytochemicals. Prerequisite: Human Biology core or consent of instructor.

4 units, Spr (Gardner, C)

### **HUMBIO 132. Functional Anatomy of Exercise**

Interdisciplinary: physiology, pathology, and biomechanics. Anatomy of the body's major joints in the context of exercise and movement emphasizing adaptations that occur with intensity and nature of exercise, age, and disease. Students will work in cooperative groups in the Stanford Human Performance Lab to conduct projects and experiments relating to biomechanics, exercise physiology, and anatomy of the athlete. Enrollment limited to 40. Prerequisites: HumBio 139 or consent of instructor.

4 units, Spr (Garza, D)

### **HUMBIO 133. Human Physiology**

(Same as BIO 112, BIO 212) The functioning of organ systems emphasizing mechanisms of control and regulation. Topics: structure and function of endocrine and central nervous systems, cardiovascular physiology, respiration, salt and water balance, exercise, and gastrointestinal physiology. Satisfies Central Menu Area 3 for Bio majors. Prerequisite: Biology or Human Biology core. GER: DB-NatSci

4 units, Win (Garza, D)

### **HUMBIO 135. Exercise Physiology**

How body systems respond to the stress of acute exercise and adapt to chronic exercise training. How the cardiovascular system adapts to optimize oxygen delivery and utilization, how muscles generate force and hypertrophy in response to training, how metabolic/biochemical pathways are regulated to support the increased energy demand of exercise. Theories on the causes of fatigue and muscle soreness, and on what limits human performance. Applied topics such as the effects of aging, gender, and environmental conditions (high altitude, heat, cold) on exercise capacity will also be discussed. Prerequisite: Human Biology core, Biology core, or equivalent, or consent of instructor.

4 units, Aut (Friedlander, A)

### **HUMBIO 135S. Applied Topics in Exercise Physiology and Metabolism**

Focus on scientific research related to exercise physiology, sports performance, impacts of aging and environmental physiology. Discussions of controversial topics in physiology and interpretation of conflicting data. Student presentations. Summary paper. A requirement of this class is participation in public blogs. Enrollment limited to 10. If class is full, contact instructor for application. Prerequisites: HB135 or consent of instructor.

3 units, Spr (Friedlander, A)

### **HUMBIO 139. Sports Medicine**

Sports, exercise, health, and medicine throughout the human performance continuum. Exercise as therapy; injuries and illnesses that result from sports and exercise; and the use of technology in modern sports science. Sources include physiology, nutrition, and biomechanics. Medical problems exacerbated or caused by exercise and sport; maximizing performance in elite athletes; and population-based issues such as exercise and its relationship to health, drugs in sport, and aging. Prerequisite: Biology or Human Biology core, or consent of instructor. GER: DB-NatSci

4 units, Aut (Garza, D)

### **HUMBIO 140. Sex Differences in Human Physiology and Disease**

(Same as OBGYN 240, MED 240) Chromosomal and hormonal influences on cells, tissues, and organs that underlie the development of reproductive organs and sexual dimorphism of the neuroendocrine system. Effects of endogenous and exogenous sex hormones and environmental factors that differ between men and women on the musculoskeletal, neurological, cardiovascular, and immunological systems over the lifecourse, from conception to puberty, through reproductive phases (including changes during the menstrual cycle up to and beyond menopause in women and with aging in men). Transgender health issues. Guest lecturers. Prerequisite: Human Biology core or equivalent, or consent of instructor GER:EC-Gender

2-3 units, Win (Stefanick, M)

### **HUMBIO 142. Adolescent Development**

Underlying changes and their consequences in everyday functioning. Physical, cognitive, social, and sexual development;

how these changes influence the emerging sense of identity, autonomy, and intimacy. Contexts in which adolescents move such as family, friends and peers, school, and workplace. Focus is on normal development of boys and girls; attention to problem outcomes including eating disorders, depression, and teen pregnancy. Prerequisite: 3B or PSYCH 1, or consent of instructor.

4 units, NEXTYEAR

### **HUMBIO 142M. Special Topics in Adolescent Mental Health**

Includes the study of aspects of common disorders seen in adolescent populations, such as prevalence, developmental course, gender differences, theoretical explanations, and therapeutic interventions. Topics will include mood/anxiety disorders, eating disorders, learning disabilities and ADHD, sexual risk behaviors, developmental disorders, substance abuse, and self-harm. Goals of this course include getting students to think critically about the unique mental health needs of adolescents, collaborating on devising ways to improve the way our society meets those needs, and strengthening writing and communication skills applicable to this area of inquiry.

4 units, Aut (Medoff, L), alternate years, not given next year

### **HUMBIO 143. Adolescent Sexuality**

Developmental perspective. Issues related to scientific, historical, and cultural perceptions; social influences on sexual development; sexual risk; and the limitations and future directions of research. Sexual identity and behavior, sexually transmitted diseases including HIV, pregnancy, abortion, gay and lesbian youth, sex education and condom availability in schools, mass media, exploitative sexual activity, and difficulties and limitations in studying adolescent sexuality. Legal and policy issues, gender differences, and international and historical trends. Prerequisite: Human Biology core or equivalent, or consent of instructor.

4 units, Win (Medoff, L)

### **HUMBIO 144. Boys' Psychosocial Development**

(Same as EDUC 143) From early childhood through adolescence. Emphasis is on how boys' lives and experiences are embedded within their interpersonal relationships and social and cultural contexts. Interdisciplinary approach including perspectives from fields such as psychology, sociology, anthropology, family studies, and education. Prerequisite: Human Biology core, or Developmental Psychology, or consent of instructor. GER:EC-Gender

4 units, Spr (Chu, J)

### **HUMBIO 145L. The Biology and Evolution of Language**

(Same as ANTHRO 171, ANTHRO 271) Lecture course surveying the biology, linguistic functions, and evolution of the organs of speech and speech centers in the brain, language in animals and humans, the evolution of language itself, and the roles of innateness vs. culture in language. Suitable both for general education and as preparation for further studies in anthropology, biology, linguistics, medicine, psychology, and speech & language therapy. Anthropology concentration: CS, EE. No prerequisites. GER: DB-NatSci

4-5 units, Win (Fox, J)

### **HUMBIO 146. Culture and Madness: Anthropological Approaches to Psychiatric Illness**

(Same as ANTHRO 181, ANTHRO 281) Interdisciplinary. Culture and social context on the identification, course, and outcome of psychiatric illness. What is known from psychiatry about the nature of illness as a biomedical process and from anthropology about the life course of illness within particular settings. Prerequisite: Human Biology core or equivalent or consent of instructor.

3-5 units, Aut (Luhmann, T)

### **HUMBIO 146D. Developmental Disabilities: From Biology to Policy**

(Same as PEDS 246) Changes in science and societal attitudes have resulted in an increased prevalence of individuals with disabilities in our communities. This course focuses on Down syndrome, cerebral palsy, Fragile X, and autism. Topics include medical and social definitions of disability; the impact of attitudes, beliefs, and values; advances in biological sciences that may lead to novel therapies to improve functioning; and federal policies, laws, and regulations such as IDEA that increase opportunities for community participation. A field experience complements

classroom discussion. Prerequisite: HUMBIO core or equivalent, and consent of instructor.

3 units, Win (Feldman, H)

#### **HUMBIO 148. Kinship and Marriage**

The course compares selected societies in Africa, Asia, and South Asia with the aim of discovering the nature of human kinship systems. GER:DB-SocSci, EC-Gender

4 units, Win (Wolf, A)

#### **HUMBIO 148W. Women, Fertility, and Work**

(Same as ANTHRO 151, ANTHRO 251) How do choices relating to bearing, nursing, and raising children influence women's participation in the labor force? Cultural, demographic, and evolutionary explanations, using cross-cultural case studies. Emphasis is on understanding fertility and work in light of the options available to women at particular times and places. GER:DB-SocSci, EC-Gender

5 units, not given this year

#### **HUMBIO 149. Psychological and Educational Resilience Among Children and Youth**

(Same as EDUC 256) Theoretical, methodological, and empirical issues pertaining to the psychological and educational resilience of children and adolescents. Overview of the resilience framework, including current terminology and conceptual and measurement issues. Adaptive systems that enable some children to achieve successful adaptation despite high levels of adversity exposure. How resilience can be studied across multiple levels of analysis, ranging from cell to society. Individual, family, school, and community risk and protective factors that influence children's development and adaptation. Intervention programs designed to foster resilient adaptation in disadvantaged children's populations.

4 units, not given this year

#### **HUMBIO 149L. Longevity**

(Same as NENS 202, PSYCH 102) Interdisciplinary. Challenges to and solutions for the young from increased human life expectancy: health care, financial markets, families, work, and politics. Guest lectures from engineers, economists, geneticists, and physiologists. GER:DB-SocSci

4 units, Win (Carstensen, L.; Rando, T)

#### **HUMBIO 150A. Assisted Reproductive Technologies**

(Same as DBIO 202, OBGYN 202) Primary and current literature in basic and clinical science aspects of assisted reproductive technologies (ART), and demonstrations of current ART techniques including in vitro fertilization and embryo culture, and micromanipulation procedures such as intracytoplasmic sperm injection and embryo biopsy and cryopreservation. Class only may be taken for 1 unit. 2 units includes papers and attendance at clinical demonstrations. 3 units includes a term paper. Recommended: DBIO 201, or consent of instructors.

1-3 units, Win (Staff)

#### **HUMBIO 151. Introduction to Epidemiology**

Principles of epidemiology: the distribution and determinants of disease; the control of health problems; and the medical detective work required to understand disease outbreaks. Case studies from developed and developing countries to explore the use of epidemiological techniques in describing disease dynamics of human, emerging and zoonotic (animal to human) diseases such as SARS, plague, HIV, and influenza; the impacts of changes in policy, law, and behavior on disease control and eradication, such as hepatitis vaccination; and modern challenges in epidemiology such as global disease transmission, environmental change, and bioterrorism threats.

4 units, Aut (Salkeld, D)

#### **HUMBIO 152. Viral Lifestyles**

Contemporary topics related to microorganism. Relevance of microorganisms to disciplines beyond molecular biology and medicine. Public health implications of human/viral interactions, and the human behaviors that bring about such interactions. The ecological role played by viruses and their role in environmental health. Prerequisite: familiarity with biological systems, evolutionary biology, and microbiology.

3 units, not given this year

#### **HUMBIO 153. Parasites and Pestilence: Infectious Public Health Challenges**

Parasitic and other pestilence of public health importance.

Pathogenesis, clinical syndromes, complex life cycles, and the interplay among environment, vectors, hosts, and reservoirs in historical context. Public health policy initiatives aimed at halting disease transmission. World Health Organization tropical disease targets including river blindness, sleeping sickness, leishmaniasis, schistosomiasis, mycobacterial disease (tuberculosis and leprosy), malaria, toxoplasmosis, dracunculiasis, and intestinal helminthes. Guest lecturers with expertise in disease control. Prerequisite: Human Biology core or equivalent, or consent of instructor.

4 units, Win (Smith, D)

#### **HUMBIO 154. Cancer Epidemiology**

Epidemiological methods relevant to human research in cancer. The concepts of risk; case control, cohort, and cross-sectional studies; clinical trials; bias; confounding; interaction; screening; and causal inference. Social, political, economic, and ethical controversies surrounding cancer screening, prevention, and research. Prerequisite: Human Biology core or equivalent, or consent of instructor.

4 units, Win (Fisher, P)

#### **HUMBIO 155B. The Vaccine Revolution**

(Same as MI 115B) Advanced seminar. Human aspects of viral disease, focusing on recent discoveries in vaccine development and emerging infections. Journal club format: students choose articles from primary scientific literature, write formal summaries, and synthesize them into a literature review. Emphasis is on analysis, experimental design, and interpretation of data. Oral presentations. Enrollment limited to 10. Prerequisites: HUMBIO 155H, MI 155V.

6 units, Aut (Siegel, R)

#### **HUMBIO 155H. Humans and Viruses I**

(Same as MI 155H) Introduction to human virology integrating epidemiology, molecular biology, clinical sciences, social sciences, history, and the arts. Emphasis is on host pathogen interactions and policy issues. Topics: polio and vaccination, smallpox and eradication, yellow fever and history, influenza and genomic diversity, rubella and childhood infections, adenovirus and viral morphology, ebola and emerging infection, lassa fever and immune response.

6 units, Aut (Siegel, R)

#### **HUMBIO 156. Global HIV/AIDS**

(Same as MED 256) Public health, policy, and research issues. Identify resources at Stanford, and from government, NGOs, and pharmaceutical, advocacy, and international organizations. Sources include biomedical, social, and behavioral sciences. Emphasis on student projects which feature methodologies in the development and design of Operational Research and Implementation Science in AIDS/TB and Malaria in response to PEPFAR and Global Fund programs. Guest lectures. Prerequisite: Human Biology core or equivalent, or consent of instructor. GER: DB-NatSci, EC-GlobalCom

3 units, Aut (Katzenstein, D)

#### **HUMBIO 156A. Human Developmental Biology and Medicine**

(Same as DBIO 156) The biological, medical, and social aspects of normal and abnormal human development. Topics: in vitro fertilization and embryo transfer; gene and cell therapy; gametogenesis; pattern formation in the nervous system and limb development; gene and grand multiple pregnancies; prematurity, in utero effects of teratogens; sex determination and differentiation; growth control; gigantism and dwarfism; neural tube defects; cardiac morphogenesis; progress in the developmental biology of humans. Limited enrollment. Prerequisites: Human Biology or Biology core, or consent of instructor.

3-4 units, NEXTYEAR

#### **HUMBIO 157. The Biology of Stem Cells**

(Same as DBIO 257) The role of stem cells in human development and potential for treating disease. Guest lectures by biologists, ethicists, and legal scholars. Prerequisites: 2A,B, or consent of instructor.

3 units, not given this year

#### **HUMBIO 158. The Human Genome and Disease**

(Same as BIO 109A, BIO 209A) The variability of the human genome and the role of genomic information in research, drug discovery, and human health. Concepts and interpretations of genomic markers in medical research and real life applications.

Human genomes in diverse populations. Original contributions from thought leaders in academia and industry and interaction between students and guest lecturers. Students with a major, minor or cotermin in Biology: 109A/209A or 109B/209B may count toward degree program but not both. GER: DB-NatSci  
3 units, Win (Heller, R)

**HUMBIO 158G. Genomics, Bioinformatics and Medicine**

(Same as BIOC 158, BIOC 258) Molecular basis of inherited human disease. Diagnostics approaches: simple Mendelian diseases and complex, multifactorial diseases. Genomics: functional genomics, epigenetics, gene expression, SNPs, copy number and other structural genomic variations involved in disease. Novel therapeutic methods: stem cell therapy, gene therapy and drug developments that depend on the knowledge of genomics. Personal genomics, pharmacogenomics, clinical genomics and their role in the future of preventive medicine. Prerequisites: BIO 41 or HUMBIO 2A or consent of instructor. Those with credit in BIOC 118 not eligible to enroll. Course webpage: <http://biochem158.stanford.edu/>

4 units, Aut (Brutlag, D)

**HUMBIO 159. Genes and Environment in Disease Causation: Implications for Medicine and Public Health**

(Same as HRP 238) The historical, contemporary, and future research and practice among genetics, epidemiology, clinical medicine, and public health as a source of insight for medicine and public health. Genetic and environmental contributions to multifactorial diseases; multidisciplinary approach to enhancing detection and diagnosis. The impact of the Human Genome Project on analysis of cardiovascular and neurological diseases, and cancer. Ethical and social issues in the use of genetic information. Prerequisite: basic course in genetics; for undergraduates, Human Biology core or equivalent or consent of instructor.

2-3 units, not given this year

**HUMBIO 160. Human Behavioral Biology**

(Same as BIO 150, BIO 250) Multidisciplinary. How to approach complex normal and abnormal behaviors through biology. How to integrate disciplines including sociobiology, ethology, neuroscience, and endocrinology to examine behaviors such as aggression, sexual behavior, language use, and mental illness. GER: DB-NatSci

5 units, Spr (Sapolsky, R), alternate years, not given next year

**HUMBIO 161. The Neurobiology of Sleep**

(Same as BIO 149, BIO 249) Preference to seniors and graduate students. The neurochemistry and neurophysiology of changes in brain activity and conscious awareness associated with changes in the sleep/wake state. Behavioral and neurobiological phenomena including sleep regulation, sleep homeostasis, circadian rhythms, sleep disorders, sleep function, and the molecular biology of sleep. Enrollment limited to 16. GER: DB-NatSci

4 units, Win (Heller, C), alternate years, not given next year

**HUMBIO 162. Clinical Neuroscience in Women's Health**

Mental health from the perspectives of neuroscience, psychology, human physiology, and feminist studies. Major depression, bipolar, and obsessive compulsive disorders; how the female reproductive system affects the clinical presentation and course of these disorders. Eating disorders, substance abuse and dependence, and sexual trauma within a biopsychosocial model. Pharmacologic and therapeutic treatment of illnesses. Prerequisite: Human Biology core or equivalent, or consent of instructor. GER:EC-Gender

4 units, not given this year

**HUMBIO 163. Neural Systems and Behavior**

(Same as BIO 163, BIO 263) The field of neuroethology and its vertebrate and invertebrate model systems. Research-oriented. Readings include reviews and original papers. How animal brains compare; how neural circuits are adapted to species-typical behavior; and how the sensory worlds of different species represent the world. Lectures and required discussions. Satisfies Central Menu Area 3 for Bio majors. Prerequisites: BIO 42, HUMBIO 4A. GER: DB-NatSci

4 units, Aut (Fernald, R), alternate years, not given next year

**HUMBIO 166. Food and Society: Exploring Eating Behaviors in Social, Environmental, and Policy Context**

The class examines the array of forces that affect the foods human beings eat, and when, where, and how we eat them, including

human labor, agriculture, environmental sustainability, politics, animal rights/welfare, ethics, policy, culture, economics, business, law, trade, and ideology, and psychology. The class addresses the impact of current policies and actions that might be taken to improve human nutrition and health; macro-scale influences on food, nutrition, and eating behavior.

4 units, Win (Robinson, T; Gardner, C)

**HUMBIO 167. The Art of Vision**

This course concerns eyes and art. It asks how eyes are built, how they process visual information, and how they are affected by diseases that are major problems in our society. These topics are illustrated through fine art and famous artists, and we explore the implications of both normal and abnormal vision for art. There are short diversions into animal eyes and the role of vision in music, literature, and sports. GER: DB-NatSci

3 units, Win (Marmor, M)

**HUMBIO 170. Justice, Policy, and Science**

The role of science in civil rights, justice, policy, criminal justice, evidence, education, and disabled rights.

5 units, NEXTYEAR

**HUMBIO 171. The Death Penalty: Human Biology, Law, and Policy**

Combines academic study with student participation in forensic research and case investigation, including DNA evidence, psychological and physiological development, mental and physical disabilities, and witness interviews. The philosophy, structure, and application of capital punishment in the U.S. Goal is to examine and challenge the issues involved in the death penalty from the perspective of involvement in a real case. Course not taught from a preconceived belief or political or philosophical agenda except to involve students in an intellectual challenge of policy and philosophy. Prerequisite: Human Biology core or equivalent, or consent of instructor.

3 units, Spr (Abrams, W)

**HUMBIO 172B. Children, Youth, and the Law**

How the legal rights of children and adolescents in America are defined, protected, and enforced through the legal process within the context of their developmental needs and competing societal interests. Topics: origins and definitions of children's rights; adoption; custody; the juvenile justice system; education; informed consent; health care; protection from harm and child welfare; due process; and privacy and freedom of expression. Interactive, using hypotheticals for discussion and analysis. A and B alternate annually; students may take one or both. Prerequisite: Human Biology core or equivalent, or consent of instructor.

5 units, Aut (Abrams, W)

**HUMBIO 173. Science, Innovation and the Law**

The interaction of science, business and law: how scientific ideas are protected by law; the rights of those who invent, develop, and finance scientific discovery; and how ideas are commercialized and brought to market. What kinds of research, discovery, and innovation are protected; who has rights that can be protected; what kinds of rights can be protected, and the kinds of protections that apply; how inventions are commercialized; and the success and failure of businesses based on scientific discovery. Prerequisite: Human Biology core or equivalent, or consent of instructor.

3 units, NEXTYEAR

**HUMBIO 174. Foundations of Bioethics**

Classic articles, legal cases, and foundational concepts. Theoretical approaches derived from philosophy. The ethics of medicine and research on human subjects, assisted reproductive technologies, genetics, cloning, and stem cell research. Ethical issues at the end of life. Prerequisite: Human Biology core or equivalent, or consent of instructor. GER:EC-EthicReas

3 units, Win (Magnus, D)

**HUMBIO 175. Health Care as Seen Through Medical History, Literature, and the Arts**

The differences between disease as pathology and as the patient's experience. Topics include: patient-doctor relationships; medical technology; the changing focus on illness; gender issues; love, sex, and illness; mental illness; sick children; and death and dying. Limited enrollment.

3 units, Aut (Zaroff, L)

**HUMBIO 175S. Novels and Theater of Illness**

Illness and disease through novels and plays by authors including Shakespeare, Miller, Sophocles, Hemingway, and Camus. How sickness involves the patient, family, community, and state. Limited enrollment.

3 units, Spr (Zaroff, L)

**HUMBIO 178. Ethics and Politics of Public Service**

(Same as CSRE 178, ETHICSOC 133, PHIL 175A, PHIL 275A, POLISCI 133) Ethical and political questions in public service work, including volunteering, service learning, humanitarian assistance, and public service professions such as medicine and teaching. Motives and outcomes in service work. Connections between service work and justice. Is mandatory service an oxymoron? History of public service in the U.S. Issues in crosscultural service work. Integration with the Haas Center for Public Service to connect service activities and public service aspirations with academic experiences at Stanford. GER:DB-SocSci

5 units, Win (Mitchell, T)

**HUMBIO 179. Spirituality and Healing**

(Same as ANTHRO 115) This course considers the puzzle of symbolic healing. How have societies without the resources of modern medicine approached healing? Why do these rituals have common features around the world? We explore shamanism, spirit possession, prayer, and the role of placebos in modern biomedicine. Students will do ethnographic work and practical explorations along with more traditional scholarly approaches to learning.

3-5 units, not given this year

**HUMBIO 180. Human Osteology**

(Same as ANTHRO 175, ANTHRO 275) The human skeleton. Focus is on identification of fragmentary human skeletal remains. Analytical methods include forensic techniques, archaeological analysis, paleopathology, and age/sex estimation. Students work independently in the laboratory with the skeletal collection. GER:DB-NatSci

5 units, Spr (Klein, R; Codding, B)

**HUMBIO 182. Peopling of the Globe: Changing Patterns of Land Use and Consumption Over the Last 50,000 Years**

(Same as ANTHRO 18, ARCHLGY 12, EARTHSYS 21) Fossil, genetic and archaeological evidence suggest that modern humans began to disperse out of Africa about 50,000 years ago. Subsequently, humans have colonized every major landmass on earth. This class introduces students to the data and issues regarding human dispersal, migration and colonization of continents and islands around the world. We explore problems related to the timing and cause of colonizing events, and investigate questions about changing patterns of land use, demography and consumption. Students are introduced to critical relationships between prehistoric population changes and our contemporary environmental crisis. GER:DB-SocSci

3-5 units, Aut (Bird, D)

**HUMBIO 183. Astrobiology and Space Exploration**

Evolution in the context of space and time, focusing on the emergence of life in a planetary context on Earth and possibly elsewhere. The evolution of intelligence and the search for it elsewhere. The biological, psychological, sociological, and philosophical issues of human space exploration. Integrates information from astronautics, astrophysics, biochemistry, chemistry, evolutionary biology, geology, paleontology, physiology, psychology, and sociology. Guest lectures by scientists and astronauts from NASA, SETI, Stanford, and other universities. Prerequisite: two college-level science courses such as Human Biology core, or consent of instructor. GER: DB-NatSci

3-4 units, Win (Rothschild, L)

**HUMBIO 185. Vertebrate Biology**

(Same as BIOE 161) Study of structure, function, evolution and behavior of vertebrate animals. Consideration of vertebrate origins and examination of classes of vertebrates. Physiology, morphology, behaviors and evolutionary relationships are treated in each vertebrate group, as these relate to overall evolutionary trends within vertebrates. Topics: swimming behaviors in sharks and bony fishes, olfaction and vision in fishes, sex determination in amphibians, reptiles, birds and mammals, navigation in sea

turtles and birds, evolution and biomechanics of flight in pterosaurs birds and bats, vocalization in whales and birds, temperature adaptation in reptiles, birds and mammals.

3 units, Win (Porzig, E)

**HUMBIO 187. Human Diversity: A Linguistic Perspective**

(Same as ANTHRO 123A) The diversity and distribution of human language and its implications for the origin and evolution of the human species. The origin of existing languages and the people who speak them. Where did current world languages come from and how can this diversity be used to study human prehistory? Evidence from related fields such as archaeology and human genetics. Topics: the origin of the Indo-European languages, the peopling of the Americas, and evidence that all human languages share a common origin. GER:DB-SocSci, EC-GlobalCom

3 units, Spr (Ruhlen, M)

**HUMBIO 193. Research in Human Biology**

Independent research conducted under faculty supervision, in junior or senior year, normally but not necessarily in pursuit of an honors project. May be taken for a maximum 3 quarters of credit. Prerequisite: Faculty approval; application available in student services office.

1-5 units, Aut (Staff), Win (Staff), Spr (Staff)

**HUMBIO 194. Honors**

Completion of the honors project, normally taken in the student's final quarter. First component: the honors thesis, a final paper providing evidence of rigorous research, fully referenced, and written in an accepted scientific style. Second component: participation in the honors symposium, including a 10-minute oral presentation followed by a brief question and answer session. Prerequisites: 193 or 199, and acceptance into the honors program.

1-10 units, Aut (Staff), Win (Staff), Spr (Staff)

**HUMBIO 197. Human Biology Internship**

Limited to and required of Human Biology majors. A supervised field, community, or lab experience of student's choosing, pre-approved by Human Biology faculty and student advisers, and initiated at least three quarters prior to graduation. Participation in a poster session on the internship experience is required during the first quarter that the student is in residence at Stanford after completion of the internship. May be repeated for credit. Prerequisite: Human Biology core.

1-4 units, Aut (Staff), Win (Boggs, C), Spr (Staff)

**HUMBIO 198. Senior Tutorial in Human Biology**

Reading for Human Biology majors in exceptional circumstances and under sponsorship of Human Biology associated faculty. Students must apply through Human Biology student services before registering. Reading list, paper, and evaluation required. May be repeated for credit.

1-5 units, Aut (Boggs, C), Win (Boggs, C), Spr (Staff)

**HUMBIO 199. Directed Reading/Special Projects**

Human Biology majors must obtain a sponsor from the Human Biology associated faculty or the Academic Council. Non-majors and students who have not declared must obtain a sponsor only from the Human Biology associated faculty. Students must complete application in student services office.

1-4 units, Aut (Staff), Win (Staff), Spr (Staff)

**HUMBIO 200. Teaching of Human Biology**

For upper division undergraduates and graduate students. Practical experience in teaching Human Biology or serving as an assistant in a lecture course. May be repeated for credit.

1-5 units, Aut (Staff), Win (Staff), Spr (Staff)

## HUMANITIES AND SCIENCES (HUMSCI) COURSES

### UNDERGRADUATE COURSES IN HUMANITIES AND SCIENCES

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**HUMSCI 190. Individually Designed Major Honor's Thesis**

May be repeated for credit. (Staff)

*1-10 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**GRADUATE COURSES IN HUMANITIES AND SCIENCES**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**HUMSCI 201. Graduate Environment of Support**

Psychosocial, financial, and career issues in adapting graduate students to Stanford; how these issues relate to diversity, resources, policies, and procedures. Discussions among faculty, advanced graduate students, campus resource people, and the dean's office. (Thomas)

*1 unit, Aut (Thomas, A)*

**IBERIAN AND LATIN AMERICAN STUDIES (ILAC) COURSES****UNDERGRADUATE COURSES IN IBERIAN AND LATIN AMERICAN STUDIES**

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**ILAC 101N. THE POWER OF IMAGE**

(F,Sem) Stanford Introductory Seminar. Provides critical language and tools for analyzing visual culture, specifically art by Americans of Mexican descent. Emphasis on the three central aspects of visual studies: the image, the viewer, and the social relations governing the production, distribution and consumption of images. Focus on the power of image to shape who we are and how we think, and the capacity of viewers to interpret images in ways inflected by their social positioning.

*3-5 units, Spr (Yarbro-Bejarano, Y)*

**ILAC 105N. Madness and Modernity in Cervantes' Don Quixote**

In 2002, a panel of writers from over 50 countries named Miguel de Cervantes's *Don Quixote* the most meaningful book of all time. Along with Dante's *Commedia* and Shakespeare's *Hamlet*, it was chosen by the same panel as one of the three greatest works of the Western canon. Such praise from one's peers is no small achievement for an author who spent more time in prison than in school, and it speaks to the lasting impact of a 400-year-old work aimed as much at confounding as delighting its readers. In this course, students will engage in a close reading and discussion of this modern classic, examining both its many meanings and the ways in which it works to elude meaning altogether. GER: IHUM-3

*3-5 units, Spr (Barletta, V)*

**ILAC 106N. Contemporary Latin American Literature in Translation**

(F,Sem) Stanford Introductory Seminar. What is contemporary in Latin American literature? Which books are translated into English, and why? What to make of the gap between their publication in Spanish and their reception in the United States? The course invites students to think and write about these issues in light of translation and globalization theories. Works include a representative selection of recent fiction by Aira, Bellatin, Bolano, and Vallejo, as well as films by Schroeder and Ospina. Readings in English; Spanish originals available.

*3-5 units, Win (Hoyos, H)*

**ILAC 112Q. Latin American Cities Through Literature and Film**

A study of urban issues in Latin American cities, such as Buenos Aires, Montevideo, Lima, Medellin, Quito, Mexico City, Santiago, La Paz and Sao Paulo using literary works and films, using literary works and films. Books and films by Javier Vásconez, Mario Benedetti, Sebastián Cordero, Alicia Scherson, Antonio Serrano, Gisela Kozak, Francisco Lombardi, Veronica Chen, Fernando Vallejo, Barbet Schroeder, Walter Salles, and Roman Chabaud, Santiago Roncagliolo among others.

*3-5 units, not given this year*

**ILAC 114N. Lyric Poetry**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. For students with at least two years of language preparation. Focus is on principal elements and expressive devices of lyric poetry: multi-dimensional use of language, denotation, connotation, image, metaphor, symbol, paradox, irony, meaning, idea, rhythm, and meter. Readings include the best of major poets of Spain and Latin America: Becquer, Rosalía de Castro, Ruben Dari-o, Unamuno, Antonio Machado, Garca Lorca, Neruda, and Gabriela Mistral Bilingual in English and Spanish with an emphasis on Spanish.

*3-5 units, Aut (Predmore, M)*

**ILAC 117N. Film, Nation, Latinidad**

(Same as CHICANST 117N, CSRE 117N) Examination of films from Spain, Mexico, and Latina/o USA that expand, trouble, contest, parody, or otherwise interrogate notions of national identity. Filmmakers may include Lourdes Portillo, Alejandro Gonzalez Inrritu, John Sayles, Maria Novaro, Pedro Almodvar, and Gregory Nava.

*3-4 units, not given this year*

**ILAC 118N. Slavery and Freedom, Madness and Reason in Brazil; the Fiction of Machado de Assis**

(F,Sem) Stanford Introductory Seminar. Praised by Woody Allen and Salman Rushdie as the greatest Brazilian novelist of the 19th Century, Machado de Assis (1839-1908) became a recent pop star of world literature. To Harold Bloom he is a kind of miracle, as the grandson of freed slaves in Brazil, who deserved to be included in Bloom's book *Genius: A Mosaic of One Hundred Exemplary Creative Minds*. In his texts, a paradoxical combination of guilt and innocence, jealous and love challenges the reader to make risk choices wisely. This course presents Machado de Assis masterpieces: the novels, *The Posthumous Memoirs of Bras Cubas* (1881), and *Dom Casmurro* (1900), the short novel *The Alienist* (1882) and a selection of his short stories. Key critical concepts and an overview of his reception in Brazil and in the US will support our discussions. GER: IHUM-3

*3-5 units, Spr (Librandi Rocha, M)*

**ILAC 120. Introduction to Literary and Scholarly Research**

Strategies and tactics for research and writing in the humanities; focus is on the Spanish-speaking world. How to write a research proposal; how to conduct research online and in the library; annotated bibliographies; bibliographical essays; rhetorical strategies; and common logical fallacies. (Meets Writing-in-the-Major requirement) WIM

*3-5 units, Win (Surwillo, L)*

**ILAC 121. NARRATIVES OF AFFECT**

A growing number of contemporary Latin American novels and films focus on precarious forms of life and narratives of care, beyond the disciplinary discourses of medicine and psychiatry. This course takes stock of these narratives to explore the literary dimension of care. Parting from theorizations of affect, we explore varieties of emotions, modes of care, and caring identities, as well as the emphasis on human-animal and human-plant relations. Authors and film directors may include: Mario Bellatin, Alejandro Zambra, Alan Pauls, Sergio Chejchec, Lina Meruane, Diamela Eltit, Mario Cohn, Gaston Dupratt, Lucrecia Martel. Taught in Spanish

*3-5 units, Win (Briceno, X)*

**ILAC 130. Introduction to Iberia: Cultural Perspectives**

The historical dynamics, linguistic plurality, and social complexity of the Iberian world. Topics include: empire, independence Civil war; republicanism; the crisis at the end of the century: the year 98; the civil war; dictatorships, Franco, and Salazar. Major figures include Larra, Esproceda, Bequer, Rosala de Castro, Verdaguera, Galdos, Maragall, Unamuno, Valle-Inclan, Machado, and Lorca. GER: DB-Hum

*3-5 units, Spr (Surwillo, L)*

**ILAC 131. Introduction to Latin America: Cultural Perspectives**

Major theoretical debates about the construction of Latin American identities, from the 19th century to the present. Readings by writers, poets, philosophers, and historians, including Rodo, Retamar, O'Gorman, Vasconcelos, Henrquez-Urea, Ramos, Paz, Carpentier, Lezama Lima, Borges, and Fuentes. GER: DB-Hum

3-5 units, *Win* (Librandi Rocha, M)

### ILAC 136. Modern Iberian Literatures

Survey on modern Iberian literatures (Spanish, Catalan, Basque, Galician and Portuguese) through major canonical authors. Community building, tolerance, the ethics of memory, the value of human purpose as a tool for survival are some of the issues explored in key works by Eca de Queiros, Miguel de Unamuno, García Lorca, Fernando Pessoa, Antonio Machado, Merce Rodoreda, Maria Angels Anglada, Ramon Sainzarboritoria and Manuel Rivas. SPANLANG 13 or equivalent, SPANLANG 102 Recommended GER:DB-Hum

3-5 units, *Aut* (Resina, J)

### ILAC 155. A Reader of Early Modern Spain

(Same as ILAC 255) Cervantes was an astute reader of the literature, culture, and politics of his age. This class is both a study of sixteenth and early seventeenth-century Iberia seen through Cervantes the reader and an introduction to early modern reading practices, methods of manuscript and book production, and histories of textual reception and circulation. Although readings include selections from Cervantes's works, the course examines lyric poetry, popular prose, political treatises, literary criticism, and drama from other early modern authors as well. GER:DB-Hum

3-5 units, *Spr* (Kimmel, S)

### ILAC 157. Medieval and Early Modern Iberian Literatures

This survey of the literatures and cultures of medieval and early modern Iberia covers different kinds of literary texts, including lyric and epic poetry, frame tales, Renaissance prose, and Baroque drama, as well as selections from Muslim, Jewish, and Christian philosophical and theological works. Though the focus is on close reading and analytical skills in Spanish, the class also serves as an introduction to the linguistic hodgepodge that is Iberian history from the eighth through the seventeenth century. GER:DB-Hum

3-5 units, *Aut* (Kimmel, S)

### ILAC 158. New Lat American Short Stories and Films (1980-2009): a Survey

(Same as ILAC 258, ILAC 278B) The short story is one of the most popular literary forms and in Latin America it enjoyed the double tradition of its vernacular origins and the influence of European models. Focus will be in the modern short story from the Sixties to the present with attention on works by Borges, Garro, Cortazar, Poniatowska, Fuentes, Onetti, Somers, Benedetti, Arreola, along with a parallel examination of short films, some of them adaptations of short stories. ILAC 278B approved in place of ILAC 278 or 278A.

3-5 units, *Aut* (Ruffinelli, J)

### ILAC 161. Modern Latin American Literature

From independence to the present. Topics include romantic allegories of the nation; modernism and postmodernism; avant-garde poetry; regionalism versus cosmopolitanism; indigenous and indigenist literature; magical realism and the literature of the boom; Afro-Hispanic literature; and testimonial narrative. Authors may include: Boli-var, Bello, Gomez de Avellaneda, Isaacs, Sarmiento, Machado de Assis, Dario, Marti-, Agustini, Vallejo, Huidobro, Borges, Cortizar, Neruda, Guillon, Rulfo, Ramos, Garci-a Marquez, Lispector, Bolano. GER:DB-Hum

3-5 units, *Win* (Briceno, X)

### ILAC 189A. Honors Research

Senior honors students enroll for 5 units in Winter while writing the honors thesis, and may enroll in 189B for 2 units in Spring while revising the thesis. Prerequisite: DLCL 189.

5 units, *Win* (Staff)

### ILAC 189B. Honors Research

Open to juniors with consent of adviser while drafting honors proposal. Open to senior honors students while revising honors thesis. Prerequisites for seniors: 189A, DLCL 189.

2 units, *Spr* (Staff)

### ILAC 193. The Cinema of Pedro Almodovar

Pedro Almodovar is one of the most recognizable auteur directors in the world today. His films express a hybrid and eclectic visual style and the blurring of frontiers between mass and high culture. Special attention is paid to questions of sexuality and the centering of usually marginalized characters. This course studies Pedro Almodovar's development from his directorial debut to the present,

from the shocking value of the early films to the award-winning mastery of the later ones. Prerequisite: ability to understand spoken Spanish. Readings in English. Midterm and final paper can be in English. Majors should write in Spanish. GER:DB-Hum

3-5 units, *Spr* (Resina, J)

### ILAC 193Q. Spaces and Voices of Brazil through Film

(S.Sem) (Same as PORTLANG 193Q) Stanford Introductory Seminar. The manners in which a country is perceived and defines itself is a result of many complex forces, and involves the reproduction of social relations and complex social constructions both on the part of those who live there and those who see it from a distance. The perceptions of what Brazil is and what defines the country has changed throughout times, but has conserved some clear pervasive defining traits. This course is an introduction to the history, culture, politics and artistic production of Brazil as seen through feature films, documentaries and some complementary readings. Movies include, among others, Banana is my Business, Black Orpheus, Olga, They Don't Use Black-Tie, City of God, Central Station, Gaijin, and Four Days in September-among others. In English. GER:DB-Hum, EC-GlobalCom

3-4 units, *Aut* (Wiedemann, L)

### ILAC 197. Brazilian Culture in a Comparative Latin American Perspective

Brazilian modernization and cultural dynamism in the second half of the 20th century. Concrete poetry and its relation to the construction of Brasilia, the bossa nova movement, and tropicalism. Comparative studies in the global art context. Authors include: Haroldo de Campos, Augusto de Campos, Decio Pignatari, Eugen Gomringer, Severo Sarduy, Octavio Paz, Ramón Xirau, Max Bense, and Charles Bernstein. Texts in English, Spanish, and Portuguese.

3-5 units, *not given this year*

### ILAC 199. Individual Work

Open only to students in the department, or by consent of instructor.

1-12 units, *Aut* (Staff), *Win* (Staff), *Spr* (Staff), *Sum* (Staff)

### ILAC 201. Gender, Body, Nation, & the Interpretation of Contemporary Catalan Literature & Art

The notions of gender, body, and nation are adequate interpretive tools in order to read the otherization processes that affect Catalan cultural identity as portrayed in contemporary literature and art. In this seminar we will review, in the first place, a number of critical contributions dealing with Post-Franco cultural identity construction, such as Josep-Anton Fernández's *Another Country* and his contributions to *Calçasses, gallines i maricons*, which link sexual and national subordination; Katryn Cramer's *Language, the Novelist and National Identity in Post-Franco Catalonia*, which explores the ties between language and national identity; and Stewart King and Irene Boada's essays on the possibility of using postcolonial criticism in reading the Catalan scenario. Secondly, in light of the concepts of body, gender, and nation we will analyze a number of literary and artistic productions belonging to different fields: a) prose (a selection of short stories by Carme Riera and Quim Monzó)

3-5 units, *Aut* (Pons Jaume, M)

### ILAC 204. Spanish Nationalist Discourses from Franco to Zapatero: What does 'plural Spain' mean?

(Same as HISTORY 272A) Spanish nationalism and 'patriotic affirmation' discourses existing in contemporary Spain. Since the end of Francoism, Spanish nationalism has existed in a de-articulated and diffuse way, rather as a reaction against the challenge of stateless nationalisms than as a substantive doctrine. However, since the mid-1980s there has been a recovery of Spanish nationalist discourse, often labeled as 'Constitutional patriotism', whose main point is the insistence on History as the founding basis for the legitimation of the present Spanish polity, as well as the vindication of the 1978 Constitution as the end-point of decentralization.

3-5 units, *not given this year*

### ILAC 214. Crypto-Muslim Culture in Early Modern Spain

(Same as RELIGST 220B) What is known about the secret religious practice and culture of the Moriscos, Spain's large minority community of Muslim converts to Christianity (1500-1609)? What role did their handwritten literature (largely Islamic



texts written in Castilian but copied out in Arabic script) play in the formation and maintenance of their culture? What can these Crypto-Muslim communities teach us regarding the place of Muslim culture in Western Europe today? The course will be taught in English; knowledge of Spanish and/or Arabic script is useful but not necessary.

3-5 units, not given this year

#### **ILAC 215. PORTUGAL, EMPIRE, AND ISLAM**

(Same as ILAC 278C) Focus is on literature related to Portugal's early modern empire in Muslim Africa and Asia. Readings in Portuguese. Authors include Luis de Camoes, Gomes Eanes de Zurara, Miguel de Castanhoso, Frenao Mendes Pinto, and Joao de Barros. ILAC 278C approved in place of ILAC 278 or 278A

3-5 units, Win (*Barletta, V*)

#### **ILAC 229. The work of Luis Martín Santos in Mid-Twentieth Century Spain**

(Same as COMPLIT 218) First published in 1962, *Tiempo de Silencio* is the only book that the young psychiatrist Luis Martín Santos finished during his lifetime, and, although largely overlooked (even in Spain) until the present day, one of the great European novels of the 20th century. It brings to a complex convergence the evocation of Spain's decadent and run-down post-Civil War society with high-modernist literary procedures and (an implicit parody of) phenomenological analysis.

3-5 units, not given this year

#### **ILAC 237. Viewing Modern Barcelona**

An overview of Barcelona's modern history since the 19th century expansion through the 1992 Olympics to the 21st century's challenges of globalization. At the crossroads of an active traffic of goods, people, and cultures, this cosmopolitan city in Spain is also the capital of Catalonia, home of a millennial European culture. This interdisciplinary seminar will acquaint students with salient aspects of the history of this city, its role in Spain's modernization and democratization as well as its tensions with the state. Attention will be given to city planning, the architecture of Gaudi-, Picasso's, Miro's and Dali-'s art, the politics of bilingualism and literature about the city. (Taught in English.)

3-5 units, Aut (*Resina, J*)

#### **ILAC 240E. Borges and Philosophy**

Analysis of the Argentine author's literary renditions of philosophical ideas. Topics may include: time, free will, infinitude, authorship and self, nominalism vs. realism, empiricism vs. idealism, skepticism, peripheral modernities, postmodernism, and Eastern thought. Close reading of short stories, poems, and essays from Labyrinths paired with selections by authors such as Augustine, Berkeley, James, and Lao Tzu. The course will be conducted in English; Spanish originals will be available. Satisfies the capstone seminar requirement for the major in Philosophy and Literature. GER:DB-Hum

3-5 units, not given this year

#### **ILAC 242. POETRY WORKSHOP IN SPANISH**

Latin American and Spanish poetry approached through elements of craft. Assignments are creative in nature and focus on lyric subgenres (e.g. ode, elegy, prose poetry) and formal elements of poetry (e.g. meter, rhythm, rhetorical figures, and tropes). Students write original poems over the course of the quarter. No previous experience with creative writing is required. Authors include Dari-o, Machado, Jimenez, Vallejo, Huidobro, Salinas, Pales Matos, Lorca, Alexandre, Cernuda, Neruda, Gironde. Course is offered every other year. Enrollment limited. Prerequisite: 100-level course taught in Spanish or equivalent. Enrollment limited to 10 students.

3-5 units, Spr (*Santana, C*)

#### **ILAC 247E. Magical Realism and Globalization**

Is magical realism a genre, a style, a politics, or a label for elaborate fiction from the Third World? Seminal works and their role in the 20th century. Topics include: postcolonial discourse, myth and truth, tradition versus modernity, and realism versus fantasy. Novels, plays, and short stories by García Márquez, Rushdie, and Morrison; films by Schlöndorff and Begnigni; essays by Roh and Carpentier. GER:DB-Hum

3-5 units, not given this year

#### **ILAC 250. Latin America at the End of the Cold War**

Systematic study of the cultural transformations in Latin America

before and after the fall of the Berlin Wall. Comparisons between works that respond to the defining moments of the conflict (Neruda, Cardinal) and texts that reflect on its later, residual stage. Fiction: *Sin remedio* by Antonio Caballero, *Literatura nazi en América* by Roberto Bolaño, and *Pasado Perfecto* by Leonardo Padura. Film: *Hijos de la guerra fría* by Gonzalo Justiniano. Theoretical readings by Jorge Castañeda, Michael Reid, and Jean Franco.

3-5 units, not given this year

#### **ILAC 259. Military, Intelligentsia, Las Madres of Plaza de Mayo & Tlatelolco: Film & Politics 1968-2009**

An examination of how contemporary Latin American cinema (in documentaries and feature films) has focused on several historical pockets of the Continent: the Dirty War, the Falkland Islands war, the Tlatelolco Massacre, the Vladivideos and corruption in Peru, the Disappeared, as part of the historical reconstruction of the recent past. Films: *La deuda interna*, *Rojo Amanecer*, *La historia oficial*, *Por esos ojos*, *La noche de los lápices*, *Mariposa Negra*, *Cautiva*, *Hijos/Figli* and others.

3-5 units, not given this year

#### **ILAC 262. The Literature of Elena Poniatowska**

Detailed reading of the major works of Elena Poniatowska, one of the most innovative and important Mexican women writers in the XX and XXI centuries. She has developed the testimonial journalistic genre and the literary novel as expressions of society. Readings include: *La noche de Tlatelolco* (1971) to *El tren pasa primero* (2006, Romulo Gallegos Prize) and *Leonora* (Biblioteca Breve Award, 2011). Elena Poniatowska will visit Stanford to celebrate her 80th birthday. Taught in Spanish.

3-5 units, Win (*Ruffinelli, J*)

#### **ILAC 264. VISIONS OF THE ANDES**

(Same as ILAC 364) What visions and images of the Andes circulate in Latin American literature? How are they constructed? How is their value accrued? The course explores the visual economy of the Andes in representative literary texts of the 20th century, vis-a-vis critical discourses about Andean culture. Topics: visual culture and identity, iconography and the word/image tension, nature vs. culture, debates on utopia, indigenismo, mestizaje, and hibridez. Authors may include: Pablo Neruda, Gabriela Mistral, Martí-n Chambi, Jose Carlos Mariategui, Cesar Vallejo, Jose Maria Arguedas, Mario Vargas Llosa, Raul Salmon, Aurelio Arturo.

3-5 units, Aut (*Briceno, X*)

#### **ILAC 271. Brazilian Presence: Landscape, Life and Literature**

This course explores Brazil's literature and its representation of the country's diverse regional cultures and ecology. The course offers an in-depth discussion of Brazilian society, presenting fundamental texts that portray Brazilian landscape with its diverse eco-regions, people and culture. The program includes major authors such as Euclides da Cunha and his description of the Amazon in the early 1900s; the travels of anthropologist Claude Levi-Strauss and his contact with Caduveo, Nhambiquara, Bororo and Tupi indigenous tribes; Mario de Andrade's novel, *Macunaima* and its ironical representation of Brazilian identity and miscegenation; Guimarães Rosa's short stories that show the imagery of the sertao and its people (the sertanejo culture); Milton Hatoum's novel, *The Brothers*, and its impressive portrayal of Manaus city in the 20th Century as an unstable world seen through the lens of Lebanese immigrants. These central books will be discussed together with critical essays about some i GER:EC-GlobalCom

3-5 units, Spr (*Librandi Rocha, M*)

#### **ILAC 272B. Frontiers of Iberian and Latin American Culture and History**

(Same as HISTORY 272B, HISTORY 372B, ILAC 372B) Analyzes the construction and deconstruction of communities and their internal and external frontiers in Iberia and Ibero-America from the early modern period to the early twentieth century by observing both historical and cultural artifacts (historical documents, novels, bibliography, etc.). Topics: the coming of nations, the making of state (or national) territory, the role assigned or taken on by immigrants, minorities and, in the American case, natives, and the persistence of areas now called borderlands or of groups now assigned to such (indeterminate) locations. GER:DB-SocSci

3-5 units, Aut (*Surwillo, L; Herzog, T*)



**ILAC 272E. Clarice Lispector: the Style of Ecstasy**

An exploration of the presence, both in the mystic and in the erotic sense, of the feeling of ecstasy in Clarice Lispector's texts (novels, short stories, chronicles). Ecstasy favors a non-conceptual approach to writing and reading and an effect of delight that can be only communicated by words that mimitizes music and visual arts. Theoreticians of ecstasy, eroticism and epiphany: G. Bataille, H. Cixous, Jean-Luc Nancy; Gumbrecht, Lyotard. Course taught English with readings in English and Portuguese.

3-5 units, not given this year

**ILAC 278. Senior Seminar: Early 20th Century Iberian Poets**

Major works of Antonio Machado, Juan Ramón Jiménez, and Federico García Lorca will be examined, with special emphasis on the historical context of the first three decades of the 20th century and their contributions to the development of 20th century Spanish lyric poetry. GER:DB-Hum

3-5 units, not given this year

**ILAC 278B. New Lat American Short Stories and Films (1980-2009): a Survey**

(Same as ILAC 158, ILAC 258) The short story is one of the most popular literary forms and in Latin America it enjoyed the double tradition of its vernacular origins and the influence of European models. Focus will be in the modern short story from the Sixties to the present with attention on works by Borges, Garro, Cortazar, Poniatowska, Fuentes, Onetti, Somers, Benedetti, Arreola, along with a parallel examination of short films, some of them adaptations of short stories. ILAC 278B approved in place of ILAC 278 or 278A.

3-5 units, Aut (Ruffinelli, J)

**ILAC 278C. PORTUGAL, EMPIRE, AND ISLAM**

(Same as ILAC 215) Focus is on literature related to Portugal's early modern empire in Muslim Africa and Asia. Readings in Portuguese. Authors include Luis de Camoes, Gomes Eanes de Zurara, Miguel de Castanhoso, Frenao Mendes Pinto, and Joao de Barros. ILAC 278C approved in place of ILAC 278 or 278A

3-5 units, Win (Barletta, V)

**ILAC 280. Latin@ Literature**

(Same as CHICANST 200, CSRE 200, ILAC 382) Texts by U.S. Latin@s of Mexican, Puerto Rican, Cuban, and Dominican descent. Examines how these writers' shared history of Spanish colonization and U.S. imperialism has resulted in differing representations of home and homeland, nation, diaspora, history, and memory. Explores how racialization informs the production of gendered identities as well as sexualities. Analysis of the formal conventions of fiction, poetry, drama, memoir, and film.

3-5 units, Win (Yarbro-Bejarano, Y)

**ILAC 287. QUEER RAZA**

(Same as FEMST 120) Examination of cultural representations by U.S. Latin@s that explore the following questions: How is the mutual constitution of race/sex/class/gender theorized and represented? How is desire racialized? How is racial difference produced through sex acts and what is the function of sex in racial (self)formation? How to reconcile pleasure and desire with histories of imperialism and (neo)colonialism and other structures of power? How do these texts reinforce or contest stereotypes and the ideal bodies of national identity? How do these texts produce queerness as a web of social relations?

3-5 units, Win (Yarbro-Bejarano, Y)

**ILAC 332. Race and Slavery in Nineteenth Century Spanish Empire**

An analysis of the literature written in Spain during the nineteenth and twentieth centuries dealing with the empire post 1808. Authors discussed include Blanco White, Baroja, Avellaneda, and Rusiñol, among others

3-5 units, not given this year

**GRADUATE COURSES IN IBERIAN AND LATIN AMERICAN STUDIES**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**ILAC 212. Cuban Cinema since the Revolution**

Since 1959, Cuba has developed a unique style of social, political and Cultural Revolution that has lasted 50 years, which calls for an

analysis and discussion of Cuban cinema as an expression, and a mirror of society, as well as a tool for social transformation. Films: Now! Lucia, Memories of Underdevelopment, Portrait of Teresa, and The Days of Water, Strawberry and Chocolate, among others. In the documentary genre the focus will be in films made about Ernesto Che Guevara. Taught in Spanish.

3-5 units, Win (Ruffinelli, J)

**ILAC 218. Anticlericalism in the Iberian Novel of XIX**

The rapid social and cultural changes in which 19th-century novelists wrote; the anti-clerical stance as marker of society's attempts to modernize. Why were monks and priests reviled by many Spanish novelists? How and why did they re-write Spanish history around these figures? What was the role of the church and religious men in modern society? Questions of individualism, property, and labor in novels by major Iberian prose realists. In Spanish.

3-5 units, not given this year

**ILAC 222. The Problem of Two Spains: Literature and Society in 19th-Century Spain**

Representative literary figures including Larra, Espronceda, Zorrilla, Rosalía de Castro, Bécquer, and Galdós. Modern lyric poetry and the modern realist novel against the background of Napoleonic invasions, the loss of overseas colonies, two Carlist civil wars, and frustrated attempts to establish the First Spanish Republic.

3-5 units, not given this year

**ILAC 224. Literature and the Spanish Civil War**

This course will deal with the significance of the Spanish Civil War in Iberian, European, and world history, through the literary works (poetry, theater, and novel) of major Spanish and Latin American writers. The war is anticipated in the poetry of Antonio Machado and in the theater of Garci-a Lorca, dealt with directly in the poetry of Alberti and Hernandez, and of Neruda (Chile), Vallejo (Peru), and N. Guillen (Cuba), and treated in the aftermath during the Franco dictatorship in the novels of Cela and Sender.

3-5 units, Win (Predmore, M)

**ILAC 225E. Theater, Society, and Politics in 20th-Century Spain**

Ramón del Valle-Inclán and Federico García Lorca. The avant garde nature of their major plays and their engagement with social and political issues of the times including feudalism, the emerging liberal state, women's protest, class struggle, and civil war. Symbolism, expressionism, and realism.

3-5 units, not given this year

**ILAC 239. BORGES AND TRANSLATION**

Borges's creative process and practice as seen through the lens of translation. How do Borges's texts articulate the relationships between reading, writing, and translation? Topics include authorship, fidelity, irreverence, and innovation. Readings will draw on Borges's short stories, translations, and essays. Prerequisite: 100-level course in Spanish or permission of instructor.

3-5 units, Win (Santana, C)

**ILAC 255. A Reader of Early Modern Spain**

(Same as ILAC 155) Cervantes was an astute reader of the literature, culture, and politics of his age. This class is both a study of sixteenth and early seventeenth-century Iberia seen through Cervantes the reader and an introduction to early modern reading practices, methods of manuscript and book production, and histories of textual reception and circulation. Although readings include selections from Cervantes's works, the course examines lyric poetry, popular prose, political treatises, literary criticism, and drama from other early modern authors as well.

3-5 units, Spr (Kimmel, S)

**ILAC 258. New Lat American Short Stories and Films (1980-2009): a Survey**

(Same as ILAC 158, ILAC 278B) The short story is one of the most popular literary forms and in Latin America it enjoyed the double tradition of its vernacular origins and the influence of European models. Focus will be in the modern short story from the Sixties to the present with attention on works by Borges, Garro, Cortazar, Poniatowska, Fuentes, Onetti, Somers, Benedetti, Arreola, along with a parallel examination of short films, some of them adaptations of short stories. ILAC 278B approved in place of

ILAC 278 or 278A.

3-5 units, *Aut (Ruffinelli, J)*

**ILAC 299. Individual Work**

Open to department advanced undergraduates or graduate students by consent of professor. May be repeated for credit.

1-12 units, *Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**ILAC 301. 19th Century Iberian Political Thought**

This seminar will study the main trends in Spanish political and cultural thinking in the 19th century and its reflection in literary culture. From Antonio Capmany's anti-Napoleonic *Centinela contra franceses* to the moderantismo represented by Jaume Balmaes and the conservatism of Donoso Cortes, to the federalism of Pi y Margall, the *¿Iberianism of Oliveira Martins*, the particularism of Valenti Almirall, the regeneracionismo of Joaquín Costa, and the emergence of modern nationalism with Ganivet and Unamuno. Readings will include contemporary historiographic reflections on the 19th-century consolidation of the nation state and the invention of national traditions. Taught in Spanish

3-5 units, *Win (Resina, J)*

**ILAC 313. Centers and Peripheries in Contemporary Catalan Culture**

This seminar will deal with the concepts of center and periphery in contemporary Catalan culture. We will analyze the specificity of canon-formation processes in the Catalan literary system (e.g. the contacts and frictions with the Spanish/Iberian framework or the biased reception of the North American debate on literary canon [Bloom et al.]). Centrality and periphericity will be examined in a variety of fields and artistic productions: a) geography (insularity as condition, limit and motif in Blai Bonet's novel *El mar* and in Miquel Barceló's paintings and writings); b) experimental literature (objectual and visual poetry as suburbia of the lyrical genre); and c) transmediality (Ventura Pons's *Amic/Amat* both as a film adaptation of Josep M. Benet i Jornet's *Testament* and as an independent work). This course will be taught in Spanish. Written assignments can be submitted in Catalan, English or Spanish.

3-5 units, *Aut (Pons Jaume, M)*

**ILAC 316. Realism and Surrealism in the Cinema of Luis Bunuel**

Surrealism, realism, dark comedy, film genres transformed by Spanish director, Luis Bunuel in Spain, France and Mexico during the second half of the XX century. An examination of Bunuel's work from his Surrealist beginnings (*L'Age d'Or*, *Un Chien Andalou*), subsequent realistic films in Mexico (*Los Olvidados*, *Nazarin*), and a mixture of Surrealism and Realism (*Viridiana*, *Exterminating Angel*, *Simon del Desierto*), as well his work with dark comedy (*Archibaldo de la Cruz*, *Belle de Jour*, *Le charme discret de la bourgeoisie*). In Spanish.

3-5 units, *Spr (Ruffinelli, J)*

**ILAC 319. Performance Spaces in Spanish Theater**

Students in this course will read theater works from the Spanish repertoire across several centuries with critical attention to the architectural and theoretical spaces in which they were and are performed.

3-5 units, *Win (Surwillo, L)*

**ILAC 323. Renaissance/Early Modern Seminar**

Focus is on how authors and readers from this period theorize various historical processes: the rise of European imperialism; religious conflicts and revolutions; new understandings of the self and the world; and the rise of the novel. Authors: Boccaccio, Machiavelli, Martorell, Rabelais, Camões, Cervantes, Montaigne, and Shakespeare.

3-5 units, *Win (Barletta, V)*

**ILAC 330. Josep Pla: From Journalism to Literature**

In the 1920s and 30s journalism gave the tone to a normalized Catalan culture, whose distinctive traits were a cosmopolitan outlook and a high degree of professionalism. It is in this context that the works of journalist Josep Pla grow from an underbrush of quality journalism that, long neglected, throws light on the social and political situation of the time and constitutes an unsurpassed civilizational referent for today's culture wars. Some of the journalists studied are Josep Pla, Eugeni d'Ors, Eugeni Xammar, and Gaziol. Readings in Catalan will be available in Spanish, but

students are responsible for ordering the texts in the preferred version.

3-5 units, *not given this year*

**ILAC 336. Early 20th-Century Peninsular Spanish Poetry**

Poetry in restoration Spain, 1871-1930, against the background of the democratic tradition of Spanish liberalism. Emphasis is on stylistic analysis and concepts such as the generation of 1898, modernism, Krausism, pure poetry, and symbolic systems.

3-5 units, *not given this year*

**ILAC 340. The Crowded Solitude of Juan Rulfo: his Writing, his Photography, his Children, his Legacy**

A study of Mexican writer Juan Rulfo's literary work and photography as well as the film adaptations of his work, his portrayal in documentaries authored by his son Juan Carlos Rulfo and his literary legacy among young writers who have continue his work, like Elmer Mendoza's *Cóbrase Caro* and Susana Pagano's *Y si yo fuera Susana San Juan?*

3-5 units, *not given this year*

**ILAC 344. Theorizing the Novel after 1989**

Issues of literary historiography, canon formation, and cultural relevance through a detailed study of selected works, criticism, and theory from the last two decades. Topics may include: postnationalism, cultural synchronization, fiction as commodity, revisions of dictatorship, new media ecologies, anxiety of influence, meaning-making communities, and relations to visual culture. Readings by Latin American authors: Bolaño, Vallejo, Eltit, Bellatin and Fuguet. Critical texts by Richard, Sarlo, Rancière, and Casanova.

3-5 units, *not given this year*

**ILAC 349. LITERARY THEORY**

(Same as COMPLIT 349, DLCL 349, SLAVLIT 349) Advanced survey course of key schools in literary theory, from formalism onwards. Emphasis is on the discussion of primary sources. Topics include structuralism, ideology critique, psychoanalysis, reception aesthetics, deconstruction, feminism, and post-colonialism. Readings by Barthes, Bakhtin, Benjamin, Borges, Derrida, de Man, Foucault, Freud, Iser, Lacan, Shklovsky, and Spivak, among others.

3-5 units, *Aut (Hoyos, H; Skakov, N)*

**ILAC 349. LITERARY THEORY**

(Same as COMPLIT 349, DLCL 349, SLAVLIT 349) Advanced survey course of key schools in literary theory, from formalism onwards. Emphasis is on the discussion of primary sources. Topics include structuralism, ideology critique, psychoanalysis, reception aesthetics, deconstruction, feminism, and post-colonialism. Readings by Barthes, Bakhtin, Benjamin, Borges, Derrida, de Man, Foucault, Freud, Iser, Lacan, Shklovsky, and Spivak, among others.

3-5 units, *Aut (Staff)*

**ILAC 364. VISIONS OF THE ANDES**

(Same as ILAC 264) What visions and images of the Andes circulate in Latin American literature? How are they constructed? How is their value accrued? The course explores the visual economy of the Andes in representative literary texts of the 20th century, vis-a-vis critical discourses about Andean culture. Topics: visual culture and identity, iconography and the word/image tension, nature vs. culture, debates on utopia, indigenismo, mestizaje, and hibridez. Authors may include: Pablo Neruda, Gabriela Mistral, Martí-n Chambi, Jose Carlos Mariategui, Cesar Vallejo, Jose Maria Arguedas, Mario Vargas Llosa, Raul Salmon, Aurelio Arturo.

3-5 units, *Aut (Briceno, X)*

**ILAC 369. LISTENING TO LITERATURE**

How does fictional prose dialogue and incorporate musical paradigms in its creation? How can one describe the voice of a fictional character and of a literary style? How could novels be described in analogy with musical and audition patterns? Theories of literacy and orality will be connected to the sense of hearing, aurality, and auditivity. Possible authors: Claude Levi Strauss, Derrida, Barthes, Lyotard, W. Ong, Way Chee Dimock, Carpentier, Cortazar, Rosa, Lispector, Chatwin, Italo Calvino. Readings in English, French, Spanish and Portuguese (or in translation)

3-5 units, *Win (Librandi Rocha, M)*

**ILAC 370E. Machado de Assis: Mimesis, Memory and money Machinations**

Machado de Assis's paradoxes: the greatest author of the 19th Century and his oblique and peripheral perspective. The ruins and rebuilds of memory: Memórias Póstumas de Brás Cubas and Memorial de Aires; Jealously view and its mimesis in Dom Casmurro; his short stories and Rio de Janeiro's 19th century's sociability. The economy in his chronicles. Recent critical readings and editions. Course taught English with readings in English and Portuguese.

3-5 units, not given this year

**ILAC 372B. Frontiers of Iberian and Latin American Culture and History**

(Same as HISTORY 272B, HISTORY 372B, ILAC 272B) Analyzes the construction and deconstruction of communities and their internal and external frontiers in Iberia and Ibero-America from the early modern period to the early twentieth century by observing both historical and cultural artifacts (historical documents, novels, bibliography, etc.). Topics: the coming of nations, the making of state (or national) territory, the role assigned or taken on by immigrants, minorities and, in the American case, natives, and the persistence of areas now called borderlands or of groups now assigned to such (indeterminate) locations.

3-5 units, Aut (Surwillo, L; Herzog, T)

**ILAC 380E. Critical Concepts in Chicana/o Literature**

(Same as CHICANST 201C, CSRE 201C) Interrogation of the critical discourses that have configured and reconfigured the canon of Chicana/o literature over the last thirty years. Close textual readings of primary texts, mainly narrative, within the development of Chicana/o literary and cultural criticism. Construction of narrative genealogies and foundational texts. Impact of the publication of late-nineteenth or pre-movement novels and Chicana feminist/lesbian/queer critiques. Consideration of alternative paradigms such as positioning Chicana/o literature within a U.S. Latina/o literary imaginary, and the shift of critical discourse in the field of visual art from a paradigm of resistance and affirmation to one of post Chicano.

3-5 units, not given this year

**ILAC 382. Latin@ Literature**

(Same as CHICANST 200, CSRE 200, ILAC 280) Texts by U.S. Latin@s of Mexican, Puerto Rican, Cuban, and Dominican descent. Examines how these writers' shared history of Spanish colonization and U.S. imperialism has resulted in differing representations of home and homeland, nation, diaspora, history, and memory. Explores how racialization informs the production of gendered identities as well as sexualities. Analysis of the formal conventions of fiction, poetry, drama, memoir, and film.

3-5 units, Win (Yarbro-Bejarano, Y)

**ILAC 389E. Race / Sex / Gender in Cultural Representations**

Critical theory and cultural representations in a variety of media that address issues surrounding the representation of race, gender, sexuality and politics. How is desire racialized? How is racial difference produced through sex as a material practice and what is the function of sex in racial (self)formation? How do we reconcile questions of pleasure and desire and the structures of power? How do these texts reinforce or contest stereotypes and the ideal bodies of national identity? Is it desirable to envision a bridging of queer communities of color, or a transnational, transfronterizo or global network?

3-5 units, Spr (Yarbro-Bejarano, Y)

**ILAC 399. Individual Work**

For Spanish and Portuguese department graduate students only. Prerequisite: consent of instructor.

1-12 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**ILAC 802. TGR Dissertation**

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

## IBERIAN LANGUAGES (IBERLANG) COURSES

### UNDERGRADUATE COURSES IN IBERIAN LANGUAGES

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**IBERLANG 7. First-Year Basque Language and Culture, First Quarter**

Speaking, reading, writing, and listening. Authentic and classroom materials. Interactive approach with emphasis on developing communicative expression. The cultural context in which Basque is spoken.

5 units, Aut (Lopez de Luzuriaga Martinez, J)

**IBERLANG 8. First-Year Basque Language and Culture, Second Quarter**

Continuation of 7. Speaking, reading, writing, and listening. Authentic materials. Interactive approach with emphasis on developing communicative expression. The cultural context in which Basque is spoken. Prerequisite: 7 or equivalent.

5 units, Win (Lopez de Luzuriaga Martinez, J)

**IBERLANG 9. First-Year Basque Language and Culture, Third Quarter**

Continuation of 8. Speaking, reading, writing, and listening. Authentic materials. Interactive approach with emphasis on developing communicative expression. The cultural context in which Basque is spoken. Prerequisite: 8 or equivalent. Completion of 9 fulfills the University language requirement.

5 units, Spr (Lopez de Luzuriaga Martinez, J)

### GRADUATE COURSES IN IBERIAN LANGUAGES

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**IBERLANG 395. Graduate Studies in Iberian**

2-5 units, Aut (Staff), Win (Staff), Spr (Staff)

## IMMUNOLOGY (IMMUNOL) COURSES

### UNDERGRADUATE COURSES IN IMMUNOLOGY

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**IMMUNOL 185. Brain and the Immune System**

(Same as IMMUNOL 285) For advanced undergraduates, coterminial students, and graduate students. Molecular and cellular interactions between the nervous and immune systems. Focus is on the role of immune molecules in neural development, the bi-directional mechanisms by which the brain and immune system communicate with each other, and the role of the immune system in the diseased and infected brain. Topics include: molecular basis of fever, stress and inflammation, gender differences in autoimmune diseases, inflammation in neurodegenerative diseases, central nervous system infections, and the immune system in psychiatric disorders. Expert guest lectures, weekly discussion sections, and student presentations. Prerequisite: Biological Sciences or Human Biology core.

3 units, not given this year

**IMMUNOL 199. Undergraduate Research**

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

## GRADUATE COURSES IN IMMUNOLOGY

Primarily for graduate students; undergraduates may enroll with consent of instructor.

### IMMUNOL 201. Advanced Immunology I

(Same as MI 211) For graduate students, medical students and advanced undergraduates. Topics include the innate and adaptive immune systems; genetics, structure, and function of immune molecules; lymphocyte activation and regulation of immune responses. Prerequisites: undergraduate course in Immunology and familiarity with experimental approaches in biochemistry, molecular biology, and cell biology.

3 units, Win (Chien, Y)

### IMMUNOL 202. Advanced Immunology II

(Same as MCP 202) Readings of immunological literature. Classic problems and emerging areas based on primary literature. Student and faculty presentations. Prerequisite: IMMUNOL 201/MI 211.

3 units, Spr (Staff)

### IMMUNOL 203. Advanced Immunology III

Key experiments and papers in immunology. Student presentations and interviews with faculty regarding their experimental process and scientific papers. Prerequisite: IMMUNOL 201/MI 211 or IMMUNOL 202/MCP 202.

3 units, Sum (Utz, P)

### IMMUNOL 204. Innate Immunology

(Same as MI 104, MI 204) Innate immune mechanisms as the only defenses used by the majority of multicellular organisms. Topics include Toll signaling, NK cells, complement, antimicrobial peptides, phagocytes, neuroimmunity, community responses to infection, and the role of native flora in immunity. How microbes induce and defeat innate immune reactions, including examples from vertebrates, invertebrates, and plants.

3 units, Spr (Staff)

### IMMUNOL 205. Immunology in Health and Disease

Concepts and application of adaptive and innate immunology and the role of the immune system in human diseases. Case presentations of diseases including autoimmune diseases, infectious disease and vaccination, hematopoietic and solid organ transplantation, genetic and acquired immunodeficiencies, hypersensitivity reactions, and allergic diseases. Problem sets based on lectures and current clinical literature. Laboratory in acute and chronic inflammation.

2-4 units, Win (Lewis, D)

### IMMUNOL 209. Translational Immunology

(Open to medical students in the Immunology concentration, graduate students, undergraduates by consent of instructor) Journal style format focusing on current basic immunology research and how it is translated into immunotherapies and clinical trials. Topics include hematopoiesis, transplantation, tolerance, immune monitoring, vaccination, autoimmunity and antibodies, rheumatoid arthritis, chronic pulmonary disease, and asthma. May be repeated for credit.

1 unit, Aut (Miklos, D), Win (Miklos, D), Spr (Staff)

### IMMUNOL 210. Immunology Research Seminars for Medical Students

Required for medical students selecting the Immunology Concentration. Attendance at a minimum of ten seminars related to immunology outside of required medical school classes. A one-page essay on each seminar, what was presented and how it relates to a clinical immunologic problem, is required.

2 units, Aut (Miklos, D), Win (Miklos, D), Spr (Staff)

### IMMUNOL 211. Clinical Research Design and Development Using Immunomodulatory Agents

For advanced undergraduates, coterminal students, medical students, and graduate students. Immunomodulatory agents have improved outcomes in human disease such as autoimmunity, cancer, allergies, asthma, and transplantation. The agents that immunomodulate have been developed from discovery of targets in basic immunology. Objectives: 1) how to design phase I (safety and proof of concept studies) based on animal models of new targets for immunomodulatory agents, including concepts such as endpoints, translational biomarker studies, immunological monitoring, power size calculations, and basic statistics applied to clinical trial design; 2) to understand regulatory (FDA) pathways

and institutional policies to obtain approval of clinical studies; 3) to become familiar with patent law for applying for composition of matter and methods of use for discovery of targets for immunomodulatory agents. Prerequisite: Biology or Human Biology core for undergraduates.

2 units, not given this year

### IMMUNOL 212. Granulocyte Biology in Human Disease

For advanced undergraduates, coterminal students, medical students, and graduate students. Objectives: 1) to learn the basic functions and activation pathways of major granulocytes in humans (neutrophils, eosinophils, basophils and mast cells); 2) to understand the pathology in human diseases primarily associated with disorders in neutrophils, eosinophils, basophils, or mast cells; 3) to compare and contrast each granulocyte type and its response to therapies used in clinical medicine. Expert guest lectures, weekly discussion sections, and an emphasis on science communication and science writing. Prerequisite: Biology or Human Biology core for undergraduates.

2 units, alternate years, not given this year

### IMMUNOL 215. Principles of Biological Technologies

(Same as MI 215) The principles underlying novel as well as commonly utilized techniques to answer biological questions. Lectures and primary literature critiques on topics such as fluorescence microscopy, including applications such as FRET and single-cell analysis; human and murine genetic analysis; FACS; proteomics and analysis of noncoding RNAs. Class participation is emphasized. Prerequisite: biochemistry. Required of first-year graduate students in Microbiology and Immunology and the Immunology program.

3 units, Spr (Staff)

### IMMUNOL 231. Medicine for Innovators and Entrepreneurs

(Same as PEDS 231) Interdisciplinary, project-based course in which bioscience, bioinformatics, biodesign, bioengineering students learn concepts and principles to understand human disease and work together to propose solutions to medical problems. Diabetes mellitus is used as a paradigm for understanding human disease. Guest medical school and outside faculty. Field trips to Stanford clinics and biotechnology companies. Prerequisite: college level biology.

3-4 units, not given this year

### IMMUNOL 260. HIV: The Virus, the Disease, the Research

(Same as MED 260) Open to medical students, graduate students in biological sciences, undergraduates with strong biological background. Topics: immunopathogenesis immune deficits, opportunistic infections including TB, and malignancies; genomics viral genetic analyses that have traced the origin of HIV-1 and HIV-2 to primates, dated the spread of infection in humans, and characterized the evolution of the virus within infected individuals; antiretroviral drug development identification of drug targets, structure-based drug design, overcoming drug resistance, pivotal clinical trials, and role of community activism; clinical management solutions in high- and low-income countries; vaccine development learning from past failures and the future of engineering the human immune response. 4 units includes a final project assigned in consultation with the instructor to fit the individual student's background and area of HIV interest.

3-4 units, Spr (Staff)

### IMMUNOL 275. Tumor Immunology

(Same as CBIO 275) Focuses on the ability of innate and adaptive immune responses to recognize and control tumor growth. Topics include: tumor antigens, tumor immunosurveillance and immunoediting, tumor immunotherapy, cancer vaccines and dendritic cell therapy. Tracks the historical developments of our understanding of modulating tumor immune response and discusses their relative significance in the light of current research findings. Prerequisite: for undergraduates, human biology or biology core.

3 units, Aut (Rothbard, J; Engleman, E)

### IMMUNOL 280. Early Clinical Experience in Immunology

Clinical observation experience for medical students in the Immunology Scholarly Concentration. At the end of the observation period, which may span over one to two quarters, the student submits a case observation paper to his/her faculty sponsor. Prerequisite: IMMUNOL 205.

1-3 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### **IMMUNOL 285. Brain and the Immune System**

(Same as IMMUNOL 185) For advanced undergraduates, coterminal students, and graduate students. Molecular and cellular interactions between the nervous and immune systems. Focus is on the role of immune molecules in neural development, the bi-directional mechanisms by which the brain and immune system communicate with each other, and the role of the immune system in the diseased and infected brain. Topics include: molecular basis of fever, stress and inflammation, gender differences in autoimmune diseases, inflammation in neurodegenerative diseases, central nervous system infections, and the immune system in psychiatric disorders. Expert guest lectures, weekly discussion sections, and student presentations. Prerequisite: Biological Sciences or Human Biology core.

3 units, not given this year

### **IMMUNOL 290. Teaching in Immunology**

Practical experience in teaching by serving as a teaching assistant in an immunology course. Unit values are allotted individually to reflect the level of teaching responsibility assigned to the student. May be repeated for credit.

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### **IMMUNOL 299. Directed Reading in Immunology**

Prerequisite: consent of instructor.

1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### **IMMUNOL 305. Immunology Journal Club**

Required of first- to fourth-year graduate students. Graduate students present and discuss recent papers in the literature. May be repeated for credit.

1 unit, Aut (Steinman, L; Martinez, O), Win (Steinman, L; Martinez, O), Spr (Staff)

### **IMMUNOL 311. Seminar in Immunology**

Enrollment limited to Ph.D., M.D./Ph.D., and medical students whose scholarly concentrations are in Immunology. Current research topics.

1 unit, Aut (Steinman, L; Fathman, C), Win (Steinman, L; Fathman, C), Spr (Staff)

### **IMMUNOL 311A. Discussions in Immunology**

Students discuss papers of speakers in 311, and meet with the speakers. Corequisite: 311.

1 unit, Aut (Steinman, L; Fathman, C), Win (Steinman, L; Fathman, C), Spr (Staff)

### **IMMUNOL 315. Special Topics in Immunology**

Format for 2010-11 is a two-quarter lecture series comprising an intensive study of human and mouse immunology. Topics over include: innate and adaptive immunity; antibodies and antigens; histocompatibility complex; lymphocyte development and the rearrangement and expression of antigen receptor genes; T-cell, B-cell activation and antibody production; immunological tolerance; cytokines; immunities; transplantation; diseases caused by immune responses; congenital and acquired immunodeficiencies.

1 unit, Aut (Butte, M), Win (Butte, M)

### **IMMUNOL 399. Graduate Research**

For Ph.D., M.D./Ph.D. students, and medical students whose scholarly concentrations are in Immunology.

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### **IMMUNOL 801. TGR Project**

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### **IMMUNOL 802. TGR Dissertation**

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

## INSTITUTE FOR INTERNATIONAL STUDIES (FREEMAN SPOGLI) (IIS) COURSES

### **UNDERGRADUATE COURSES IN INSTITUTE FOR INTERNATIONAL STUDIES (FREEMAN SPOGLI)**

Primarily for undergraduates; graduate students may enroll with consent of adviser.

#### **IIS 199. Interschool Honors Program in International Security Studies**

Students from different schools meet in a year-long seminar to discuss, analyze, and conduct research on international security. Combines research methods, policy evaluation, oral presentation, and preparation of an honors thesis by each student. May be repeated for credit.

1-5 units, Aut (Blacker, C; Crenshaw, M), Win (Crenshaw, M; Blacker, C), Spr (Blacker, C; Crenshaw, M)

## INTERDISCIPLINARY STUDIES IN HUMANITIES (HUMNTIES) COURSES

### **UNDERGRADUATE COURSES IN INTERDISCIPLINARY STUDIES IN HUMANITIES**

Primarily for undergraduates; graduate students may enroll with consent of adviser.

#### **HUMNTIES 100. Text and Context in Humanities: Oedipus and His Vicissitudes**

(Same as ENGLISH 184B) Tales of Modernity from Sophocles, Freud, Chekhov, Babel, and Woolf. Introduction to cross-disciplinary approach in humanities through foundational texts in the modern tradition. The main focus is on Sigmund Freud's Totem and Taboo (1913), alongside his ancillary writings. Contemporary social thought and historical scholarship provide the context (Georg Simmel, Norbert Elias, Karl Schorske, John Murray Cuddihy) while works of imaginative literature (Sophocles, Anton Chekhov, Isaac Babel, and Virginia Woolf) illuminate the significance of the Oedipus myth for understanding the inter-generational conflict in antiquity and modernity. GER:DB-Hum

3 units, not given this year

## INTERNATIONAL POLICY STUDIES (IPS) COURSES

### **GRADUATE COURSES IN INTERNATIONAL POLICY STUDIES**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

#### **IPS 201. Managing Global Complexity**

Is international relations theory valuable for policy makers? The first half of the course will provide students with a foundation in theory by introducing the dominant theoretical traditions and insights in international relations. The second half of the course focuses on several complex global problems that cut across policy specializations and impact multiple policy dimensions. Students will assess the value of major theories and concepts in international relations for analyzing and addressing such complex

global policy issues.

3 units, Win (Gould, E)

### IPS 202. Topics in International Macroeconomics

Topics: standard theories of open economy macroeconomics, exchange rate regimes, causes and consequences of current account imbalances, the economics of monetary unification and the European Monetary Union, recent financial and currency crises, the International Monetary Fund and the reform of the international financial architecture.

5 units, Aut (Aturupane, C)

### IPS 203. Issues in International Economics

Topics in international trade and international trade policy: trade, growth and poverty, the World Trade Organization (WTO), regionalism versus multilateralism, the political economy of trade policy, trade and labor, trade and the environment, and trade policies for developing economies. Prerequisite: ECON 165, ECON 166.

5 units, Win (Aturupane, C)

### IPS 204A. Microeconomics

(Same as PUBLPOL 301A) Microeconomic concepts relevant to decision making. Topics include: competitive market clearing, price discrimination; general equilibrium; risk aversion and sharing, capital market theory, Nash equilibrium; welfare analysis; public choice; externalities and public goods; hidden information and market signaling; moral hazard and incentives; auction theory; game theory; oligopoly; reputation and credibility. Prerequisites: ECON 50 and MATH 51 or equiv.

4 units, Aut (Bulow, J)

### IPS 204B. Cost-Benefit Analysis and Evaluation

(Same as PUBLPOL 301B) Relationship between microeconomic analysis and public policy making. Economic rationales for policy interventions. Economic models of politics and application to policy making. Relationship of income distribution to policy choice. Welfare evaluation of public and private decisions. Education policy, social security, and health care. Prerequisites: PUBLPOL 301A (for graduate students) or ECON 50, and 102B (for undergraduates).

4-5 units, Spr (Ishii, J)

### IPS 207. Governance, Corruption, and Development

The role of governance in the growth and development experience of countries with a focus on the economics of corruption. Topics covered: the concept and measurement of governance; theory and evidence on the impact of corruption on growth and development outcomes, including investment, financial flows, human capital accumulation, poverty and income inequality; the link between governance and financial crises with a focus on the recent global crisis; the cultural, economic, and political determinants of corruption; and policy implications for improving governance. Prerequisite: ECON 50.

3-5 units, Spr (Aturupane, C)

### IPS 207A. Judgment and Decision Making

(Same as PUBLPOL 305A) (Same as LAW 333.) Theories and research on heuristics and biases in human inference, judgment, and decision making. Experimental and theoretical work in prospect theory emphasizing loss and risk aversion. Challenges that psychology offers to the rationalist expected utility model; attempts to meet this challenge through integration with modern behavioral economics. Decision making biases and phenomena of special relevance to public policy such as group polarization, group think, and collective action.

4 units, Win (Brest, P)

### IPS 208. Justice

(Same as ETHICSOC 171, PHIL 171, PHIL 271, POLISCI 3P, POLISCI 136S) Focus is on the ideal of a just society, and the place of liberty and equality in it, in light of contemporary theories of justice and political controversies. Topics include protecting religious liberty, financing schools and elections, regulating markets, assuring access to health care, and providing affirmative action and group rights. Issues of global justice including human rights and global inequality.

4-5 units, Aut (Dougherty, T)

### IPS 209. Practicum

(Same as PUBLPOL 309) Applied policy exercises in various fields. Multidisciplinary student teams apply skills to a

contemporary problem in a major policy exercise with a public sector client such as a government agency. Problem analysis, interaction with the client and experts, and presentations. Emphasis is on effective written and oral communication to lay audiences of recommendations based on policy analysis.

1-10 units, Aut (Nation, J), Win (Nation, J)

### IPS 209A. IPS Master's Thesis

For IPS M.A. students only (by petition). Regular meetings with thesis advisers required.

1-10 units, Aut (Staff), Win (Staff)

### IPS 210. The Politics of International Humanitarian Action

The relationship between humanitarianism and politics in international responses to civil conflicts and forced displacement. Focus is on policy dilemmas and choices, and the consequences of action or inaction. Case studies include northern Iraq (Kurdistan), Bosnia, Rwanda, Kosovo, and Darfur.

3-5 units, Aut (Morris, E)

### IPS 211. The Transition from War to Peace: Peacebuilding Strategies

How to find sustainable solutions to intractable internal conflicts that lead to peace settlements. How institutions such as the UN, regional organizations, and international financial agencies attempt to support a peace process. Case studies include Bosnia, East Timor, Kosovo, Burundi, Liberia, and Afghanistan.

3-5 units, Spr (Morris, E)

### IPS 213. International Mediation and Civil Wars

This graduate seminar will examine international mediation efforts to achieve negotiated settlements for civil wars over the last two decades. Contending approaches to explain the success or failure of international mediation efforts will be examined in a number of cases from Africa (Sudan, Sierra Leone, Burundi), the Balkans (Bosnia, Macedonia), and Asia (Cambodia, Indonesia/Aceh).

3-5 units, Win (Morris, E)

### IPS 219. Intelligence and National Security

How intelligence supports U.S. national security and foreign policies. How it has been used by U.S. presidents to become what it is today; organizational strengths and weaknesses; how it is monitored and held accountable to the goals of a democratic society; and successes and failures. Current intelligence analyses and national intelligence estimates are produced in support of simulated policy deliberations.

3-4 units, Aut (Fingar, T)

### IPS 221. International Political Economy and International Organizations: Theory and Practice

(Same as POLISCI 214G) What is the appropriate balance between government regulation and market freedom? Introduction to important theoretical and policy debates in international political economy. Topics include: political economy of trade; exchange rate policy; the liberalization of trade and finance; the global move to openness; development, debt and aid; and the role of international organizations. Discussion of application of academic insights to key policy debates, including whether governments should offset the welfare costs of globalization, whether the IMF and World Bank should be reformed to meet the needs of the 21st century, and how the international community should respond to financial crises. Students will research, write and orally present policy briefs on specific policy questions.

3-5 units, Win (Gould, E)

### IPS 221A. Globalization and Its Discontents: An Introduction to International Political Economy

What is globalization? Its impacts on different countries and population including those that multilateral organizations such as the World Bank, International Monetary Fund, and World Trade Organization have on the economic policies of member states and the functioning of the global economy. Topics include: political economy of trade; exchange rate policy; the liberalization of trade and finance; the global move to openness; development, debt and aid; and the role of international organizations.

3-5 units, not given this year

### IPS 222. Economic Development

General theories of economic development with focus on development policies. Topics include: agriculture, industrialization, role of financial development, income distribution, human resource development, international relations,

and economic aid.

*5 units, not given this year*

**IPS 230. Democracy, Development, and the Rule of Law**

(Same as INTNLREL 114D, POLISCI 114D, POLISCI 314D) Links among the establishment of democracy, economic growth, and the rule of law. How democratic, economically developed states arise. How the rule of law can be established where it has been historically absent. Variations in how such systems function and the consequences of institutional forms and choices. How democratic systems have arisen in different parts of the world. Available policy instruments used in international democracy, rule of law, and development promotion efforts.

*5 units, Aut (Diamond, L; Stoner-Weiss, K)*

**IPS 233. Public Policy and South Asian Development**

Trends in socioeconomic conditions in South Asia from independence to present and the policies that influenced them. Topics: theoretical framework of the relationship between forms of governance and development; governance choices in South Asia, particularly democracy and federalism; and influence of political governance, national identity, and socioeconomic institutions on development. Review of case studies, including the Kerala development experience, India's IT industry, Bangladesh's microfinance initiative, and Sri Lanka's education system.

*3-5 units, not given this year*

**IPS 241. International Security in a Changing World**

(Same as POLISCI 114S) The major international and regional security problems in the modern world. Interdisciplinary faculty lecture on the political and technical issues involved in nuclear proliferation, terrorism and homeland security, civil wars and insurgencies, and future great power rivalries.

*5 units, Win (Crenshaw, M)*

**IPS 244. U.S. Policy toward Northeast Asia**

Case study approach to the study of contemporary U.S. policy towards Japan, Korea, and China. Historical evolution of U.S. foreign policy and the impact of issues such as democratization, human rights, trade, security relations, military modernization, and rising nationalism on U.S. policy. Case studies include U.S.-Japan trade tensions, anti-Americanism in Korea, and cross-straits relations between China and Taiwan.

*5 units, Win (Armacost, M; Fingar, T; Straub, W; Sneider, D)*

**IPS 246. China on the World Stage**

China's reemergence as a global player is transforming both China and the international system. Other nations view China's rise with a mixture of admiration, anxiety, and opportunism. Some welcome China's rise as a potential counterweight to US preeminence; others fear the potential consequences of Sino-American rivalry and erosion of the US-led international system that has fostered unprecedented peace and prosperity. This course provides an overview of China's engagement with countries in all regions and on a wide range of issues since it launched the policy of opening and reform in 1978. The goal is to provide a broad overview and systematic comparisons across regions and issues, and to examine how China's global engagement has changed over time.

*3-5 units, Win (Fingar, T)*

**IPS 250. International Conflict: Management and Resolution**

(Same as PSYCH 383) (Same as LAW 656) Interdisciplinary. Theoretical insights and practical experience in resolving intergroup and international conflicts. Sources include social psychology, political science, game theory, and international law. Personal, strategic, and structural barriers to solutions. How to develop a vision of a mutually bearable shared future, trust in the enemy, and acceptance of loss that a negotiated settlement may produce. Spoilers who seek to sabotage agreements. Advantages and disadvantages of unilateral versus reciprocal measures. Themes from the Stanford Center of International Conflict and Negotiation (SCICN). Prerequisite for undergraduates: consent of instructor.

*3 units, Win (Weiner, A)*

**IPS 250A. International Conflict Resolution Colloquium**

(Same as PSYCH 283) (Same as LAW 611.) Sponsored by the Stanford Center on International Conflict and Negotiation (SCICN). Conflict, negotiation, and dispute resolution with emphasis on conflicts and disputes with an international dimension, including conflicts involving states, peoples, and

political factions such as the Middle East and Northern Ireland. Guest speakers. Issues including international law, psychology, and political science, economics, anthropology, and criminology.

*1 unit, Win (Weiner, A)*

**IPS 262. Contemporary Issues in Nuclear Energy Policy**

Current nuclear energy trends related to economic growth and carbon-free energy production to reduce global warming. Topics include: trends, promise, and perils; environment; proliferation; and international security. Policy considerations for nuclear safety and safeguards, environmentally responsible management from raw uranium to spent fuel, international security and nonproliferation, economic competition with other energy sources, domestic and foreign politics, and international law and treaties. International guest expert lecturers.

*5 units, not given this year*

**IPS 263. Energy and Climate Cooperation in the Western Hemisphere**

(Same as EARTHSYS 132, EARTHSYS 232, INTNLREL 146A) Current political dynamics in major western hemisphere fossil fuel producers in N. America, the Andean region, the Southern Cone of S. America, and Trinidad and Tobago. The potential for developing sustainable alternative energy resources in the western hemisphere for export particularly biofuels, and its impact on agricultural policy, environmental protection, and food prices. The feasibility of creating regional energy security rings such as the proposed N. American Energy Security and Prosperity Partnership.

*4 units, not given this year*

**IPS 264. Behind the Headlines: An Introduction to Modern Afghanistan, Pakistan and India**

Introduction to history and contemporary politics of South Asia. Analyzes history and current state of India, Afghanistan and Pakistan: historical forces that shaped the region (diverse religions and ethnicities, geography, and colonialism), the rise of the Taliban and Al Qaeda in Afghanistan; Pakistan's government, military, and mullahs; the economic and political rise of India; and the U.S. intervention in Afghanistan, US relationship with Pakistan, and its policy shift toward India.

*3-5 units, Aut (Manuel, A)*

**IPS 270. The Geopolitics of Energy**

This course examines how the interplay of political, economic, and technological forces may reshape future energy production and consumption. Building upon international political economy theory, we will address questions such as: What policies are energy importers pursuing to ensure reliable, plentiful and cheap energy supply? What are the socioeconomic and political challenges and strategic options energy exporters face? How can technological breakthroughs in alternative energy and carbon policies affect the distribution of power between traditional energy exporters and importers?

*3-5 units, Win (Staff)*

**IPS 280. Transitional Justice, International Criminal Tribunals, and the International Criminal Court**

(Same as ETHICSOC 280) Historical backdrop of the Nuremberg and Tokyo Tribunals. The creation and operation of the Yugoslav and Rwanda Tribunals (ICTY and ICTR). The development of hybrid tribunals in East Timor, Sierra Leone, and Cambodia, including evaluation of their success in addressing perceived shortcomings of the ICTY and ICTR. Examination of the role of the International Criminal Court and the extent to which it will succeed in supplanting all other ad hoc international justice mechanisms and fulfill its goals. Analysis focuses on the politics of creating such courts, their interaction with the states in which the conflicts took place, the process of establishing prosecutorial priorities, the body of law they have produced, and their effectiveness in addressing the needs of victims in post-conflict societies.

*3-5 units, Spr (Cohen, D)*

**IPS 298. Practical Training**

Students obtain internship in a relevant research or industrial activity to enhance their professional experience consistent with their degree program and area of concentration. Prior to enrolling students must get internship approved by associate director. At the end of the quarter, a three page final report must be supplied documenting work done and relevance to degree program. Meets



the requirements for Curricular Practical Training for students on F-1 visas. Student is responsible for arranging own internship. Limited to International Policy Studies students only. May be repeated for credit.

1-3 units, Sum (Staff)

### IPS 299. Directed Reading

IPS students only. May be repeated for credit.

1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### IPS 300. Issues in International Policy Studies

Presentations of techniques and applications of international policy analysis by students, faculty, and guests, including policy analysis practitioners.

1 unit, Aut (Stoner-Weiss, K)

### IPS 314S. Decision Making in U.S. Foreign Policy

(Same as POLISCI 314S) Priority to IPS students. Formal and informal processes involved in U.S. foreign policy decision making. The formation, conduct, and implementation of policy, emphasizing the role of the President and executive branch agencies. Theoretical and analytical perspectives; case studies.

5 units, Spr (Blacker, C)

### IPS 388. Palestine and the Arab-Israeli Conflict

(Same as HISTORY 288, HISTORY 388, JEWISHST 288, JEWISHST 388) 1882 to the present. Comparison of representative expressions of competing historical interpretations. U.S. policy towards the conflict since 1948. (Beinin)

4-5 units, not given this year

### IPS 802. TGR Dissertation

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

## INTERNATIONAL RELATIONS (INTNLREL) COURSES

### UNDERGRADUATE COURSES IN INTERNATIONAL RELATIONS

Primarily for undergraduates; graduate students may enroll with consent of adviser.

#### INTNLREL 1. Introduction to International Relations

(Same as POLISCI 1) Approaches to the study of conflict and cooperation in world affairs. Applications to war, terrorism, trade policy, the environment, and world poverty. Debates about the ethics of war and the global distribution of wealth. GER:DB-SocSci

5 units, Spr (Fearon, J)

#### INTNLREL 10SI. The International Responsibility to Protect

This Student-Initiated Course focuses on the main issues and themes surrounding international responses to mass atrocities and genocide. We will explore the events and international norms that led to the creation of The Responsibility to Protect Doctrine, the main thematic dilemmas surrounding international action, and a brief history of international responses to past genocides. The objective of this course is to give each student a better idea of what the realistic possibilities are for international action on grave human rights violations of this kind.

1-2 units, Win (Stedman, S)

#### INTNLREL 61Q. Food and security

(S,Sem) (Same as EARTHSYS 61Q, EESS 61Q) Stanford Introductory Seminar. The course will provide a broad overview of key policy issues concerning agricultural development and food security, and will assess how global governance is addressing the problem of food security. At the same time the course will provide an overview of the field of international security, and examine how governments and international institutions are beginning to include food in discussions of security.

5 units, Aut (Naylor, R; Stedman, S)

#### INTNLREL 110C. America and the World Economy

(Same as POLISCI 110C, POLISCI 110X) Examination of contemporary US foreign economic policy. Areas studied: the changing role of the dollar; mechanism of international monetary management; recent crises in world markets including those in

Europe and Asia; role of IMF, World Bank and WTO in stabilizing world economy; trade politics and policies; the effects of the globalization of business on future US prosperity. GER:DB-SocSci

5 units, Aut (Goldstein, J)

#### INTNLREL 110D. War and Peace in American Foreign Policy

(Same as POLISCI 110D, POLISCI 110Y) (Students not taking this course for WIM, register for 110Y.) The causes of war in American foreign policy. Issues: international and domestic sources of war and peace; war and the American political system; war, intervention, and peace making in the post-Cold War period. GER:DB-SocSci, DB-SocSci

5 units, Win (Schultz, K)

#### INTNLREL 114D. Democracy, Development, and the Rule of Law

(Same as IPS 230, POLISCI 114D, POLISCI 314D) Links among the establishment of democracy, economic growth, and the rule of law. How democratic, economically developed states arise. How the rule of law can be established where it has been historically absent. Variations in how such systems function and the consequences of institutional forms and choices. How democratic systems have arisen in different parts of the world. Available policy instruments used in international democracy, rule of law, and development promotion efforts. GER:DB-SocSci

5 units, Aut (Diamond, L; Stoner-Weiss, K)

#### INTNLREL 115. Development Issues in South Asia

1) Study of socio-economic trends from independence up to the present time in South Asia. 2) The complex interactions between development, and political governance, national identity and socio-economic institutions. 3) Case studies of exemplary outcomes: the Kerala development experience, India's IT industry. Bangladesh's microfinance initiative and education in Sri Lanka. 4) Student assessment will be based on class presentation and paper.

5 units, Spr (Dossani, R)

#### INTNLREL 122A. The Political Economy of the European Union

EU institutions, the legislative process, policies, relations with the U.S., and enlargement and the future of the EU. History and theories of EU integration. Democratic accountability of the institutions, and the emerging party system. Principal policies in agriculture, regional development, the internal market, single currency, and competition. Emphasis is on policies that affect the relations with the U.S. including trade and security. Results of the EU's constitutional convention.

5 units, Win (Crombez, C)

#### INTNLREL 136R. Introduction to Global Justice

(Same as ETHICSOC 136R, PHIL 76, POLISCI 136R, POLISCI 336) Recent work in political theory on global justice. Topics include global poverty, human rights, fair trade, immigration, climate change. Do developed countries have a duty to aid developing countries? Do rich countries have the right to close their borders to economic immigrants? When is humanitarian intervention justified? Readings include Charles Beitz, Thomas Pogge, John Rawls.

5 units, Spr (Satz, D)

#### INTNLREL 140A. International Law and International Relations

What is the character of international legal rules? Do they matter in international politics, and if so, to what degree? The foundational theories, principles, and sources of public international law. Prominent theories of international relations and how they address the role of law in international politics. Practical problems such as human rights, humanitarian intervention, and enforcement of criminal law. International law as a dynamic set of rules, at times influenced by power, at other times constraining it, but always essential to studying international relations. WIM

5 units, Aut (Lutomski, P)

#### INTNLREL 140C. The U.S., U.N. Peacekeeping, and Humanitarian War

The involvement of U.S. and the UN in major wars and international interventions since the 1991 Gulf War. The UN Charter's provisions on the use of force, the origins and evolution of peacekeeping, the reasons for the breakthrough to peacemaking and peace enforcement in the 90s, and the ongoing debates over the legality and wisdom of humanitarian intervention. Case studies



include Croatia and Bosnia, Somalia, Rwanda, Kosovo, East Timor, and Afghanistan.

5 units, Spr (Patenaude, B)

**INTNLREL 141A. Camera as Witness: International Human Rights Documentaries**

Rarely screened documentary films, focusing on global problems, human rights issues, and aesthetic challenges in making documentaries on international topics. Meetings with filmmakers. GER:DB-Hum

5 units, Aut (Bojic, J)

**INTNLREL 146A. Energy and Climate Cooperation in the Western Hemisphere**

(Same as EARTHSYS 132, EARTHSYS 232, IPS 263) Current political dynamics in major western hemisphere fossil fuel producers in N. America, the Andean region, the Southern Cone of S. America, and Trinidad and Tobago. The potential for developing sustainable alternative energy resources in the western hemisphere for export particularly biofuels, and its impact on agricultural policy, environmental protection, and food prices. The feasibility of creating regional energy security rings such as the proposed N. American Energy Security and Prosperity Partnership.

4 units, not given this year

**INTNLREL 147. The Political Economy of the Southern Cone of South America**

Argentina, Brazil, Paraguay, Uruguay, Bolivia, and Chile. Post-WW II political economy developments and political relations. Impacts of military rule from the 60s into the 80s. Regional and international political developments that led to MERCOSUR in 1991, and subsequent expansion.

5 units, Spr (Staff)

**INTNLREL 148. Economic Integration of the Americas**

Current attempts at economic integration throughout the Western Hemisphere, including the Andean Community, the Caribbean Common Market (CARICOM), the Latin American Integration Association (ALADI), MERCOSUR, the North American Free Trade Area (NAFTA), and the Central American Integration System (SICA). Emphasis is on practical applications of integration efforts and nuts-and-bolts issues of how integration efforts function.

5 units, Win (O'Keefe, T)

**INTNLREL 149. The Economics and Political Economy of the Multilateral Trade System**

The historical development of the multilateral trade system, the current agenda of the World Trade Organization, and prospects for trade liberalization. Emphasis is on the economic rationale for multilateral trade rules, the political problems facing countries in supporting further liberalization, and the challenges to the legitimacy of WTO procedures and practices. Issues include the greater participation of developing countries, the impact of new members, and the relationship between the WTO and other multilateral bodies. Guest speakers; student research paper presentations.

5 units, Win (Josling, T)

**INTNLREL 165A. Globalization, governance and human rights**

Globalization is associated with a downward spiral of human rights. Yet, paradoxically, more countries now subscribe to human rights treaties than ever before. The class discusses different aspects of globalization drawing on theories from sociology, political science, cultural anthropology and law. In examining the economic, political and cultural aspects of globalization, the class shows the tensions within globalization and their paradoxical effects on human rights. The course outlines different global governance mechanism aimed at improving human rights. These include governmental treaties, international NGOs advocacy work and corporate Codes of Conduct and their effects on human rights. The effects of the United Nations International Labour Organization on labor related human rights, such as child labor and discrimination, serve as examples. Integrating social sciences theories with empirical research, this course provides an overview of the debates surrounding the causes and eff

5 units, Spr (Abu Sharkh, M)

**INTNLREL 170. ENERGY AND CLIMATE**

The seminar provides an interdisciplinary introduction to the

technology, economics, and international politics of energy and climate. We investigate specific energy technologies and discuss their impact on geopolitics, the environment and mitigating the effects of climate change. What is the role of energy in national security? What will climate change mean for our energy mix? How do developing countries view energy and climate change? What is the proper balance between regulation and free market operation in energy markets?

5 units, Win (Rosencranz, A)

**INTNLREL 191. IR Journal**  
(Staff)

1 unit, Aut (Schultz, K), Win (Schultz, K), Spr (Schultz, K)

**INTNLREL 197. Directed Reading in International Relations**

Open only to declared International Relations majors. (Staff)

1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**INTNLREL 198. Senior Thesis**

Open only to declared International Relations majors with approved senior thesis proposals.

2-10 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**INTNLREL 200A. International Relations Honors Field Research**

For juniors planning to write an honors thesis during senior year. Initial steps to prepare for independent research. Professional tools for conceptualizing a research agenda and developing a research strategy. Preparation for field research through skills such as data management and statistics, references and library searches, and fellowship and grant writing. Creating a work schedule for the summer break and first steps in writing. Prerequisite: acceptance to IR honors program.

3 units, Spr (Gould, E)

**INTNLREL 200B. International Relations Honors Seminar**

Second of two-part sequence. For seniors working on their honors theses. Professional tools, analysis of research findings, and initial steps in writing of thesis. How to write a literature review, formulate a chapter structure, and set a timeline and work schedule for the senior year. Skills such as data analysis and presentation, and writing strategies. Prerequisites: acceptance to IR honors program, and 199 or 200A.

3 units, Aut (Gould, E)

**INTNLREL 206. Palestinian Nationalism, Past and Present**

The Palestinian national movement and its role in the Arab-Israeli conflict. The roots of the movement in the Ottoman Empire, its growth through the British Mandate, the 1948 and 1967 wars, the Intifada, and the Israeli-Palestinian peace process. Emphasis is on components which contributed to or delayed the growth of a distinct Palestinian identity, including Zionism.

5 units, not given this year

**INTNLREL 207. Tribe, State, and Society in the Modern Middle East**

The staying power of tribal identities and values in the Middle East. Examples include the Iraqi Sunni tribal insurgency against the U.S. The role of tribes in the formation of Middle Eastern states and how tribal values continue to impact social, political, and economic issues today.

5 units, not given this year

## INTRODUCTION TO THE HUMANITIES (IHUM) COURSES

### UNDERGRADUATE COURSES IN INTRODUCTION TO THE HUMANITIES

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**IHUM 2. Epic Journeys, Modern Quests**

First of a two quarter sequence. Through the metaphor of the journey, epic poems externalize the human quest for identity and self-definition: as the epic hero crosses the physical world and descends into the underworld, to visit the dead and seek counsel from them, he gradually comes closer to himself. The different goals of such journeys and the evolution of the epic hero as he

struggles to reach his destination, with attention to how exile and alienation, the encounter with ancestors, the female voice, and divine guidance define the trajectories traced by the various epics in question. The diminished importance of the dead and the increased emphasis on the power of the living in various literary genres. How concepts of humanity and society are defined by the sense of rupture with the past, including a heightened importance given to innovation, the present, the living, and the everyday that contrasts with the formative power of the afterlife, tradition, and the dead. GER:IHUM-2

*4 units, Win (Harrison, R; Wittman, L)*

### **IHUM 3. Epic Journeys, Modern Quests**

Second of a two quarter sequence. Through the metaphor of the journey, epic poems externalize the human quest for identity and self-definition: as the epic hero crosses the physical world and descends into the underworld, to visit the dead and seek counsel from them, he gradually comes closer to himself. The different goals of such journeys and the evolution of the epic hero as he struggles to reach his destination, with attention to how exile and alienation, the encounter with ancestors, the female voice, and divine guidance define the trajectories traced by the various epics in question. The diminished importance of the dead and the increased emphasis on the power of the living in various literary genres. How concepts of humanity and society are defined by the sense of rupture with the past, including a heightened importance given to innovation, the present, the living, and the everyday that contrasts with the formative power of the afterlife, tradition, and the dead. GER:IHUM-3

*4 units, Spr (Edelstein, D; Landy, J)*

### **IHUM 10A. Philosophical Perspectives on Science**

First in a two quarter sequence. A humanistic perspective views science itself as an essential part of human culture and explores the many relationships between scientific activity and religion, philosophy, society, politics, and the arts. Exploration of these relationships from a philosophical point of view, across a large part of the development of Western science from ancient Greece and the medieval period, through the scientific revolution of the 16th and 17th centuries, and up to recent times. GER:IHUM-2

*4 units, Win (Friedman, M)*

### **IHUM 10B. Philosophical Perspectives on Science**

Second in a two quarter sequence. A humanistic perspective views science itself as an essential part of human culture and explores the many relationships between scientific activity and religion, philosophy, society, politics, and the arts. Exploration of these relationships from a philosophical point of view, across a large part of the development of Western science from ancient Greece and the medieval period, through the scientific revolution of the 16th and 17th centuries, and up to recent times. GER:IHUM-3

*4 units, Spr (Daube, M)*

### **IHUM 11A. Making of the Modern World: Europe and Latin America**

First in a two quarter sequence. How did the modern world come to be? The emergence of modernity from 1300 to the present. Demographic and religious transformations in Europe; the development of ideologies, social formations, and political institutions as they eventually crossed the Atlantic and were modified in the Americas; 20th-century social revolution and authoritarianism throughout Latin America. Students build an understanding of the modern world and engage with the creative/destructive tensions inherent in this long transformation. Readings include classics of imaginative literature, political thought, and historical criticism. Theorists who have confronted and analyzed the problem of the origins of capitalist modernity, such as Adam Smith, Karl Marx, Max Weber. Records of ordinary life, such as parish registers, wills and diaries illustrate changes in social and economic existence. Sources include materials drawn from literature, philosophy, economic and social theory, and pri GER:IHUM-2

*4 units, not given this year*

### **IHUM 11B. Making of the Modern World: Europe and Latin America**

Second in a two quarter sequence. How did the modern world come to be? The emergence of modernity from 1300 to the present. Demographic and religious transformations in Europe; the development of ideologies, social formations, and political

institutions as they eventually crossed the Atlantic and were modified in the Americas; 20th-century social revolution and authoritarianism throughout Latin America. Students build an understanding of the modern world and engage with the creative/destructive tensions inherent in this long transformation. Readings include classics of imaginative literature, political thought, and historical criticism. Theorists who have confronted and analyzed the problem of the origins of capitalist modernity, such as Adam Smith, Karl Marx, Max Weber. Records of ordinary life, such as parish registers, wills and diaries illustrate changes in social and economic existence. Sources include materials drawn from literature, philosophy, economic and social theory, and pr GER:IHUM-3

*4 units, not given this year*

### **IHUM 23A. The Fate of Reason**

Two quarter sequence. Every day, each one of us faces problems about what to believe and how to act. Socrates began the tradition of philosophy by insisting that answers to these problems ought to be guided by reason; that if we could only believe and act more rationally, our lives would be better for us overall. This course explores the fate of Socrates' proposal. Some of our authors defend the power of reason to improve our lives. Others insist that purely rational principles demand too much of us, or else are insufficient to help us act well or reach important insights. Many writers focus on working out the proper relation between reason and the passions, or emotions. We will trace the fate of reason in several cultural traditions, thereby exploring the fundamental basis for our commitments about how to live, and for our most important beliefs about God, ourselves, the world, and our place within it. GER:IHUM-2

*4 units, not given this year*

### **IHUM 25A. Art and Ideas**

First in a two quarter sequence. Arts and Ideas will explore a broad sampling of cultural practices; primarily dance and theater; that use the human body as an art medium. From the critical perspectives of dance and drama history and theory, we will examine both established and emerging works. The focus will be on developing perceptual and interpretive skills for understanding how the performing arts have functioned historically and critically as key indexes to and challenging templates of cultural understanding. How can we come to read the body as an art medium? What kinds of knowledge can a highly disciplined moving body reveal? What does it mean to re-present life through performance historically? How does a live performance work to construct the spectator who views it? How do we come to know ourselves through both watching and participating in performance? From romantic ballet and realist drama to the present; including examples such as the Harlem Renaissance, the early-20 GER:IHUM-2

*4 units, not given this year*

### **IHUM 25B. Art and Ideas**

Second in a two quarter sequence. Arts and Ideas will explore a broad sampling of cultural practices; primarily dance and theater; that use the human body as an art medium. From the critical perspectives of dance and drama history and theory, we will examine both established and emerging works. The focus will be on developing perceptual and interpretive skills for understanding how the performing arts have functioned historically and critically as key indexes to and challenging templates of cultural understanding. How can we come to read the body as an art medium? What kinds of knowledge can a highly disciplined moving body reveal? What does it mean to re-present life through performance historically? How does a live performance work to construct the spectator who views it? How do we come to know ourselves through both watching and participating in performance? From romantic ballet and realist drama to the present; including examples such as the Harlem Renaissance, the early-20 GER:IHUM-3

*4 units, not given this year*

### **IHUM 28A. Poetic Justice: Order and Imagination in Russia**

Russia is where the most beautiful dreams and the ugliest nightmares of other places come true. There the doctrines of Christianity, Marxism, and now free-market capitalism, born elsewhere, have developed in fantastic ways, and borrowed artistic forms, from the novel to the ballet, have reached a new level. This

course traces Russian culture over a millennium, focusing on the tensions that developed there between beauty and power, self and other, past and future. We start the winter with Biblical stories, folktales about princes and peasants, medieval icons and saints' lives, then turn to masterpieces of nineteenth-century literature. Alexander Pushkin transforms the bloody history of the Pugachev rebellion into a novella about disguise, power and love. Nikolai Gogol imagines an uneasy world where your own nose could leave your body to become your rival. Fedor Dostoevsky, in *The Brothers Karamazov*, questions why we trust the state, the church, the family, and language itself. Le GER:IHUM-2

4 units, Win (Safran, G)

#### **IHUM 28B. Poetic Justice: Order and Imagination in Russia**

Two quarter sequence. The difference between justice and law in 19th- and 20th-century Russian writers. Focus is on the notion of poetic justice: the artistic representation of order whether divine, natural, or human. Goal is to heighten awareness of familiar narratives, mythologies, ideas, and images, and to convey a sense of a long-established national culture with its own dynamic vision. GER:IHUM-3

4 units, Spr (Skakov, N)

#### **IHUM 34A. A Life of Contemplation or Action? Debates in Western Literature and Philosophy**

First in a two quarter sequence. Which is preferable: a life of thought or a life of action? Are the two necessarily in conflict, or is it possible to reconcile them? This course focuses on literary treatments of the ongoing debate over the active life versus the contemplative life, as it is carried out in texts from the classical to the modern eras. While the debate itself is perennial, it takes on different forms and implications as it moves across changing literary, historical and philosophical contexts. The winter quarter will consider the debate as it is defined by classical authors, early Christian thinkers, and medieval mystical and literary texts, and is redefined in the Renaissance by humanist and posthumanist treatments of it. The spring quarter will consider the role of contemplation in an increasingly market-driven and secular world. GER:IHUM-2

4 units, not given this year

#### **IHUM 34B. A Life of Contemplation or Action? Debates in Western Literature and Philosophy**

Second in a two quarter sequence. Which is preferable: a life of thought or a life of action? Are the two necessarily in conflict, or is it possible to reconcile them? This course focuses on literary treatments of the ongoing debate over the active life versus the contemplative life, as it is carried out in texts from the classical to the modern eras. While the debate itself is perennial, it takes on different forms and implications as it moves across changing literary, historical and philosophical contexts. The winter quarter will consider the debate as it is defined by classical authors, early Christian thinkers, and medieval mystical and literary texts, and is redefined in the Renaissance by humanist and posthumanist treatments of it. The spring quarter will consider the role of contemplation in an increasingly market-driven and secular world. GER:IHUM-3

4 units, not given this year

#### **IHUM 39A. Inventing Classics: Greek and Roman Literature in Its Mediterranean Context**

First in a two quarter sequence. Are you concerned with fundamental questions about the human condition? Do you ask yourself whether your life is controlled more by your own free choices or by your genetic code? Do you wonder whether the universe is just or unjust? Do you worry whether a superpower can function without hubristic arrogance? If these sorts of issues seem central to your intellectual and personal explorations, this IHUM sequence will reveal to you that the ancient Mediterranean world was equally consumed with identical questions about the nature of human society and human existence. We will undertake our explorations by reading a wide and deep selection of important and influential literary texts from Greece and Rome, amplified by a smaller selection of texts from other cultures in the Mediterranean and the Near East. The sequence will be organized historically, with the winter quarter covering the period from c.2000BC to the fourth century BC, and the spring quarter cont GER:IHUM-2

4 units, Win (McCall, M)

#### **IHUM 39B. Inventing Classics: Greek and Roman Literature**

#### **in Its Mediterranean Context**

Second in a two quarter sequence. Are you concerned with fundamental questions about the human condition? Do you ask yourself whether your life is controlled more by your own free choices or by your genetic code? Do you wonder whether the universe is just or unjust? Do you worry whether a superpower can function without hubristic arrogance? If these sorts of issues seem central to your intellectual and personal explorations, this IHUM sequence will reveal to you that the ancient Mediterranean world was equally consumed with identical questions about the nature of human society and human existence. We will undertake our explorations by reading a wide and deep selection of important and influential literary texts from Greece and Rome, amplified by a smaller selection of texts from other cultures in the Mediterranean and the Near East. The sequence will be organized historically, with the winter quarter covering the period from c.2000BC to the fourth century BC, and the spring quarter con GER:IHUM-3

4 units, Spr (Walsh, T)

#### **IHUM 40A. World Archaeology and Global Heritage**

First in a two quarter sequence. In a world marked by rapid globalization and forward-looking technology, heritage presents a particular paradox. Increasingly, heritage sites are flashpoints in cultural and religious conflicts around the globe. Simultaneously heritage is viewed as a unifying force in nation-building and in forging international alliances. Clearly, history matters but how do certain histories come to matter in particular ways, and to whom? How is research on the past shaped through present-day concerns about identity, community, nation, alongside transnational flows of people, money, and goods? The main topics of our course are the impact of the past on the present, and the impact of the present on the past. Thus we will be looking both at how the past plays a role in contemporary society, and at contemporary archaeological research, management and conservation. Through close study of important archaeological sites, we will critically analyze landscapes, architecture GER:IHUM-2

4 units, Win (Hodder, I)

#### **IHUM 40B. World Archaeology and Global Heritage**

Second in a two quarter sequence. In a world marked by rapid globalization and forward-looking technology, heritage presents a particular paradox. Increasingly, heritage sites are flashpoints in cultural and religious conflicts around the globe. Simultaneously heritage is viewed as a unifying force in nation-building and in forging international alliances. Clearly, history matters but how do certain histories come to matter in particular ways, and to whom? How is research on the past shaped through present-day concerns about identity, community, nation, alongside transnational flows of people, money, and goods? The main topics of our course are the impact of the past on the present, and the impact of the present on the past. Thus we will be looking both at how the past plays a role in contemporary society, and at contemporary archaeological research, management and conservation. Through close study of important archaeological sites, we will critically analyze landscapes, architecture GER:IHUM-3

4 units, Spr (Daehnke, J)

#### **IHUM 51. Transformations: The Intersection of High Art and Contemporary Culture**

Othello, Zarathustra, and enlightenment humanism from initial occurrences through moments of reemergence in the 20th-century Western imagination. Transformations across media and contributions to modern constructions of the self and the human condition. GER:IHUM-1

4 units, Aut (Hinton, S; Stephens, S)

#### **IHUM 57. Humans and Machines**

How is a living, thinking human being like, or not like, a machine? This might seem like a new question for the Information Age, yet it has been a preoccupation of our civilization for centuries. From the culmination of the Scientific Revolution in the seventeenth century, philosophers, physiologists, engineers, authors, political actors and artists of every kind have taken humanity's measure by comparing humans with machines. Our course follows this tradition. Together, we ask a number of questions about what it means to think of the human mind, body, and society as types of machines. How has the machine served as a metaphor for the

cosmos and culture? How do we interact with machines, and how have machines influenced literature, performance, and the arts? What separates us from our machines, and are we really as separate as we think we are? We explore the shifting boundary lines between the mechanical and the human by considering how humanity has created or imagined machines and our GER:IHUM-1  
4 units, Aut (Lowood, H; Bailenson, J)

#### **IHUM 58. Technological Visions of Utopia**

Throughout history, philosophers have speculated about the nature of the "good society" and how to achieve it. Although earlier writers had offered their own views, Sir Thomas More gave a name to this ideal society that has now become part of common language: utopia. In the almost 500 years since More's Utopia appeared, changes in society—including enormous advances in science and technology—have opened up new possibilities for the utopian society that More and his predecessors could not have envisioned. At the same time, science and technology also entail risks that suggest more dystopian scenarios—in their most extreme form, threats to humanity's very survival. This course looks at several works that consider how literary visions of society have evolved with the progress of science and technology. The Readings begin with More and continue forward to the much more technologically determined visions of the late 20th century. The course also considers one cinematic treatment of techn GER:IHUM-1

4 units, Aut (Roberts, E; Robinson, O)

#### **IHUM 65. Race and Reunion: American Memory and the Civil War**

The place of slavery and the war in American cultural memory; its representation in literature, visual arts, music, high art, popular culture, and film. How the battle shifted from real to imagined locations. How stories told by writers and artists are shaped by memories and narratives of the past. Themes include competing ideas of race and nation, freedom and citizenship, personal and collective identity, and the purpose of literature and the arts. GER:IHUM-1

4 units, Aut (Fishkin, S; Wolf, B)

#### **IHUM 69A. Human History: A Global Approach**

First of a two quarter sequence. 75,000 years ago there were barely 20,000 people on earth and each of them consumed about 4,000 calories of energy each day, half of it for food and half for everything else combined. Today, by contrast, there are 6,000,000,000 people on earth and in the US we each, on average, burn through 230,000 calories per day, for everything from driving Hummers to eating much more than we need. We take for granted things that would have seemed like magic a hundred years ago; we have penetrated every niche on the planet and have even moved beyond planet. Yet at the same time, other species are going extinct at the rate of one every 20 minutes and we have poisoned the atmosphere and seas. Depending on how you look at it, people are the greatest success story or the greatest disaster of the last million years. We may be on the verge of an astonishing transformation, transcending biology and making death obsolete; or we may be on the verge of destroying ourselves (an GER:IHUM-2

4 units, Win (Morris, I)

#### **IHUM 69B. Human History: A Global Approach**

Second of a two quarter sequence. 75,000 years ago there were barely 20,000 people on earth and each of them consumed about 4,000 calories of energy each day, half of it for food and half for everything else combined. Today, by contrast, there are 6,000,000,000 people on earth and in the US we each, on average, burn through 230,000 calories per day, for everything from driving Hummers to eating much more than we need. We take for granted things that would have seemed like magic a hundred years ago; we have penetrated every niche on the planet and have even moved beyond planet. Yet at the same time, other species are going extinct at the rate of one every 20 minutes and we have poisoned the atmosphere and seas. Depending on how you look at it, people are the greatest success story or the greatest disaster of the last million years. We may be on the verge of an astonishing transformation, transcending biology and making death obsolete; or we may be on the verge of destroying ourselves ( GER:IHUM-3

4 units, Spr (Morris, I)

#### **IHUM 70. Word and Image**

Is a picture really worth a thousand words? This familiar phrase, which began to appear frequently in the U.S. press around 1920, is particularly worth pondering in our image-saturated era, when an image shown for a few seconds can sell a product, seal an election, result in death threats, or shift public opinion. What roles do pictures and words play in our perception and understanding of the world, in how we learn, enjoy, remember, and experience emotions? What is the relationship of an image or a word to that which it represents? These and similar questions are raised today in many different places: in journalism as much as in cognitive science, in science as much as in literature, on the internet and in the criminal justice system. How images argue, prove, convince - and how they argue, prove and convince differently from the written or spoken word - are central questions asked in this course. It is a question that, with differing degrees of urgency, has concerned those that GER:IHUM-1

4 units, Aut (Bobonich, C; Daub, A)

#### **IHUM 72. The Poet Re-making the World**

Can poetry change the world? In this course we will show how poetry has proved itself to be a resilient aesthetic form at the intersection of the personal and the political. We will follow the poem as it is written by men and women facing wars, imprisonment, journeys, social upheavals and the intense fragmentation of their worlds. Through reading works from different historical, cultural and poetic traditions, we explore the question of whether something as individual as subjective artistic experience can help us cope with social and political events that threaten suffering and destruction. The course uncovers the adventures of the individual poet: a young man caught in the trenches of the First World War; a Japanese haiku master and inspired wanderer of the 17th century; an American Beat, Jack Kerouac; a poet from St Louis who went to England and changed the course of 20th century poetry; an English woman trapped in the conventions of her time; a contemporary US soldier in Iraq. Th GER:IHUM-1

4 units, Aut (Boland, E; Carter, S)

#### **IHUM 73A. Ultimate Meanings: Decoding Religious Stories from around the World**

Is there more to life than survival, or does it have some higher purpose? Why is there suffering, death, and evil in the world, and is there some way to overcome them? Religious communities often answer such questions through the art of story-telling, through history, myth, biography and other forms of distilling human experience into narrative. These stories have shaped the world we live in, helping people to cope with difficult aspects of experience, influencing the way we love, suffer and die, inspiring the imagination, and helping to ignite conflict and violence. This course introduces you to some of the great stories of the world's religions; the sacred narratives of Buddhism, Judaism, Christianity and Islam. We will read these stories to learn something about the religious cultures that produced them, and how they have shaped human experience. In the winter quarter, students will be introduced to stories drawn primarily from the Buddhist tradition in the many forms which it developed GER:IHUM-2

4 units, Win (Harrison, P)

#### **IHUM 73B. Ultimate Meanings: Decoding Religious Stories from around the World**

Is there more to life than survival, or does it have some higher purpose? Why is there suffering, death, and evil in the world, and is there some way to overcome them? Religious communities often answer such questions through the art of story-telling, through history, myth, biography and other forms of distilling human experience into narrative. These stories have shaped the world we live in, helping people to cope with difficult aspects of experience, influencing the way we love, suffer and die, inspiring the imagination, and helping to ignite conflict and violence. This course introduces you to some of the great stories of the world's religions; the sacred narratives of Buddhism, Judaism, Christianity and Islam. We will read these stories to learn something about the religious cultures that produced them, and how they have shaped human experience. In the winter quarter, students will be introduced to stories drawn primarily from the Buddhist tradition in the many forms which it developed GER:IHUM-3

4 units, Spr (Weitzman, S)

**IHUM 74A. The Problem of Europe**

This course explores how a small peninsula regularly torn by civil, ethnic, and national discord became an unlikely center of global political power, economic wealth, and intellectual invention. It considers how Europeans, from the end of the Middle Ages to the present day, have understood and responded to the myriad challenges associated with modernity; responses that have run the gamut from renaissance and enlightenment to inquisition and holocaust. Through engagement with key political and philosophical texts, as well as novels, poetry, and films, students will discuss how Europeans have tried to resolve, with mixed results, fundamental problems associated with religious plurality, political revolution, the changing role of the state and nation, industrialization, imperialism, and globalization.

4 units, Win (Staff)

**IHUM 74B. The Problem of Europe**

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4 units, Spr (Staff)

**IHUM 75. Can the People Rule?**

This course will examine basic questions about the ideas of popular (or republican or democratic) government that developed in the century and a half after the Glorious Revolution, and do so primarily by focusing on the American founding era and its aftermath. Using two European authorities who operated under monarchical regimes but sympathized with projects for popular government, John Locke and Alexis de Tocqueville, we'll discuss the possibilities and limits of the republican system that Americans began fashioning after 1776, using the three central segments of the course to focus on specific aspects of the American experiment, from the decision to establish republican governments in 1776, to the reconsideration of that experiment in 1787-1788, and the development of the special doctrine of judicial review under the aegis of the Constitution.

4 units, Aut (Rakove, J)

**IHUM 76. Voyagers and Visionaries**

In this course we will examine five moments of intellectual encounter among the far-flung civilizations of the Eastern Hemisphere in the premodern and early modern eras. The texts we will investigate are landmark works of cultural translation and ethnographic analysis, penned by scholar-travelers from across the Old World. In addition to reading works by two Western analysts of the East, you will be introduced to early Chinese and Persian appraisals of India, as well as a North African encounter with sub-Saharan Africa. Each of our chosen works shows a self-critical mind at work; each represents a lifetime of empirical research, drawing on firsthand experience of foreign lands as well as careful interrogation of prior accounts; and each went on to become an influential classic in a distinctive intellectual tradition. Using methods from intellectual history and cultural geography, we will focus on reconstructing the worldviews and geographical imaginations that inform each text. Hi

4 units, Aut (Wigen, K; Parker, G)

**IHUM 77. What is a Classic?**

The goal of this sequence is to provide Stanford freshman with structured access to great works of literature. The core question is: Why (and how) should we read classics today? Part of this process involves engaging them in an interrogation of the very notion of classic literature. One standard understanding of classic involves the claim that a certain work surpasses its original context and speaks to later generations. Whether or not that definition suffices, the course will ask students to read literature of the past (whether distant or less distant) and to ask why and how we still read such works. A major topic of the sequence is therefore the durability of

literary works and the explanations offered up to explain that durability. While some students in What is a Classic may choose to major in a literary field, our goal is not primarily recruitment but rather to provide all participating students, whatever their eventual major choice, with the concepts and skills to rem

4 units, Win (Gumbrecht, H)

**INTRODUCTORY SEMINARS****AERONAUTICS AND ASTRONAUTICS INTRODUCTORY COURSES****AA 113N. Structures: Why Things Don't (and Sometimes Do) Fall Down**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. How structures created by nature or built by human beings keep things up and keep things in. Topics: nature's structures from microorganisms to large vertebrae; buildings from ancient dwellings to modern skyscrapers; spacecraft and airplanes; boats from ancient times to America's Cup sailboats, and how they win or break; sports equipment; and biomedical devices including bone replacements and cardiovascular stents. How composite materials are used to make a structure light and strong. GER:DB-EngrAppSci

3 units, Win (Springer, G)

**AA 116N. Electric Automobiles and Aircraft**

(S,Sem) (Same as EE 25Q) Stanford Introductory Seminar. Transportation accounts for nearly one-third of American energy use and greenhouse gas emissions and three-quarters of American oil consumption. It has crucial impacts on climate change, air pollution, resource depletion, and national security. Students wishing to address these issues will need to reconsider how we move, finding sustainable transportation solutions. This course will provide an introduction to the issue, covering the past and present of transportation and its impacts; examining alternative fuel proposals; and digging deeper into the most promising option: battery electric vehicles. Energy requirements of air, ground, and maritime transportation; design of electric motors, power control systems, drive trains, and batteries; and technologies for generating renewable energy. Two fun opportunities for hands-on experiences with electric cars. Prerequisites: Introduction to calculus and Physics AP or elementary mechanics. GER:DB-EngrAppSci

3 units, Win (Cox, D; Enge, P)

**AFRICAN AND AFRICAN AMERICAN STUDIES INTRODUCTORY COURSES****AFRICAAM 16N. African Americans and Social Movements**

(F,Sem) (Same as CSRE 16N, SOC 16N) Stanford Introductory Seminar. Theory and research on African Americans' roles in post-Civil Rights, US social movements. Topics include women's right, LGBT rights, environmental movement, and contemporary political conservatism. GER:DB-SocSci

3 units, Aut (Fields, C)

**AFRICAAM 48Q. South Africa: Contested Transitions**

(S,Sem) (Same as HISTORY 48Q) Stanford Introductory Seminar. Preference to sophomores. The inauguration of Nelson Mandela as president in May 1994 marked the end of an era and a way of life for S. Africa. The changes have been dramatic, yet the legacies of racism and inequality persist. Focus: overlapping and sharply contested transitions. Who advocates and opposes change? Why? What are their historical and social roots and strategies? How do people reconstruct their society? Historical and current sources, including films, novels, and the Internet. GER:DB-Hum, EC-GlobalCom

3 units, Win (Samoff, J)

**AFRICAAM 56N. Mixed Race in the New Millennium: Crossings of Kin, Faith & Culture**

(F,Sem) (Same as CSRE 56N, ENGLISH 56N) Stanford Introductory Seminar. Preference to freshmen. How literature, theater, graphic art and popular culture shape understandings of contemporary mixed race identity and other complex experiences of cultural hybridity. Course explores implications for racial identity, art, and politics for the new millennium. GER:DB-Hum

3 units, Win (Elam, M)

## AMERICAN STUDIES INTRODUCTORY COURSES

### AMSTUD 25N. Understanding the Sixties

(F,Sem) (Same as SOC 25N) Stanford Introductory Seminar. Preference to freshmen. The tendency of critics to view the 60s through ideological lenses as either the best or worst of times has made a balanced perspective difficult to achieve. Goal is to provide a sociological explanation for the political and cultural turbulence that marked the era. The confluence of demographic, political, economic, and cultural trends that date back to at least the 30s. The ambiguous legacy of the 60s. Using the 60s to shed light on the 80s and 90s. Enrollment limited to 16. GER:DB-SocSci

3 units, Win (Staff)

### AMSTUD 51N. Comparative Fictions of Ethnicity

(S,Sem) (Same as COMPLIT 51N, CSRE 51N) Stanford Introductory Seminar. We may know who we are, but we are, after all, social creatures. How does our sense of self interact with those around us? How does literature provide a particular medium for not only self expression, but also for meditations on what goes into the construction of the Self? After all, don't we tell stories in response to the question, who are you? Besides a list of nouns and names and attributes, we give our lives flesh and blood in telling how we process the world. Our course focuses in particular on this question--Does this universal issue (who am I) become skewed differently when we add a qualifier before it, like ethnic? GER:DB-Hum

5 units, Win (Palumbo-Liu, D)

### AMSTUD 68N. Mark Twain and American Culture

(F,Sem) (Same as ENGLISH 68N) Stanford Introductory Seminar. Preference to freshmen. Mark Twain has been called our Rabelais, our Cervantes, our Homer, our Tolstoy, our Shakespeare. Ernest Hemingway maintained that all modern American literature comes from one book by Mark Twain called *The Adventures of Huckleberry Finn*. President Franklin D. Roosevelt got the phrase *New Deal* from A Connecticut Yankee in King Arthur's Court. Class discussions will focus on how Twain's work illuminates and complicates his society's responses to such issues as race, technology, heredity versus environment, religion, education, and what it means to be American. GER:DB-Hum

4 units, Aut (Fishkin, S)

### AMSTUD 114N. Visions of the 1960s

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Introduction to the ideas, sensibility, and, to a lesser degree, the politics of the American 60s. Topics: the early 60s vision of a beloved community; varieties of racial, generational, and feminist dissent; the meaning of the counterculture; and current interpretive perspectives on the 60s. Film, music, and articles and books. GER:DB-Hum, EC-AmerCul

5 units, Aut (Gillam, R)

## ANTHROPOLOGY INTRODUCTORY COURSES

### ANTHRO 21N. The Anthropology of Globalization

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Anthropological approach to how cultural change, economic restructuring, and political mobilization are bound up together in the process of globalization. GER:DB-SocSci

4 units, Aut (Ebron, P)

### ANTHRO 26N. Hauntings, Visions, and Prophecy

(F,Sem) Stanford Introductory Seminar. This course explores the conditions under which people have experiences that they identify as  $\zeta$ supernatural $\zeta$ : experiences of something that is not physically present. We will explore the cultural and psychological dimensions of this very real phenomenon. We will not, however, make ontological judgments about whether something which is experienced as externally present is in fact externally present: in other words, this is a class about culture and psychology, not about metaphysics. We will do experimental work, using our selves and fellow classmates, as subjects, to understand who, when and how people have experiences that they deem  $\zeta$ super $\zeta$ natural.

3-5 units, Win (Luhmann, T)

### ANTHRO 27N. Ethnicity and Violence: Anthropological Perspectives

(F,Sem) Stanford Introductory Seminar. Ethnicity is one of the most compelling and most modern ways in which people - in the midst of considerable global and local uncertainty - all across the world imagine and narrate themselves. This seminar will take an anthropological look at both the modernity and the compulsions of ethnic allegiance, and, why struggles over ethnic identity are so frequently violent. Our questions will be both historical  $\zeta$  how, why and when did people come to think of themselves as possessing different ethnic identities - and contemporary  $\zeta$  how are these identities lived, understood, narrated, and transformed and what is the consequence of such ethnicisation. We follow this through anthropological perspectives which ask persistently how people themselves locally narrate and act upon their experiences and histories. Through this we will approach some of the really big and yet everyday questions that many of us around the world face: how do we relate to ourselves and to those

3-5 units, Aut (Thiranagama, S)

### ANTHRO 30Q. The Big Shift: An Anthropological Approach to Wealth, Migration, and the New Margins of America

(S,Sem) Stanford Introductory Seminar. Is the middle class shrinking? How do people who live at the extremes of American society- the super rich, the working poor and those who live on the margins, imagine and experience the good life? How do we understand phenomena such as gang cultures, addiction and the realignment of white consciousness? This class uses the methods and modes of ethnographic study in an examination of American culture. Ethnographic materials range from an examination of the new American wealth boom of the last 20 years (Richistan by Robert Frank) to the extreme and deadly world of the invisible underclass of homeless addicts on the streets of San Francisco (Righteous Dopefiend by Phillippe Bourgois and Jeff Schonberg). The experiences of Hispanic immigrants and the struggle to escape gang life in Los Angeles are highlighted in the story of Homeboy Industries a job creation program initiated by a priest working in LA's most deadly neighborhoods (G-Dog and the Homeboys by

4 units, Aut (Wilcox, M)

## APPLIED PHYSICS INTRODUCTORY COURSES

### APPPHYS 78Q. Tools of Nanotechnology

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Topics include: current and future applications of nanotechnology, nanofabrication tools, nanoscale characterization and manipulation tools, scanning probe microscopy (SPM), Stanford nanotechnology research examples, hands-on activities, research lab tours. Prerequisite: high school physics. GER:DB-EngrAppSci

3 units, Aut (Beetz, T)

### APPPHYS 79N. Energy Options for the 21st Century

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Choices for meeting the future energy needs of the U.S. and the world. Basic physics of energy sources, technologies that might be employed, and related public policy issues. Trade-offs and societal impacts of different energy sources. Policy options for making rational choices for a sustainable world energy economy. GER:DB-EngrAppSci

3 units, Aut (Fox, J; Geballe, T)

## ART HISTORY INTRODUCTORY COURSES

### ARTHIST 260Q. Art, War and Politics in the Modern Period

(S,Sem) Stanford Introductory Seminar. Considers the pivotal relationship between war, politics and the visual arts from the beginnings of the French Revolution in 1789 to the end of the Vietnam War in 1975, exploring how iconic works of modernism have both shaped and reflected public discourse on war, whether in support of such campaigns or in opposition to them. Topics: the power of visual representation to capture the trauma of the battlefield; propaganda and the art of persuasion; how developments in modern art are implicated in the evolution of modern warfare and vice-versa. Case studies include: Francisco de Goya's wrenching portrayal of the Napoleonic Wars, *The Third of May* (1808); Pablo Picasso's monument to the murderous bombing of a Basque town during the Spanish Civil War, *Guernica* (1937);

and the surprising history of Abstract Expressionism, the CIA and the cold war. Sophomore seminar; enrollment restricted and by application only. GER:DB-Hum

3 units, Win (Lee, P)

### **ARTHIST 232Q. Place: Making Space Now**

(S,Sem) (Same as CEE 32Q) Stanford Introductory Seminar. This seminar argues that architects are ultimately placemakers, and questions what that means in the contemporary world. Part I investigates the meaning of the word place. Additional background for understanding contemporary place making will include a critique of the history of modern place-making through an examination of modern form. Part II examines two traditional notions of place by scale: from home to the city. What elements give these conceptions of space a sense of place? To answer this question, themes such as memory, mapping, and boundary, among others, will be investigated. Part III presents challenges to the traditional notions of place discussed in Part II. Topics addressed include: What does it mean to be out of place? What sense of place does a nomad have, and how is this represented? What are the non-places and how can architects design for these spaces? Part IV addresses the need to re-conceptualize contemporary space

3 units, Spr (Barton, J; Beischer, T)

## **BIOCHEMISTRY INTRODUCTORY COURSES**

### **BIOC 118Q. Genomics and Medicine**

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Knowledge gained from sequencing human genomes and implications for medicine and biomedical research. Novel diagnoses and treatment of diseases, including stem cells, gene therapy and rational drug design. Personal genomics and how it is used to improve health and well being. Social and ethical implications of genetic information such as privacy, discrimination and insurability. Course Webpage:

<http://biochem118.stanford.edu/>. GER:DB-EngrAppSci

3 units, Win (Brutlag, D)

## **BIOENGINEERING INTRODUCTORY COURSES**

### **BIOE 70Q. Medical Device Innovation**

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Survey of innovative technologies and medical devices used in multiple medical specialties. Guest lecturers include Stanford Medical School physicians, entrepreneurs, and venture capitalists. Focus on how to identify clinical needs and design device solutions to address those needs. Fundamentals of starting a company. Field trips to local medical device companies and design house. No previous engineering training required.

3 units, Spr (Mandato, J; Pierce, R)

## **BIOLOGY INTRODUCTORY COURSES**

### **BIO 4N. Personalized Genomic Medicine**

(F,Sem) Stanford Introductory Seminar. Exploration of the exciting new field of personalized genomic medicine. Personalized medicine is based on the idea that each person's unique genome sequence can be used to predict risk of acquiring specific diseases, and to make more informed medical choices. Learn about the fascinating science behind these approaches; where they are heading in the future; and the ethical implications such technology presents. Lectures will be augmented with hands-on experience in exploring and analyzing a real person's genome. GER: DB-NatSci

3 units, Aut (Fraser, H)

### **BIO 8N. Human Evolution**

(F,Sem) Stanford Introductory Seminar. A survey of the anatomical and behavioral evidence for human evolution and of the increasingly important information from molecular genetics. Emphasis on the split between the human and chimpanzee lines 6-7 million years ago, the appearance of the australopithecines 4.1 million years ago, the emergence of the genus *Homo* about 2.5 million years ago, the spread of *Homo* from Africa 1.7-1.6 million years ago, the subsequent divergence of *Homo* into different species on different continents, and the expansion of fully modern humans (*Homo sapiens*) from Africa about 50,000 years ago to

replace the Neanderthals and other non-modern Eurasians. GER: DB-NatSci

3 units, Win (Klein, R)

### **BIO 12N. Sensory Ecology of Marine Animals**

(F,Sem) Stanford Introductory Seminar. Animals living in the oceans experience a highly varied range of environmental stimuli. An aquatic lifestyle requires an equally rich range of sensory adaptations, including some that are totally foreign to us. In this course we will examine sensory system in marine animals from both an environmental and behavioral perspective and from the point of view of neuroscience and information systems engineering.

3 units, Spr (Thompson, S)

### **BIO 13N. Environmental Problems and Solutions**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Students do independent investigations of current environmental problems, analyzing differing views of them and discussing possible solutions. Each student gives seminar presentations and leads seminar discussions. Short, documented position papers are written for policy makers. GER: DB-NatSci

3 units, Spr (Ehrlich, P)

### **BIO 15N. Environmental Literacy**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Lack of public understanding of the details of most environmental problems is cited as a cause of environmental deterioration. Good citizenship requires literacy about the elements of the scientific and decision making processes that accompany most environmental issues: what can happen, what are the odds, how can the credibility of sources of expertise be assessed, which components of environmental debates deal with factual and theoretical issues, and which are political value judgments? GER: DB-NatSci

3 units, Aut (Root, T)

### **BIO 16N. Island Ecology**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. How ecologists think about the world. Focus is on the Hawaiian Islands: origin, geology, climate, evolution and ecology of flora and fauna, and ecosystems. The reasons for the concentration of threatened and endangered species in Hawaii, the scientific basis for their protection and recovery. How knowledge of island ecosystems can contribute to ecology and conservation biology on continents. GER: DB-NatSci

3 units, Spr (Vitousek, P)

### **BIO 22N. Infection, Immunity, and Global Health**

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. The causes and prevention of infectious diseases, focusing on the interplay between pathogens and the immune system that determines the outcome of the disease. Introduction to microbiology, immunology, and epidemiology. Diseases of the past and present, including TB, malaria, AIDS, and Ebola. The roles of biological, environmental, and societal factors in disease emergence, spread, and prevention. Primary scientific literature, student-led discussions, and research projects. Prerequisite: biology background, preferably introductory college courses (e.g., 41, 42, or HUMBIO 2A, 3A. GER: DB-NatSci

3 units, Spr (Jones, P)

### **BIO 25Q. The Molecular Basis of Genetic Disease**

(F,Dial) Stanford Introductory Dialogue. Preference to sophomores. Focus is on two genetic diseases resulting from the production of protein molecules that are unable to fold into their native conformations, called conformational diseases: cystic fibrosis and amyotrophic lateral sclerosis or Lou Gehrig's disease. Hypotheses and controversies surrounding the molecular basis of these disorders, and implications for novel therapeutics. Readings from research literature. GER: DB-NatSci

3 units, Spr (Kopito, R)

### **BIO 26N. Maintenance of the Genome**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. The precious blueprint for life is entrusted to the genomic DNA molecules in all living cells. Multiple strategies have evolved to prevent the deleterious consequences from endogenous DNA alterations and damage from radiation or genotoxic chemicals in the environment. In this seminar you will learn about the remarkable systems that scan cellular DNA for alterations and make repairs to ensure genomic stability. Deficiencies in DNA



repair have been implicated in many hereditary diseases involving developmental defects, premature aging, and/or predisposition to cancer. An understanding of DNA repair mechanisms is important for advances in the fields of cancer biology, neurobiology, and gerontology. Background readings, introductory lectures, student presentations, short term paper. GER: DB-NatSci

3 units, Aut (Hanawalt, P)

### **BIO 27N. Nature and Nurture in Brain Development**

(F,Sem) Stanford Introductory Seminar. Preference to sophomores. Examination of the roles of genes and the environment in shaping brain wiring and behavior, using readings of papers from the primary scientific literature as examples of how the developing nervous system integrates information from both the genetic blueprint and external experience in forming neural connections. GER: DB-NatSci

3 units, Win (McConnell, S)

### **BIO 30N. Extinctions in Near Time: Biodiversity loss since the Pleistocene**

(F,Sem) Stanford Introductory Seminar. The transition 11,700 years ago from the Pleistocene glacial period into the Holocene interglacial witnessed the expansion of humans around the world, climatic warming and the demise of many large vertebrate species. Since that time extinctions have continued on land and in the sea, culminating with the biodiversity crisis we are experiencing today. We will explore these prehistoric extinctions: Who? When? Where? and Why? in order to learn more about our planet's future. GER: DB-NatSci

3 units, Aut (Hadly, E)

### **BIO 33N. Conservation Science and Practice**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Interdisciplinary. The science and art of conservation today. The forces that are driving change in Earth's atmosphere, lands, waters, and variety of life forms. Which broad dimensions of the biosphere, and which elements of ecosystems, most merit protection? The prospects for, and challenges in, making conservation economically attractive and commonplace. Field trip; project. GER: DB-NatSci

3 units, Spr (Daily, G)

### **BIO 34N. Hunger**

(F,Sem) Stanford Introductory Seminar. The biology of hunger and satiety, disease states that disrupt normal responses to hunger and satiety, starvation responses and adaptations to starvation in a variety of organisms, food production and distribution mechanisms, historic famines and their causes, the challenges of providing adequate food and energy for the Earth's growing population, local and global efforts to alleviate hunger, and hunger in fiction. GER: DB-NatSci

3 units, Aut (Barton, K)

### **BIO 38N. Photosynthesis: From Basic Mechanisms to Biofuels**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Photosynthetic processes in terrestrial and aquatic environments. Biological and chemical ways that have been developed to capture the energy of sunlight; how this light energy can be converted to usable forms of energy, including biofuels; and potential impacts of anthropogenic energy generation on the health of the planet. GER: DB-NatSci

3 units, Win (Grossman, A)

### **BIO 39N. Networks in Biology**

(F,Sem) Stanford Introductory Seminar. Networks are everywhere, including friendship links on Facebook, airline routes, power grids, and the Internet. Biology is no exception. Examples include food chains, protein interaction maps, and metabolic pathways. Despite their ubiquitousness, the study of networks in the real world only started about a decade ago. Exploration of the types of networks in biology and the approaches people use in studying them. Discussions and presentations of original research papers. GER: DB-NatSci

3 units, Spr (Rhee, S), alternate years, not given next year

## **CHEMICAL ENGINEERING INTRODUCTORY COURSES**

### **CHEMENG 35N. Renewable Energy for a Sustainable World**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen.

An overall world energy assessment, projections, and technologies. How to assess good and bad potential impacts of leading renewable energy candidates: benefit versus impact ratio using quantitative cradle-to-grave approach. Technologies suitable for near-term application in developing economic systems. Governmental policies, governmental versus private sector investments, raw materials supply issues, and impact of cultural influences on technology choices and speed of implementation. GER:DB-EngrAppSci

3 units, Aut (Swartz, J)

### **CHEMENG 60Q. Environmental Regulation and Policy**

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. How environmental policy is formulated in the U.S. How and what type of scientific research is incorporated into decisions. How to determine acceptable risk, the public's right to know of chemical hazards, waste disposal and clean manufacturing, brownfield redevelopment, and new source review regulations. The proper use of science and engineering including media presentation and misrepresentation, public scientific and technical literacy, and emotional reactions. Alternative models to formulation of environmental policy. Political and economic forces, and stakeholder discussions. GER:DB-EngrAppSci

3 units, Aut (Robertson, C; Libicki, S)

### **CHEMENG 70Q. Masters of Disaster**

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. For students interested in science, engineering, politics, and the law. Learn from past disasters to avoid future ones. How disasters can be tracked to failures in the design process. The roles of engineers, artisans, politicians, lawyers, and scientists in the design of products. Failure as rooted in oversight in adhering to the design process. Student teams analyze real disasters and design new products presumably free from the potential for disastrous outcomes. GER:DB-EngrAppSci

3 units, Aut (Robertson, C; Moalli, J)

### **CHEMENG 80Q. Art, Chemistry, and Madness: The Science of Art Materials**

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Chemistry of natural and synthetic pigments in five historical palettes: earth (paleolithic), classical (Egyptian, Greco-Roman), medieval European (Middle Ages), Renaissance (old masters), and synthetic (contemporary). Composite nature of paints using scanning electron microscopy images; analytical techniques used in art conservation, restoration, and determination of provenance; and inherent health hazards. Paintings as mechanical structures. Hands-on laboratory includes stretching canvas, applying gesso grounds, grinding pigments, preparing egg tempera paint, bamboo and quill pens, gilding and illumination, and papermaking. GER:DB-EngrAppSci

3 units, Spr (Frank, C; Loesch-Frank, S)

## **CHEMISTRY INTRODUCTORY COURSES**

### **CHEM 24N. Nutrition and History**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Intended to broaden the introductory chemistry experience. The biochemical basis of historically important nutritional deficiencies (vitamins, minerals, starvation, metabolic variants that predispose to disease) and environmental toxins is related to physiological action and the sociological, political, and economic consequences of its effect on human populations. Prerequisite: high school chemistry. Recommended: 31A,B, or 31X, or 33.

3 units, Spr (Huestis, W)

### **CHEM 25N. Science in the News**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Possible topics include: diseases such as avian flu, HIV, and malaria; environmental issues such as climate change, atmospheric pollution, and human population; energy sources in the future; evolution; stem cell research; nanotechnology; and drug development. Focus is on the scientific basis for these topics as a basis for intelligent discussion of societal and political implications. Sources include the popular media and scientific media for the nonspecialist, especially those available on the web.

3 units, Aut (Andersen, H)

### **CHEM 25Q. Science-in-Theatre: A New Genre?**

(S,Sem) (Same as DRAMA 25N) Stanford Introductory Seminar.



Preference to sophomores. How scientists acquire their rules, mores, and idiosyncrasies through a form of intellectual osmosis in a mentor-disciple relationship. Scientists represented as Frankensteins or nerds, rather than normal. Why more intellectually challenging plays have appeared on the Anglo-American theatre scene where scientific behavior and even science are presented accurately. Students engage in a playwriting experiment.

3 units, Win (Djerassi, C)

#### **CHEM 26N. The What, Why, How and wow's of Nanotechnology**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Introduction to nanotechnology with discussion of basic science at the nanoscale, its difference from molecular and macroscopic scales, and implications and applications. Developments in nanotechnology in the past two decades, from imaging and moving single atoms on surfaces to killing cancer cells with nanoscale tools and gadgets. GER: DB-NatSci

3 units, Spr (Dai, H)

#### **CHEM 34XN. General Chemistry Laboratory**

(F,Sem) Stanford Introductory Seminar. Introduction to chemical laboratory practice. Topics include preparation of compounds and characterization of their properties by modern spectroscopic techniques. Corequisite: Chemistry 31X or the equivalent. Limited to 12 students; enrollment by consent of the instructor.

1 unit, Aut (Cox, C; Fayer, M)

### **CHICANA/O STUDIES INTRODUCTORY COURSES**

#### **CHICANST 14N. Growing Up Bilingual**

(F,Sem) (Same as CSRE 14N, EDUC 114N) Stanford Introductory Seminar. This course is a Freshman Introductory Seminar that has as its purpose introducing students to the sociolinguistic study of bilingualism by focusing on bilingual communities in this country and on bilingual individuals who use two languages in their everyday lives. Much attention is given to the history, significance, and consequences of language contact in the United States. The course focuses on the experiences of long-term US minority populations as well as that of recent immigrants.

3 units, Win (Valdes, G)

#### **CHICANST 160N. Latino/Latina Performance in the United States**

(F,Sem) (Same as CSRE 160N, DRAMA 17N) Stanford Introductory Seminar. Preference to freshmen. This course will introduce works by U.S. Latino and Latina performance artists producing from the margins of the mainstream Euro-American theater world. We will examine how performance art serves as a kind of dramatized political forum for Latino/a artists, producing some of the most transgressive explorations of queer and national/ethnic identities in the U.S. today. By the course's conclusion, each student will create and perform in a staged reading of an original performance piece. GER:DB-Hum, EC-AmerCul

3 units, Win (Moraga, C)

### **CHINESE GENERAL INTRODUCTORY COURSES**

#### **CHINGEN 70N. Marvelous Creatures: Animals and Humans in Chinese Literature**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Read novels and short stories as well as view films that feature an array of marvelous creatures from late imperial times to the contemporary era. What animal imageries and metaphors can reveal about the Chinese and how they relate to the natural, supernatural, and human worlds across the centuries. GER:DB-Hum, EC-GlobalCom

3-4 units, Spr (Lee, H)

### **CIVIL AND ENVIRONMENTAL ENGINEERING INTRODUCTORY COURSES**

#### **CEE 31Q. Accessing Architecture Through Drawing**

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Drawing architecture provides a deeper understanding of the intricacies and subtleties that characterize contemporary buildings. How to dissect buildings and appreciate the formal elements of a building, including scale, shape, proportion, colors and materials, and the problem solving reflected in the design. Students construct conventional architectural drawings, such as plans, elevations, and perspectives. Limited enrollment. GER:DB-EngrAppSci

4 units, Aut (Barton, J), Win (Barton, J)

#### **CEE 32Q. Place: Making Space Now**

(S,Sem) (Same as ARTHIST 232Q) Stanford Introductory Seminar. This seminar argues that architects are ultimately placemakers, and questions what that means in the contemporary world. Part I investigates the meaning of the word place. Additional background for understanding contemporary place making will include a critique of the history of modern place-making through an examination of modern form. Part II examines two traditional notions of place by scale: from home to the city. What elements give these conceptions of space a sense of place? To answer this question, themes such as memory, mapping, and boundary, among others, will be investigated. Part III presents challenges to the traditional notions of place discussed in Part II. Topics addressed include: What does it mean to be out of place? What sense of place does a nomad have, and how is this represented? What are the non-places and how can architects design for these spaces? Part IV addresses the need to reconceptualize contemporary s

3 units, Spr (Barton, J; Beischer, T)

#### **CEE 50N. From the Foothills to the Bay**

(F,Sem) Stanford Introductory Seminar. Stanford University sits on the shores of one of the world's great estuaries, the San Francisco Bay/Delta, the connection of the inland river systems of the Central Valley to the Pacific Ocean. This course is intended to provide an introduction to the San Francisco Bay/Delta including its history, current scientific understanding of its physical and ecological functioning, descriptions and underpinnings of engineering manipulations of the system, and the intersection of science and engineering with policies designed to manage its resources. Because of the important effects that water resources development, most notably upstream diversions, have had on the system, Bay-Delta science, engineering and policy are completely intertwined with the management of the water supply of California. Thus, we will also examine relevant issues in California water that touch on the Bay Delta including an overall description of California hydrology, the State and Federal wa

3 units, Spr (Monismith, S)

#### **CEE 80N. The Art of Structural Engineering**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. The history of modern bridges, buildings, and other large-scale structures. Students learn about modern structures, the social context in which they are built and their symbolic value. Principles of structural engineering and calculating efficiency and safety taught through case studies. Field trip to Bay Area landmark and hands-on exercises including building and testing a model bridge. Students from all backgrounds welcome. GER:DB-EngrAppSci

4 units, Win (Billington, S)

### **CLASSICS ART/ARCHAEOLOGY INTRODUCTORY COURSES**

#### **CLASSART 21Q. Eight Great Archaeological Sites in Europe**

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Focus is on excavation, features and finds, arguments over interpretation, and the place of each site in understanding the archaeological history of Europe. Goal is to introduce the latest archaeological and anthropological thought, and raise key questions about ancient society. The archaeological perspective foregrounds interdisciplinary study: geophysics articulated with art history, source criticism with analytic modeling, statistics interpretation. A web site with resources about each site, including

plans, photographs, video, and publications, is the basis for exploring. GER:DB-Hum

3-5 units, Aut (Shanks, M), Spr (Shanks, M)

## CLASSICS GENERAL INTRODUCTORY COURSES

### CLASSGEN 6N. Antigone: From Ancient Democracy to Contemporary Dissent

(F,Sem) (Same as DRAMA 12N) Stanford Introductory Seminar. Preference to freshmen. Tensions inherent in the democracy of ancient Athens; how the character of Antigone emerges in later drama, film, and political thought as a figure of resistance against illegitimate authority; and her relevance to contemporary struggles for women's and workers' rights and national liberation. Readings and screenings include versions of Antigone by Sophocles, Anouilh, Brecht, Fugard/Kani/Ntshona, Paulin, Glowacki, Gurney, and von Trotta. GER:DB-Hum, EC-Gender

4 units, Aut (Rehm, R; Miller, D)

### CLASSGEN 24N. Sappho: Erotic Poetess of Lesbos

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Sappho's surviving fragments in English; traditions referring to or fantasizing about her disputed life. How her poetry and legend inspired women authors and male poets such as Swinburne, Baudelaire, and Pound. Paintings inspired by Sappho in ancient and modern times, and composers who put her poetry to music. GER:DB-Hum, EC-Gender

4-5 units, Spr (Peponi, A)

### CLASSGEN 37N. Socrates: Philosopher and Trickster

(F,Sem) Stanford Introductory Seminar. Socrates claimed that he was not wise but always seeking for wisdom. Socrates aimed to achieve ethical knowledge. What kind of knowledge is this? We examine Greek myth, religion, and society in order to locate Socrates' philosophy in its cultural context. We investigate the trial and death of Socrates, his philosophic method, and his cunning philosophic strategies. We read Plato's dialogues, Greek tragedies and comedies to understand this cagey and complex philosopher. GER:DB-Hum, EC-EthicReas

3-5 units, Win (Nightingale, A)

## CLASSICS HISTORY INTRODUCTORY COURSES

### CLASSHIS 23N. Slavery and Rebellion in Ancient Rome: Spartacus in Legend and History

(F,Sem) (Same as HISTORY 13N) Stanford Introductory Seminar. Preference to freshmen. Spartacus and his army of slaves resisted the power of the Roman legions for two years and became the stuff of legend. Introduction to Roman history. Slavery in ancient Rome in its psychological, social, and economic dimensions. Causes of Spartacus' rebellion; how the traumatic end of the rebellion gave rise to a legend popularized in Stanley Kubrick's 1960 film.

3 units, Aut (Saller, R)

### CLASSHIS 26N. From Community to Empire: Understanding the Premodern State

(F,Sem) Stanford Introductory Seminar. As Rousseau observed, man was born free, and everywhere he is in chains. How did this happen? Bringing together theoretical models from the social sciences and historical evidence from all over the world, this course explores the emergence, evolution and character of the state as a fundamental type of human organization that has shaped our existence for thousands of years. GER:IHUM-3

3-4 units, Spr (Scheidel, W)

## COMMUNICATION INTRODUCTORY COURSES

### COMM 130N. The idea of a free press

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. An examination of the meaning of freedom of the press, tied to but not bound by various Supreme Court rulings on the scope and purpose of the First Amendment's speech and press clauses. Discussions will include a look at the recent and rapid computerization of communication and what it portends for the future of a free press.

3-4 units, Spr (Glasser, T)

## COMPARATIVE LITERATURE INTRODUCTORY COURSES

### COMPLIT 10N. Shakespeare and Performance in a Global Context

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. The problem of performance including the performance of gender through the plays of Shakespeare. In-class performances by students of scenes from plays. The history of theatrical performance. Sources include filmed versions of plays, and readings on the history of gender, gender performance, and transvestite theater. GER:DB-Hum, EC-Gender

3 units, Spr (Parker, P)

### COMPLIT 11Q. Shakespeare, Playing, Gender

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Focus is on several of the best and lesser known plays of Shakespeare, on theatrical and other kinds of playing, and on ambiguities of both gender and playing gender. GER:DB-Hum, EC-Gender

3 units, Win (Parker, P)

### COMPLIT 51N. Comparative Fictions of Ethnicity

(S,Sem) (Same as AMSTUD 51N, CSRE 51N) Stanford Introductory Seminar. We may know who we are, but we are, after all, social creatures. How does our sense of self interact with those around us? How does literature provide a particular medium for not only self expression, but also for meditations on what goes into the construction of the Self? After all, don't we tell stories in response to the question, who are you? Besides a list of nouns and names and attributes, we give our lives flesh and blood in telling how we process the world. Our course focuses in particular on this question--Does this universal issue (who am I) become skewed differently when we add a qualifier before it, like ethnic? GER:DB-Hum

5 units, Win (Palumbo-Liu, D)

### COMPLIT 110N. Du Fu: The Case for Chinese Poetry

(F,Sem) Stanford Introductory Seminar. When one asks: what is a classic? one expects the title of a big novel as the response. This course argues the case for the classical Chinese poetry of the author who has the rightful claim of the greatest poet in Chinese history, Du Fu (712-770). We will look at how poetry focuses on the chemistry of language - the ways words can be put together just so to create specific catalytic conversations of meaning; the engineering of language - the ways specific structures build on and create certain distributions of energy and mass. We will learn to appreciate Du Fu's wit, compassion, learnedness and critical powers and to appreciate as well how poetry can illustrate the evocative and expressive power of language. GER:IHUM-3

4 units, Spr (Palumbo-Liu, D)

## COMPARATIVE MEDICINE INTRODUCTORY COURSES

### COMPMED 81N. Comparative Anatomy and Physiology of Mammals

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Emphasis is on a comparative approach to anatomy and physiology of a wide range of mammals, the unique adaptations of each species in terms of its anatomical, and behavioral characteristics, and how these species interact with human beings and other animals. Dissection required. Class size is limited to 16. GER: DB-NatSci

3 units, Win (Bouley, D)

### COMPMED 84Q. Globally Emerging Zoonotic Diseases

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Infectious diseases impacting veterinary and human health around the world today. Mechanisms of disease, epidemiology, and underlying diagnostic, treatment and control principles associated with these pathogens.

3 units, Spr (Felt, S)

### COMPMED 87Q. Introduction to the Mouse in Biomedical Research

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Focus is on the laboratory mouse, one of the most widely used

models for biomedical research. Topics include the natural history and origin of the laboratory mouse; characteristics of commonly used strains; mouse anatomy, physiology, and husbandry; common mouse diseases and their effects on research; coat color genetics; and genetically engineered mouse technology. Demonstrations and hands-on experience with necropsy, mouse handling, and research techniques.

3 units, Aut (Nagamine, C)

## COMPARATIVE STUDIES IN RACE AND ETHNICITY INTRODUCTORY COURSES

### CSRE 14N. Growing Up Bilingual

(F,Sem) (Same as CHICANST 14N, EDUC 114N) Stanford Introductory Seminar. This course is a Freshman Introductory Seminar that has as its purpose introducing students to the sociolinguistic study of bilingualism by focusing on bilingual communities in this country and on bilingual individuals who use two languages in their everyday lives. Much attention is given to the history, significance, and consequences of language contact in the United States. The course focuses on the experiences of long-term US minority populations as well as that of recent immigrants.

3 units, Win (Valdes, G)

### CSRE 16N. African Americans and Social Movements

(F,Sem) (Same as AFRICAAM 16N, SOC 16N) Stanford Introductory Seminar. Theory and research on African Americans' roles in post-Civil Rights, US social movements. Topics include women's right, LGBT rights, environmental movement, and contemporary political conservatism. GER:DB-SocSci

3 units, Aut (Fields, C)

### CSRE 28N. The Cultural Shaping of Mental Health and Illness

(F,Sem) (Same as PSYCH 28N) Stanford Introductory Seminar. This seminar examines how our cultural ideas and practices shape our conceptions, perceptions, experiences, and treatment of emotional wellness and distress. We will read and discuss empirical research and case studies from psychology, anthropology, sociology, and medicine. Course requirements include weekly reading and thought papers, weekly discussion, and a final research project and presentation.

3 units, Win (Tsai, J)

### CSRE 45Q. Understanding Race and Ethnicity in American Society

(S,Sem) (Same as SOC 45Q) Stanford Introductory Seminar. Preference to sophomores. Historical overview of race in America, race and violence, race and socioeconomic well-being, and the future of race relations in America. Enrollment limited to 16. GER:DB-SocSci

5 units, Aut (Snipp, C)

### CSRE 51N. Comparative Fictions of Ethnicity

(S,Sem) (Same as AMSTUD 51N, COMPLIT 51N) Stanford Introductory Seminar. We may know who we are, but we are, after all, social creatures. How does our sense of self interact with those around us? How does literature provide a particular medium for not only self expression, but also for meditations on what goes into the construction of the Self? After all, don't we tell stories in response to the question, who are you? Besides a list of nouns and names and attributes, we give our lives flesh and blood in telling how we process the world. Our course focuses in particular on this question--Does this universal issue (who am I) become skewed differently when we add a qualifier before it, like ethnic? GER:DB-Hum

5 units, Win (Palumbo-Liu, D)

### CSRE 56N. Mixed Race in the New Millennium: Crossings of Kin, Faith & Culture

(F,Sem) (Same as AFRICAAM 56N, ENGLISH 56N) Stanford Introductory Seminar. Preference to freshmen. How literature, theater, graphic art and popular culture shape understandings of contemporary mixed race identity and other complex experiences of cultural hybridity. Course explores implications for racial identity, art, and politics for the new millennium. GER:DB-Hum

3 units, Win (Elam, M)

### CSRE 160N. Latino/Latina Performance in the United States

(F,Sem) (Same as CHICANST 160N, DRAMA 17N) Stanford Introductory Seminar. Preference to freshmen. This course will

introduce works by U.S. Latino and Latina performance artists producing from the margins of the mainstream Euro-American theater world. We will examine how performance art serves as a kind of dramatized political forum for Latino/a artists, producing some of the most transgressive explorations of queer and national/ethnic identities in the U.S. today. By the course's conclusion, each student will create and perform in a staged reading of an original performance piece. GER:DB-Hum, EC-AmerCul

3 units, Win (Moraga, C)

## COMPUTER SCIENCE INTRODUCTORY COURSES

### CS 21N. Can Machines Know? Can Machines Feel?

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Can mental attitudes attributed to people and sometimes to animals, including knowledge, belief, desire, and intention, also be ascribed to machines? Can light sensors have a belief? Can a pool cleaning robot or tax-preparation software have an intention? If not, why not? If yes, what are the rules of such ascription, and do they vary between human beings and machines? Sources include philosophy, neuroscience, computer science, and artificial intelligence. Topics: logic, probability theory, and elements of computation. Students present a paper. GER:DB-EngrAppSci

3 units, Aut (Shoham, Y)

### CS 26N. Motion Planning for Robots, Digital Actors, and Other Moving Objects

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Motion planning theory and computational approaches: how to represent, simulate, and plan motions in a computer. Intriguing algorithms, representations, and applications: terminology and concepts for reading motion planning research literature. Problems include: how a robot arm manipulates parts without colliding with its environment; how many maneuvers are required to park a car in a tight spot; how characters in computer games avoid running into obstacles; how molecules change shapes to perform biological functions; how to assemble a product from individual parts; how a multi-limbed robot can navigate on rough terrain; how robots can perform surgical procedures. Prerequisite: some computer programming experience in any language. GER:DB-EngrAppSci, DB-EngrAppSci

3 units, Win (Latombe, J)

### CS 45N. Computers and Photography: From Capture to Sharing

(F,Sem) Stanford Introductory Seminar. Preference to freshmen with experience in photography and use of computers. Elements of photography, such as lighting, focus, depth of field, aperture, and composition. How a photographer makes photos available for computer viewing, reliably stores them, organizes them, tags them, searches them, and distributes them online. No programming experience required. Digital SLRs and editing software will be provided to those students who do not wish to use their own.

3-4 units, Aut (Garcia-Molina, H)

### CS 47N. Computers and the Open Society

(F,Sem) Stanford Introductory Seminar. How online technologies change our lives and the social structure that we live in. Course emphasizes critical analyses of current trends i.e. blogging, social networks, and instant mobile communication. Readings include case studies and analyses of basic principles i.e. privacy, equity and sustainability. Guest speakers who have participated in development of computers and the net will share their experiences and enter into debates on current issues. Students work individually and in small groups to research issues, develop the capacity for critical thinking about them, and use the results as the basis for writing and discussions both in class and on-line.

3 units, Aut (Winograd, T)

### CS 73N. The Business of the Internet

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Issues in Internet history, technology, and public policy are discussed as well as the Internet's impact on commerce, education, government, and health care. Writing for the web. Participants develop a substantial website. GER:DB-EngrAppSci

3 units, Spr (Wiederhold, G; Barr, A; Tessler, S)

**CS 74N. Digital Dilemmas**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Issues where policy decision making requires understanding computer and communications technology. Technology basics taught in non-technology terms. Topics include consumer privacy, government surveillance, file sharing and intellectual property, and electronic voting. GER:DB-EngrAppSci

3 units, Spr (Dill, D)

**CS 75N. Cell Phones, Sensors, and You**

(F,Sem) Stanford Introductory Seminar. Focuses on the role of cell phones as the first prevalent wearable sensors that gather information about you that can be both useful and potentially harmful. Topics include the state of technology, sociological and privacy implications, potential governmental regulation, etc. Addresses omniscient big brother technology including radar guns and the recording devices that led to the Watergate scandal. Students will gather and compile information on topics and come to class ready to discuss and debate with formulated opinions. GER:DB-EngrAppSci

3 units, Spr (Fedkiw, R)

**DRAMA INTRODUCTORY COURSES****DRAMA 10N. Arts and Ideas: 20th Century Art in Conflict**

(F,Sem) Stanford Introductory Seminar. The second quarter of Art & Ideas builds on the examples of Modernism students in Arts and Ideas studied in the first quarter. The Frosh Seminar 20th-Century Art in Conflict will focus on drama and film that experiments with new possibilities of form, shaping the direction of later artistic practice. We will trace how the political and aesthetic concerns of the 20th century reflect and exploit new technologies, both in theater and film, altering the position and function of author, actor, director, and audience. GER:IHUM-3

4 units, Spr (Rehm, R)

**DRAMA 11N. Dramatic Tensions: Theater and the Marketplace**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Tension between artistic and commercial forces in modern theater; the conflicted state of the art form. Sources include major and emerging contemporary figures in commercial, fringe, and nonprofit theater in the U.S. and UK. Visits with writers, directors, and dramaturges. GER:DB-Hum

4 units, Win (Freed, A)

**DRAMA 12N. Antigone: From Ancient Democracy to Contemporary Dissent**

(F,Sem) (Same as CLASSGEN 6N) Stanford Introductory Seminar. Preference to freshmen. Tensions inherent in the democracy of ancient Athens; how the character of Antigone emerges in later drama, film, and political thought as a figure of resistance against illegitimate authority; and her relevance to contemporary struggles for women's and workers' rights and national liberation. Readings and screenings include versions of Antigone by Sophocles, Anouilh, Brecht, Fugard/Kani/Ntshona, Paulin, Glowacki, Gurney, and von Trotta. GER:DB-Hum, EC-Gender

4 units, Aut (Rehm, R; Miller, D)

**DRAMA 13N. Law and Drama**

(F,Sem) Stanford Introductory Seminar. Preference to Freshmen. Beyond the obvious traits that make a good (court room) drama, theater and jurisprudence have much more in common. Just as drama is engaged not only in entertainment but also in examination of social conventions and mechanisms, so law is not only concerned with dispensing justice but with shaping and maintaining a viable human community. In this class we will read and discuss a series of plays in which court proceedings are at the center of dramatic action and concluding with an investigation of the new genre of documentary drama.

4 units, Aut (Jakovljevic, B)

**DRAMA 17N. Latino/Latina Performance in the United States**

(F,Sem) (Same as CHICANST 160N, CSRE 160N) Stanford Introductory Seminar. Preference to freshmen. This course will introduce works by U.S. Latino and Latina performance artists producing from the margins of the mainstream Euro-American theater world. We will examine how performance art serves as a kind of dramatized political forum for Latino/a artists, producing

some of the most transgressive explorations of queer and national/ethnic identities in the U.S. today. By the course's conclusion, each student will create and perform in a staged reading of an original performance piece. GER:DB-Hum, EC-AmerCul

3 units, Win (Moraga, C)

**DRAMA 25N. Science-in-Theatre: A New Genre?**

(S,Sem) (Same as CHEM 25Q) Stanford Introductory Seminar. Preference to sophomores. How scientists acquire their rules, mores, and idiosyncrasies through a form of intellectual osmosis in a mentor-disciple relationship. Scientists represented as Frankensteins or nerds, rather than normal. Why more intellectually challenging plays have appeared on the Anglo-American theatre scene where scientific behavior and even science are presented accurately. Students engage in a playwriting experiment.

3 units, Win (Djerassi, C)

**DRAMA 180Q. Noam Chomsky: The Drama of Resistance**

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Chomsky's ideas and work which challenge the political and economic paradigms governing the U.S. Topics include his model for linguistics; cold war U.S. involvements in S.E. Asia, the Middle East, Central and S. America, the Caribbean, and Indonesia and E. Timor; the media, terrorism, ideology, and culture; student and popular movements; and the role of resistance. GER:DB-Hum

4 units, Aut (Rehm, R; Miller, D)

**EARTH SYSTEMS INTRODUCTORY COURSES****EARTHSYS 41N. The Global Warming Paradox**

(F,Sem) (Same as EESS 41N) Stanford Introductory Seminar. Preference to freshman. Focus is on the complex climate challenges posed by the substantial benefits of energy consumption, including the critical tension between the enormous global demand for increased human well-being and the negative climate consequences of large-scale emissions of carbon dioxide. Topics include: Earth's energy balance; detection and attribution of climate change; the climate response to enhanced greenhouse forcing; impacts of climate change on natural and human systems; and proposed methods for curbing further climate change. Sources include peer-reviewed scientific papers, current research results, and portrayal of scientific findings by the mass media and social networks.

3 units, Aut (Diffenbaugh, N)

**EARTHSYS 49N. Multi-Disciplinary Perspectives on a Large Urban Estuary: San Francisco Bay**

(F,Sem) (Same as EESS 49N) Stanford Introductory Seminar. This course will be focused around San Francisco Bay, the largest estuary on the Pacific coasts of both North and South America as a model ecosystem for understanding the critical importance and complexity of estuaries. Despite its uniquely urban and industrial character, the Bay is of immense ecological value and encompasses over 90% of California's remaining coastal wetlands. Students will be exposed to the basics of estuarine biogeochemistry, microbiology, ecology, hydrodynamics, pollution, and ecosystem management/restoration issues through lectures, interactive discussions, and field trips. Knowledge of introductory biology and chemistry is recommended.

3 units, Spr (Francis, C)

**EARTHSYS 56Q. Changes in the Coastal Ocean: The View From Monterey and San Francisco Bays**

(S,Sem) (Same as EESS 56Q) Stanford Introductory Seminar. Preference to sophomores. Recent changes in the California current, using Monterey Bay as an example. Current literature introduces principles of oceanography. Visits from researchers from MBARI, Hopkins, and UCSC. Optional field trip to MBARI and Monterey Bay. GER: DB-NatSci

3 units, Spr (Dunbar, R)

**EARTHSYS 57Q. Climate Change from the Past to the Future**

(S,Sem) (Same as EESS 57Q) Stanford Introductory Seminar. Preference to sophomores. Numeric models to predict how climate responds to increase of greenhouse gases. Paleoclimate during times in Earth's history when greenhouse gas concentrations were elevated with respect to current concentrations. Predicted scenarios

of climate models and how these models compare to known hyperthermal events in Earth history. Interactions and feedbacks among biosphere, hydrosphere, atmosphere, and lithosphere. Topics include long- and short-term carbon cycle, coupled biogeochemical cycles affected by and controlling climate change, and how the biosphere responds to climate change. Possible remediation strategies.

3 units, Win (Chamberlain, P)

### **EARTHSYS 61Q. Food and security**

(S,Sem) (Same as EESS 61Q, INTNLREL 61Q) Stanford Introductory Seminar. The course will provide a broad overview of key policy issues concerning agricultural development and food security, and will assess how global governance is addressing the problem of food security. At the same time the course will provide an overview of the field of international security, and examine how governments and international institutions are beginning to include food in discussions of security.

5 units, Aut (Naylor, R; Stedman, S)

## **ECONOMICS INTRODUCTORY COURSES**

### **ECON 11N. Understanding the Welfare System**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Welfare reform legislation and the devolution revolution. The transfer of responsibility for antipoverty programs to the states. How recent reforms change the welfare system and who is likely to be affected. Food stamps, AFDC, TANF, SSI, and Medicaid. Income transfer programs such as earned income tax credit and income taxes, and labor market regulations such as minimum wages and overtime rules. Economic principles to understand the effectiveness of these programs and their consequences on the behavior of families. Pre- or corequisite: ECON 1. Recommended: basic understanding of labor markets, taxes, and transfers.

2 units, Aut (MaCurdy, T)

### **ECON 17N. Energy, the Environment, and the Economy**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. The relationship between environmental quality and production and consumption of energy. Can environmentally-friendly energy production and consumption compete with conventional sources? How to estimate and compare environmental impact costs of nonrenewable sources such as fossil fuels and nuclear power versus renewable sources such as solar and wind power. Implicit subsidies in conventional energy sources and the environmental costs of these subsidies. Regulatory and legal barriers to more environmentally friendly energy sources.

2 units, Spr (Wolak, F)

## **EDUCATION INTRODUCTORY COURSES**

### **EDUC 114N. Growing Up Bilingual**

(F,Sem) (Same as CHICANST 14N, CSRE 14N) Stanford Introductory Seminar. This course is a Freshman Introductory Seminar that has as its purpose introducing students to the sociolinguistic study of bilingualism by focusing on bilingual communities in this country and on bilingual individuals who use two languages in their everyday lives. Much attention is given to the history, significance, and consequences of language contact in the United States. The course focuses on the experiences of long-term US minority populations as well as that of recent immigrants.

3 units, Win (Valdes, G)

### **EDUC 131Q. Is Nationalism Dying?**

(F,Dial) Stanford Introductory Dialogue. The 19th century has been depicted as the age of nationalism. The nation-state as a blueprint and mass schooling as a nation-state project emerged and diffused. The transformation of transnational masses into national citizens is a core dynamic of this seminar, with special attention to how schools functioned as laboratories for nationalism. Readings will include Benedict Anderson's *Imagined Communities*, and selected chapters from Eugene Weber's *Peasants to Frenchmen* and from Michael Schudson's *The Good Citizen*. In recent decades, questions have been raised about nationalism and the role of schools in promoting nationalism. Some of these questions emphasize a cosmopolitan narrative that valorizes humanity, while others have stressed multiculturalism and the valorization of diversity. These questions are anchored in a human rights discourse that leads to the second core dynamic of this seminar: the

rise of a human rights regime, in particular its education

3 units, Win (Ramirez, F)

## **ELECTRICAL ENGINEERING INTRODUCTORY COURSES**

### **EE 17N. Engineering the Micro and Nano Worlds: From Chips to Genes**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. The first part is hands-on micro- and nano-fabrication including the Stanford Nanofabrication Facility (SNF) and the Stanford Nanocharacterization Laboratory (SNL) and field trips to local companies and other research centers to illustrate the many applications; these include semiconductor integrated circuits ('chips'), DNA microarrays, microfluidic bio-sensors and microelectromechanical systems (MEMS). The second part is to create, design, propose and execute a project. Most of the grade will be based on the project. By the end of the course you will, of course, be able to read critically a New York Times article on nanotechnology. More importantly you will have experienced the challenge (and fun) of designing, carrying out and presenting your own experimental project. As a result you will be better equipped to choose your major. This course can complement (and differs from) the seminars offered by Profs Philip Wong and Hari Manohar GER:DB-EngrAppSci

3 units, Spr (Pease, R)

### **EE 19N. The Internet: how it works and the services it offers**

(F,Sem) Stanford Introductory Seminar. The Internet is a universal communication system that spans the entire globe and enables a wide range of services. It is very loosely managed, yet it works very well. The goal of this seminar is two-fold: (i) to describe how the Internet infrastructure works (its underlying functions and protocols) and (ii) to explore the many services that it offers (web browsing, social networking, VoIP, IPTV, etc.) Students will work in groups of two on projects related to Internet functions and services. GER:DB-EngrAppSci

3 units, Win (Tobagi, F)

### **EE 21N. What is Nanotechnology?**

(F,Sem) Stanford Introductory Seminar. Nanotechnology is an often used word and it means many things to different people. Scientists and Engineers have some notion of what nanotechnology is, societal perception may be entirely different. In this course, we start with the classic paper by Richard Feynman (*There's Plenty of Room at the Bottom*), which laid down the challenge to the nanotechnologists. Then we discuss two classic books that offer a glimpse of what nanotechnology is: *Engines of Creation: The Coming Era of Nanotechnology* by Eric Drexler, and *Prey* by Michael Crichton. Drexler's thesis sparked the imagination of what nano machinery might do, whereas Crichton's popular novel channeled the public's attention to this subject by portraying a disastrous scenario of a technology gone astray. We will use the scientific knowledge to analyze the assumptions and predictions of these classic works. We will draw upon the latest research advances to illustrate the possibilities and impossibilities. GER:DB-EngrAppSci

3 units, Win (Wong, P)

### **EE 22N. Medical Imaging Systems**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. The technology of major imaging modalities used for disease diagnosis: x-ray, ultrasound, and magnetic resonance; their history, societal impact, and clinical applications. Field trips to a medical center and an imaging research lab. Term paper and presentation. Prerequisites: high school physics and calculus. GER:DB-EngrAppSci

3 units, Win (Nishimura, D)

### **EE 25Q. Electric Automobiles and Aircraft**

(S,Sem) (Same as AA 116N) Stanford Introductory Seminar. Transportation accounts for nearly one-third of American energy use and greenhouse gas emissions and three-quarters of American oil consumption. It has crucial impacts on climate change, air pollution, resource depletion, and national security. Students wishing to address these issues will need to reconsider how we move, finding sustainable transportation solutions. This course will provide an introduction to the issue, covering the past and present of transportation and its impacts; examining alternative fuel

proposals; and digging deeper into the most promising option: battery electric vehicles. Energy requirements of air, ground, and maritime transportation; design of electric motors, power control systems, drive trains, and batteries; and technologies for generating renewable energy. Two fun opportunities for hands-on experiences with electric cars. Prerequisites: Introduction to calculus and Physics AP or elementary mechanics. GER:DB-EngrAppSci

3 units, Win (Cox, D; Enge, P)

### EE 26N. Green Electronics

(F,Sem) Stanford Introductory Seminar. Many green technologies including hybrid cars, photovoltaic energy systems, efficient power supplies, and energy-conserving control systems have at their heart intelligent, high-power electronics. This freshman seminar examines the technology at the heart of the green-tech revolution and uses green-tech examples to teach the engineering principles of modeling, optimization, analysis, simulation, and design. The class will include a hands-on lab, readings, and discussion. Preference given to Freshman. GER:DB-EngrAppSci

3 units, Win (Dally, W)

### EE 27N. Electronics Rocks

(F,Sem) Stanford Introductory Seminar. Electronics pervades our lives, yet we often feel obliged to let a device function as it was intended. This course is about not being intimidated by voiding a warranty and modding some commercial gadget and about being confident enough to build something cool from scratch. To get there, we will study the basics of how things work and learn how to hack/mod and scratch build. Students will be mentored and encouraged to work, in teams, to play with interesting electronics and ultimately to develop a creative final project. GER:DB-EngrAppSci

3 units, Win (Kovacs, G)

### EE 28N. What Is Information?

(F,Sem) Stanford Introductory Seminar. Information is everywhere in our lives, from speaking and writing to web pages and social networking, but what is it actually? How do we define it? Is it physical? Can we measure it? Does it obey scientific laws? How do we send it, store it, access it and manipulate it? Are there limits to it? Will information technology save the planet or destroy it? This freshman seminar will examine the history, science, technology and future of information.

3 units, Spr (Miller, D)

### EE 60N. Man versus Nature: Coping with Disasters Using Space Technology

(F,Sem) (Same as GEOPHYS 60N) Stanford Introductory Seminar. Preference to freshman. Natural hazards, earthquakes, volcanoes, floods, hurricanes, and fires, and how they affect people and society; great disasters such as asteroid impacts that periodically obliterate many species of life. Scientific issues, political and social consequences, costs of disaster mitigation, and how scientific knowledge affects policy. How spaceborne imaging technology makes it possible to respond quickly and mitigate consequences; how it is applied to natural disasters; and remote sensing data manipulation and analysis. Offered every year, winter quarter. GER:DB-EngrAppSci

4 units, Win (Zebker, H)

## ENGINEERING INTRODUCTORY COURSES

### ENGR 159Q. Japanese Companies and Japanese Society

(S,Sem) (Same as MATSCI 159Q) Stanford Introductory Seminar. Preference to sophomores. The structure of a Japanese company from the point of view of Japanese society. Visiting researchers from Japanese companies give presentations on their research enterprise. The Japanese research ethic. The home campus equivalent of a Kyoto SCTI course. GER:DB-SocSci

3 units, Spr (Sinclair, R)

## ENGLISH INTRODUCTORY COURSES

### ENGLISH 36N. Lord Byron: Mad, Bad, and Dangerous to Know

(F,Sem) Stanford Introductory Seminar. The poetry, literary legacy, and significance of Lord Byron, a towering figure of European Romanticism. Emphasis on formal, aesthetic, and

stylistic elements of the poetry, with additional topics to include modern celebrity, literary marketplace, scandal, and romantic heroism. GER:DB-Hum

3 units, Aut (Rovee, C)

### ENGLISH 56N. Mixed Race in the New Millennium: Crossings of Kin, Faith & Culture

(F,Sem) (Same as AFRICAAM 56N, CSRE 56N) Stanford Introductory Seminar. Preference to freshmen. How literature, theater, graphic art and popular culture shape understandings of contemporary mixed race identity and other complex experiences of cultural hybridity. Course explores implications for racial identity, art, and politics for the new millennium. GER:DB-Hum

3 units, Win (Elam, M)

### ENGLISH 62N. Eros in Modern American Poetry

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Anne Carson, treating love from Sappho to Socrates, shows how the Greeks derived their philosophy from the erotic poetic tradition. Readings include: Carson's poetry which locates erotic desire in the larger context of the desire for knowledge; classic Japanese haiku masters such as Basho; and William Carlos Williams, Louise Bogan, and C.K. Williams. GER:DB-Hum

3 units, Win (Fields, K)

### ENGLISH 64N. Growing Up in America

(F,Sem) (Same as PSYCH 29N) Stanford Introductory Seminar. Preference to freshmen. To what extent is it possible to describe an American experience? How are different people included in or excluded from the imagined community that is America? How do a person's race, class, gender and sexuality affect his or her experience of belonging to this country? These are just some of the questions we will consider as we familiarize ourselves with the great diversity of childhood and young adult experiences of people who have grown up in America. We will read and discuss narratives written by men and women, by urban, suburban, and rural Americans, and by Asian Americans, African Americans, Syrian Americans, Native Americans, Latina/os, and European Americans. Throughout the course, we will explore how these writers write the self in literature. GER:DB-Hum, EC-AmerCul

3 units, Spr (Markus, H; Moya, P)

### ENGLISH 65N. Contemporary Women Fiction Writers

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Novels and story collections addressing childhood, coming of age, and maturity; love, sexuality, orientation; the experience of violence and the politics, domestic and global, of women's lives. Texts include Gordimer, Eisenberg, Latiolais, Munro, O'Brien, and others. GER:DB-Hum

3 units, Aut (Tallent, E)

### ENGLISH 68N. Mark Twain and American Culture

(F,Sem) (Same as AMSTUD 68N) Stanford Introductory Seminar. Preference to freshmen. Mark Twain has been called our Rabelais, our Cervantes, our Homer, our Tolstoy, our Shakespeare. Ernest Hemingway maintained that all modern American literature comes from one book by Mark Twain called *The Adventures of Huckleberry Finn*. President Franklin D. Roosevelt got the phrase New Deal from A Connecticut Yankee in King Arthur's Court. Class discussions will focus on how Twain's work illuminates and complicates his society's responses to such issues as race, technology, heredity versus environment, religion, education, and what it means to be American. GER:DB-Hum

4 units, Aut (Fishkin, S)

### ENGLISH 77N. Living in the Past: Italy in the Anglo-American Imagination

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. A survey of the way in which British and American authors from Milton to Hellenga have portrayed Italian character and culture. Recommended as an ideal orientation course for students planning to attend the Bing Overseas Study Program in Florence. GER:DB-Hum

3 units, Aut (Evans, M)

### ENGLISH 80Q. All the World's a Stage: Dramatic Realism on the Threshold of the Modern World

(S,Sem) Stanford Introductory Seminar. Witness the relationship between heightened dramatic realism ---or empiricism---and unprecedented historical, scientific, religious and cultural changes occurring in the Early Modern world, a defining moment in

explorations of uncharted realms of the self, the world, the universe, and artistic form. Readings include Shakespeare's *Othello* and *As You Like It*; John Donne's dramatic poetry; Marlowe's *Doctor Faustus*; and Beckett's *Waiting for Godot*. We will examine how these and other texts--point their readers and viewers toward the modern world through cognitive innovations in the art of perspective. Selected art, film adaptations, and modern literature to be included.

4-5 units, *Win (Brooks, H)*

#### **ENGLISH 87N. The Graphic Novel: Word, Image, Sound, Silence**

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Traces the history of graphic narrative from its beginnings to contemporary times. Students will read a number of graphic narratives, carry out research on some aspect of these narratives, and write an essay, which will then be reworked and remediated into an oral presentation with multimedia support. Fulfills the WRITE 2 requirement GER:DB-Hum

4-5 units, *Aut (Lunsford, A)*

### **ENVIRONMENTAL EARTH SYSTEM SCIENCE INTRODUCTORY COURSES**

#### **EESS 41N. The Global Warming Paradox**

(F,Sem) (Same as EARTHSYS 41N) Stanford Introductory Seminar. Preference to freshman. Focus is on the complex climate challenges posed by the substantial benefits of energy consumption, including the critical tension between the enormous global demand for increased human well-being and the negative climate consequences of large-scale emissions of carbon dioxide. Topics include: Earth's energy balance; detection and attribution of climate change; the climate response to enhanced greenhouse forcing; impacts of climate change on natural and human systems; and proposed methods for curbing further climate change. Sources include peer-reviewed scientific papers, current research results, and portrayal of scientific findings by the mass media and social networks.

3 units, *Aut (Diffenbaugh, N)*

#### **EESS 49N. Multi-Disciplinary Perspectives on a Large Urban Estuary: San Francisco Bay**

(F,Sem) (Same as EARTHSYS 49N) Stanford Introductory Seminar. This course will be focused around San Francisco Bay, the largest estuary on the Pacific coasts of both North and South America as a model ecosystem for understanding the critical importance and complexity of estuaries. Despite its uniquely urban and industrial character, the Bay is of immense ecological value and encompasses over 90% of California's remaining coastal wetlands. Students will be exposed to the basics of estuarine biogeochemistry, microbiology, ecology, hydrodynamics, pollution, and ecosystem management/restoration issues through lectures, interactive discussions, and field trips. Knowledge of introductory biology and chemistry is recommended.

3 units, *Spr (Francis, C)*

#### **EESS 56Q. Changes in the Coastal Ocean: The View From Monterey and San Francisco Bays**

(S,Sem) (Same as EARTHSYS 56Q) Stanford Introductory Seminar. Preference to sophomores. Recent changes in the California current, using Monterey Bay as an example. Current literature introduces principles of oceanography. Visits from researchers from MBARI, Hopkins, and UCSC. Optional field trip to MBARI and Monterey Bay. GER: DB-NatSci

3 units, *Spr (Dunbar, R)*

#### **EESS 57Q. Climate Change from the Past to the Future**

(S,Sem) (Same as EARTHSYS 57Q) Stanford Introductory Seminar. Preference to sophomores. Numeric models to predict how climate responds to increase of greenhouse gases. Paleoclimate during times in Earth's history when greenhouse gas concentrations were elevated with respect to current concentrations. Predicted scenarios of climate models and how these models compare to known hyperthermal events in Earth history. Interactions and feedbacks among biosphere, hydrosphere, atmosphere, and lithosphere. Topics include long- and short-term carbon cycle, coupled biogeochemical cycles affected by and controlling climate change, and how the biosphere responds to climate change. Possible remediation strategies.

3 units, *Win (Chamberlain, P)*

#### **EESS 61Q. Food and security**

(S,Sem) (Same as EARTHSYS 61Q, INTNLREL 61Q) Stanford Introductory Seminar. The course will provide a broad overview of key policy issues concerning agricultural development and food security, and will assess how global governance is addressing the problem of food security. At the same time the course will provide an overview of the field of international security, and examine how governments and international institutions are beginning to include food in discussions of security.

5 units, *Aut (Naylor, R; Stedman, S)*

### **FEMINIST STUDIES INTRODUCTORY COURSES**

#### **FEMST 188N. Imagining Women: Writers in Print and in Person**

(S,Sem) Stanford Introductory Seminar. Gender roles, gender relations and sexual identity explored in contemporary literature and conversation with guest authors. Weekly meetings designated for book discussion and meeting with authors. Interest in writing and a curiosity about diverse women's lives would be helpful to students. Students will use such tools as close reading, research, analysis and imagination. Seminar requires strong voice of all participants. Oral presentations, discussion papers, final projects. GER:DB-Hum, EC-Gender

4-5 units, *Win (Miner, V)*

#### **FEMST 191Q. Writing Women's Lives**

(F,Dial) Stanford Introductory Dialogue. Creative writing through dialogue focusing on prose about the lives of women in different cultures and generations. Novels, short stories, and micro-narrative including fiction and memoir. Students produce work using research, memory, imagination, and metaphor.

2 units, *Aut (Miner, V)*

### **FRENCH LITERATURE INTRODUCTORY COURSES**

#### **FRENLIT 38N. Coffee & Cigarettes: The Making of French Intellectual Culture**

(F,Sem) Stanford Introductory Seminar. Stanford Introductory Seminar. Preference to freshmen. This course will examine a quintessential French figure *l'intellectuel* from a long-term historical perspective. We will observe how this figure was shaped over time by such other cultural types as the writer, the artist, the historian, the philosopher, and the moralist. Proceeding in counter-chronological order, from the late 20th to the 16th century, we will read a collection of classic French works. As this course is a gateway for French studies, special emphasis will be placed on oral proficiency. Prerequisite: students must have two years of college-level French (or equivalent).

4 units, *Aut (Edelstein, D)*

#### **FRENLIT 190Q. Parisian Cultures of the 19th and Early 20th Centuries**

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Political, social, and cultural events in Paris from the Napoleonic era and the Romantic revolution to the 30s. The arts and letters of bourgeois, popular, and *avant garde* cultures. Illustrated with slides. Prerequisite: students must have two years of college-level French (or equivalent).

4 units, *Spr (Bertrand, M)*

### **GENETICS INTRODUCTORY COURSES**

#### **GENE 104Q. Law and the Biosciences**

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Focus is on human genetics; also assisted reproduction and neuroscience. Topics include forensic use of DNA, genetic testing, genetic discrimination, eugenics, cloning, pre-implantation genetic diagnosis, neuroscientific methods of lie detection, and genetic or neuroscience enhancement. Student presentations on research paper conclusions.

3 units, *Win (Greely, H)*



## GEOLOGICAL AND ENVIRONMENTAL SCIENCES INTRODUCTORY COURSES

### GES 39N. Forensic Geoscience: Stanford CSI

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Geological principles, materials, and techniques indispensable to modern criminal investigations. Basic earth materials, their origin and variability, and how they can be used as evidence in criminal cases and investigations such as artifact provenance and environmental pollution. Sources include case-based, simulated forensic exercises and the local environments of the Stanford campus and greater Bay Area. Local field trips; research presentation and paper. GER: DB-NatSci

3 units, Spr (Maher, K)

### GES 43Q. Environmental Problems

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Components of multidisciplinary environmental problems and ethical questions associated with decision making in the regulatory arena. Students lead discussions on environmental issues such as groundwater contamination from point and nonpoint sources, cumulative watershed effects related to timber and mining practices, acid rain, and subsurface disposal of nuclear waste. GER: DB-NatSci

3 units, Win (Loague, K)

### GES 55Q. The California Gold Rush: Geologic Background and Environmental Impact

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Topics include: geologic processes that led to the concentration of gold in the river gravels and rocks of the Mother Lode region of California; and environmental impact of the Gold Rush due to population increase, mining operations, and high concentrations of arsenic and mercury in sediments from hard rock mining and milling operations. Recommended: introductory geology. GER: DB-NatSci

3 units, Win (Bird, D)

## GEOPHYSICS INTRODUCTORY COURSES

### GEOPHYS 50N. Planetary Habitability, World View, and Sustainability

(F,Sem) Stanford Introductory Seminar. Astrobiology and societal sustainability draw from most fields of physical and biological science. Class follows a historical format on the start of major scientific fields, and relates these sciences to the popular world view and the effect of world view on achieving sustainability. Simple experiments to see key results in a hands-on manner; how to improve experiments. How lack in insight in addition to the lack of equipment and computational methods limited the progress of science. Discussion of current astrobiology and sustainability topics in the popular press. Students pairs lead discussions on topics. Offered occasionally.

3 units, Spr (Staff)

### GEOPHYS 60N. Man versus Nature: Coping with Disasters Using Space Technology

(F,Sem) (Same as EE 60N) Stanford Introductory Seminar. Preference to freshman. Natural hazards, earthquakes, volcanoes, floods, hurricanes, and fires, and how they affect people and society; great disasters such as asteroid impacts that periodically obliterate many species of life. Scientific issues, political and social consequences, costs of disaster mitigation, and how scientific knowledge affects policy. How spaceborne imaging technology makes it possible to respond quickly and mitigate consequences; how it is applied to natural disasters; and remote sensing data manipulation and analysis. Offered every year, winter quarter. GER:DB-EngrAppSci

4 units, Win (Zebker, H)

## GERMAN GENERAL INTRODUCTORY COURSES

### GERGEN 104N. Resistance Writings in Nazi Germany

(F,Sem) Stanford Introductory Seminar. Freshman and Sophomore Preference. This course focuses on letters and diaries written by resisters to the Nazi regime, in particular, Dietrich Bonhoeffer, Hans and Sophie Scholl, and James von Moltke. The course includes one resistance novel Every man dies alone by Hans

Fallada. GER:DB-Hum

3 units, Win (Bernhardt, E)

### GERGEN 128N. Medicine, Modernism, and Mysticism in Thomas Mann's the Magic Mountain

(F,Sem) Stanford Introductory Seminar. Published in 1924, the Magic Mountain is a novel of education, tracing the intellectual growth of a budding engineer through a maze of intellectual encounters during a seven-year sojourn in a sanatorium set high in the Swiss Alps. It engages with the key themes of modernism: the relativity of time, the impact of psychoanalysis, the power of myth, and an extended dispute between an optimistic belief in progress and a pessimistic vision of human nature. Through its detailed discussion of disease (tuberculosis) this remarkable text connects the study of medicine to the humanities. GER:IHUM-3

4 units, Spr (Berman, R)

### GERGEN 170Q. Prussia: Culture and Literature

(S,Sem) Stanford Introductory Seminar. This course traces the history and culture of a country that disappeared not too long ago, but about which most of us tend to know very little. On February 27, 1947, the Allied Control Council issues its decree no. 46, which dissolved Prussia in the interest of maintaining world peace and security and the restoration of political life in Germany on a democratic basis. Prussia, the Council continued, has since forever been a carrier of militarism and reaction in Germany. Many of the stereotypical images of Germany and German-ness, and certainly most negative images of Germany, from the spiked helmet to the iron cross, the Red Baron and the Blitzkrieg, are bound up with Prussia, its military and its ruling class. Prussia's militaristic culture not only brought on a series of increasingly brutal wars, while also often being a beacon of Enlightenment and religious tolerance; it brought together Germany's most traditional backwater with its most p

3-5 units, Spr (Daub, A)

## GERMAN LITERATURE INTRODUCTORY COURSES

### GERLIT 123N. The Brothers Grimm and Their Fairy Tales

(F,Sem) Stanford Introductory Seminar. Historical, biographical, linguistic, and literary look at the Kinder- and Hausmarchen of Jacob and Wilhelm Grimm. Readings from the fairy tales, plus materials in other media such as film and the visual arts. Four short essays, one or two oral reports. In German. GER:DB-Hum

4 units, Aut (Robinson, O)

## HEALTH RESEARCH AND POLICY INTRODUCTORY COURSES

### HRP 89Q. Introduction to Cross Cultural Issues in Medicine

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Introduction to social factors that impact health care delivery, such as ethnicity, immigration, language barriers, and patient service expectations. Focus is on developing a framework to understand culturally unique and non-English speaking populations in the health care system. GER:EC-AmerCul

3 units, Win (Corso, I)

## HISTORY INTRODUCTORY COURSES

### HISTORY 4N. A World History of Genocide

(F,Sem) Stanford Introductory Seminar. Reviews the history of genocide from ancient times until the present. Defines genocide, both in legal and historical terms, and investigates its causes, consequences, and global dimensions. Issues of prevention, punishment, and interdiction. Main periods of concern are the ancient world, Spanish colonial conquest; early modern Asia; settler genocides in America, Australia, and Africa; the Armenian genocide and the Holocaust; genocide in communist societies; and late 20th century genocide. GER:DB-SocSci

3-5 units, Win (Naimark, N)

### HISTORY 8N. How We Remember the Past: Historical, Legal and Artistic Interpretation

(F,Sem) Stanford Introductory Seminar. Examines the similarities and differences between three different methods to remember (and interpret) the past: historical research, legal proceedings, and culture (mainly literature, cinema and the plastic arts). Looking at



theoretical debates first, a historical specific example next (Spanish civil war and dictatorship, 1936-1975), we will ask under which circumstances is each method used to remember the past, and how do the results vary? Why do certain societies prefer one method to others? Does this preference depend on what is being recorded, on the availability of sources, on the conditions of those engaged in examining the past, their aim at doing so, etc.? The goal is not to learn about a specific event, time or place, but to think about the past in pluralistic ways. Students will each choose an example of their own to analyze and share with the class. Examples can refer to any moment in the past, or any region or human group as long as the student GER:DB-Hum

4-5 units, *Aut (Herzog, T)*

**HISTORY 13N. Slavery and Rebellion in Ancient Rome: Spartacus in Legend and History**

(F,Sem) (Same as CLASSHIS 23N) Stanford Introductory Seminar. Preference to freshmen. Spartacus and his army of slaves resisted the power of the Roman legions for two years and became the stuff of legend. Introduction to Roman history. Slavery in ancient Rome in its psychological, social, and economic dimensions. Causes of Spartacus' rebellion; how the traumatic end of the rebellion gave rise to a legend popularized in Stanley Kubrick's 1960 film.

3 units, *Aut (Saller, R)*

**HISTORY 30Q. English Society Through Fiction**

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. England from the eighteenth century to the twentieth century through the reading of seven novels ranging from Henry Fielding's Joseph Andrews, to Evelyn Waugh's A Handful of Dust. Focus is on the novels themselves and the historical context of the novels to acquire a knowledge of British history over two hundred years. GER:DB-Hum

4 units, *Spr (Stansky, P)*

**HISTORY 36N. Gay Autobiography**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Gender, identity, and solidarity as represented in nine autobiographies: Isherwood, Ackerley, Duberman, Monette, Louganis, Barbin, Cammermeyer, Gingrich, and Lorde. To what degree do these writers view sexual orientation as a defining feature of their selves? Is there a difference between the way men and women view identity? What politics follow from these writers' experiences? GER:DB-Hum, EC-Gender

4 units, *Spr (Robinson, P)*

**HISTORY 41Q. Mad Women: Women and Mental Illness in U.S. History**

(S,Sem) Stanford Introductory Seminar. Explores how gender and historical context have shaped the experience and treatment of mental illness in U.S. history. Why have women been the witches and hysterics of the past, and why have there historically been more women than men among the mentally ill? Topics include the relationship between historical ideas of femininity and insanity, the ways that notions of gender influence the definition and treatment of mental disorder, and the understanding of the historically embedded nature of medical ideas, diagnoses, and treatments. GER:DB-SocSci

3 units, *Aut (Horn, M)*

**HISTORY 44Q. The History of Women and Gender in Science, Medicine, and Engineering**

(S,Sem) Stanford Introductory Seminar. Preference to freshmen. Section 1 focuses on the history of women in science, medicine, and engineering. Section 2 looks at transforming research institutions so that both men and women can flourish. Section 3 explores how sex and gender analysis can enhance creativity. We discuss concrete examples of how taking gender into account has yielded new research results. Stanford University currently has a multiple year collaboration with the European Commission for Gendered Innovations, and this class will be part of that project. This course fulfills the second level Writing and Rhetoric Requirement (WRITE 2) and will emphasize oral and multimedia presentation. GER:DB-Hum, EC-Gender

4-5 units, *Win (Schiebinger, L)*

**HISTORY 48Q. South Africa: Contested Transitions**

(S,Sem) (Same as AFRICAAM 48Q) Stanford Introductory Seminar. Preference to sophomores. The inauguration of Nelson

Mandela as president in May 1994 marked the end of an era and a way of life for S. Africa. The changes have been dramatic, yet the legacies of racism and inequality persist. Focus: overlapping and sharply contested transitions. Who advocates and opposes change? Why? What are their historical and social roots and strategies? How do people reconstruct their society? Historical and current sources, including films, novels, and the Internet. GER:DB-Hum, EC-GlobalCom

3 units, *Win (Samoff, J)*

**HISTORY 56N. Celluloid America: Explorations in Film and History**

(F,Sem) Stanford Introductory Seminar. Explores the history and culture of the United States through film, examining both the history of this quintessentially American medium and the ways in which American history has been represented in movies. Topics include the invention of the moving picture technology, the creation of cinema language, the rise and fall of the Hollywood studio system, the emergence and evolution of film genres (westerns, romantic comedies, film noir, science fiction, Blaxploitation, etc.) the quest for overseas markets for American movies, race and film, and the future of movies in the digital age. Includes weekly class discussions and required screenings. Students will also complete short papers as well as final research projects on topics of their own choosing. GER:DB-Hum

3 units, *Win (Campbell, J)*

**HISTORY 82N. Modern Islamic Movements**

(F,Sem) Stanford Introductory Seminar. Muslim political mobilization in local and global settings. Topics include: Pan-Islam, the Muslim Brothers, Khomeinism, Hezbollah, al-Qaeda, the Taliban, and the geopolitics of social movements. GER:DB-Hum

3 units, *Win (Crews, R)*

**HISTORY 84N. The American Empire in the Middle East since the Cold War: Afghanistan, Iraq, and Israel/Palestine**

(F,Sem) Stanford Introductory Seminar. What were the traditional objectives of U.S. policy in the Middle East since the end of WW II? What forces shaped U.S. policy towards the Middle East? Did those interests and the means employed to pursue them change substantially after the demise of the Soviet Union? What has been the impact of U.S. policy on the region itself? The three principal cases to be examined are Afghanistan, Iraq, and Israel/Palestine. GER:DB-SocSci, EC-GlobalCom

4-5 units, *Aut (Beinin, J)*

**HISTORY 91N. Mao Zedong: The Man Who Would Become China**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. His life, including early anthropological work, reinterpretation of Marxism, ascendance to power in the Chinese Communist Party, theory of guerilla warfare, socioeconomic vision in the early People's Republic, the Great Leap Forward, deification during the Cultural Revolution, and repercussions of his death in 1976. No prior knowledge of Chinese history is necessary. GER:DB-SocSci

3-5 units, *Spr (Mullaney, T)*

**HUMAN BIOLOGY INTRODUCTORY COURSES**

**HUMBIO 82Q. The Omnivore's Dilemma - Or Is It?**

(S,Sem) Stanford Introductory Seminar. The omnivore's dilemma-making the right food choices from the vast number possible. The health implications of our food choices. Why we make these choices- the positive and negative influences of the food industry, research in nutritional science, and public health policies and the resulting confusion about what we should eat. Discussion-based class with readings including In Defense of Food by M. Pollan and primary reference materials. Introduction to the scientific literature in human nutrition.

3 units, *Aut (Endemann, G)*

**HUMBIO 87Q. Women and Aging**

(S,Sem) (Same as MED 87Q) Stanford Introductory Seminar. Preference to sophomores. Biology, clinical issues, social and health policies of aging; relationships, lifestyles, and sexuality; wise women and grandmothers. Sources include scientific articles, essays, poetry, art, and film. Service-learning experience with older women. Service Learning Course (certified by Haas Center).

GER:EC-Gender  
5 units, Spr (Winograd, C)

### **HUMBIO 90Q. Contemporary Issues in Human Experimentation**

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. The guiding principles currently used to protect human subjects in terms of informed consent and protection of privacy; ethical issues relating to compensatory mechanisms for inherent risks; historical perspective and the development of the current mechanisms to safeguard the privacy and integrity of the individual; examples of use/abuse of human experimentation during medieval, Nazi, and modern times. Guest speakers currently performing human experiments or involved in approving such experimentation.  
3 units, Aut (Constantinou, C)

### **HUMBIO 91Q. Neuroethology: The Neural Control of Behavior**

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Animal behavior offers insights about evolutionary adaptations. The origins of the study of animal behavior and its development to the present. Discussion of original research papers. The use and misuse of parallels between animal and human behavior. Possible field trip to observe animals in their natural habitat. GER: DB-NatSci  
3 units, Aut (Fernald, R)

### **HUMBIO 96Q. Injustice, Advocacy and Courage: The Path of Everyday Heroes**

(S,Sem) Stanford Introductory Seminar. This course will study the paradigms of people of courage, action and energy who have fought against injustice by advocating for causes against great odds and at personal risk. The focus will be on everyday people who have taken action, often at great personal risk, not for ambition, but because of their convictions and steadfast commitment to their beliefs.  
3 units, Win (Abrams, W)

### **HUMBIO 97Q. Sport, Exercise, and Health: Exploring Sports Medicine**

(S,Sem) (Same as ORTHO 97Q) Stanford Introductory Seminar. Preference to sophomores. Sports medicine is the practice of clinical medicine at the interface between health and performance, competition and well-being. While sports medicine had its origins in providing care to athletes, medical advances developed in care of athletes exerted a great effect on the nature and quality of care to the broader community. Topics include sports injuries, medical conditions associated with sport and exercise, ethics, coaching, women's issues, fitness and health, and sports science. Case studies.  
3 units, Aut (Matheson, G), Win (Matheson, G), Spr (Matheson, G)

### **HUMBIO 99Q. Becoming a Doctor: Readings from Medical School, Medical Training, Medical Practice**

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. For students considering medicine as a career. Goal is to acquaint students with medical school, training in medicine and surgery, and the practice of medicine and surgery. Topics include: how to pick a medical school and a residency; how medicine affects family life, especially children; the differences between surgical and medical specialties; the advantages and disadvantages among academic/teaching, pure research, group practice, HMO, hospital staff, or private practice; malpractice concerns; and financial considerations.  
3 units, Aut (Zaroff, L)

## **IBERIAN AND LATIN AMERICAN STUDIES INTRODUCTORY COURSES**

### **ILAC 101N. THE POWER OF IMAGE**

(F,Sem) Stanford Introductory Seminar. Provides critical language and tools for analyzing visual culture, specifically art by Americans of Mexican descent. Emphasis on the three central aspects of visual studies: the image, the viewer, and the social relations governing the production, distribution and consumption of images. Focus on the power of image to shape who we are and how we think, and the capacity of viewers to interpret images in ways inflected by their social positioning.  
3-5 units, Spr (Yarbro-Bejarano, Y)

### **ILAC 106N. Contemporary Latin American Literature in Translation**

(F,Sem) Stanford Introductory Seminar. What is contemporary in Latin American literature? Which books are translated into English, and why? What to make of the gap between their publication in Spanish and their reception in the United States? The course invites students to think and write about these issues in light of translation and globalization theories. Works include a representative selection of recent fiction by Aira, Bellatin, Bolano, and Vallejo, as well as films by Schroeder and Ospina. Readings in English; Spanish originals available.  
3-5 units, Win (Hoyos, H)

### **ILAC 114N. Lyric Poetry**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. For students with at least two years of language preparation. Focus is on principal elements and expressive devices of lyric poetry: multi-dimensional use of language, denotation, connotation, image, metaphor, symbol, paradox, irony, meaning, idea, rhythm, and meter. Readings include the best of major poets of Spain and Latin America: Becquer, Rosalia de Castro, Ruben Dari-o, Unamuno, Antonio Machado, Garca Lorca, Neruda, and Gabriela Mistral Bilingual in English and Spanish with an emphasis on Spanish.  
3-5 units, Aut (Predmore, M)

### **ILAC 118N. Slavery and Freedom, Madness and Reason in Brazil; the Fiction of Machado de Assis**

(F,Sem) Stanford Introductory Seminar. Praised by Woody Allen and Salman Rushdie as the greatest Brazilian novelist of the 19th Century, Machado de Assis (1839-1908) became a recent pop star of world literature. To Harold Bloom he is a kind of miracle, as the grandson of freed slaves in Brazil, who deserved to be included in Bloom's book *Genius: A Mosaic of One Hundred Exemplary Creative Minds*. In his texts, a paradoxical combination of guilt and innocence, jealous and love challenges the reader to make risk choices wisely. This course presents Machado de Assis masterpieces: the novels, *The Posthumous Memoirs of Bras Cubas* (1881), and *Dom Casmurro* (1900), the short novel *The Alienist* (1882) and a selection of his short stories. Key critical concepts and an overview of his reception in Brazil and in the US will support our discussions. GER: IHUM-3  
3-5 units, Spr (Librandi Rocha, M)

### **ILAC 193Q. Spaces and Voices of Brazil through Film**

(S,Sem) (Same as PORTLANG 193Q) Stanford Introductory Seminar. The manners in which a country is perceived and defines itself is a result of many complex forces, and involves the reproduction of social relations and complex social constructions both on the part of those who live there and those who see it from a distance. The perceptions of what Brazil is and what defines the country has changed throughout times, but has conserved some clear pervasive defining traits. This course is an introduction to the history, culture, politics and artistic production of Brazil as seen through feature films, documentaries and some complementary readings. Movies include, among others, *Banana is my Business*, *Black Orpheus*, *Olga*, *They Don't Use Black-Tie*, *City of God*, *Central Station*, *Gaijin*, and *Four Days in September*-among others. In English. GER: DB-Hum, EC-GlobalCom  
3-4 units, Aut (Wiedemann, L)

## **INTERNATIONAL RELATIONS INTRODUCTORY COURSES**

### **INTNLREL 61Q. Food and security**

(S,Sem) (Same as EARTHSYS 61Q, EESS 61Q) Stanford Introductory Seminar. The course will provide a broad overview of key policy issues concerning agricultural development and food security, and will assess how global governance is addressing the problem of food security. At the same time the course will provide an overview of the field of international security, and examine how governments and international institutions are beginning to include food in discussions of security.  
5 units, Aut (Naylor, R; Stedman, S)

## ITALIAN GENERAL INTRODUCTORY COURSES

### ITALGEN 52N. *Life is a Play: Identity, Persona, and Improvisation in Luigi Pirandello*

(F,Sem) Stanford Introductory Seminar. Stanford Introductory Seminar. Preference to freshmen. For Pirandello (1867-1936; Nobel Prize, 1934), to suddenly realize your entire life has been a performance is a moment of utmost horror, comedy, and opportunity for self-awareness. In a quintessentially modern fashion, he claims that the performance cannot be stopped, that authenticity is a mirage, and that learning to laugh at oneself is the only liberation. Materials include Pirandello's existential theater within the theater, his novels, and their film adaptations, which we will study in their cultural context. GER:IHUM-3

3-5 units, Spr (Wittman, L)

## ITALIAN LITERATURE INTRODUCTORY COURSES

### ITALLIT 45N. *Italianità: Photography / Literature / Film*

(F,Sem) Stanford Introductory Seminar. Stanford Introductory Seminar. Preference to freshmen. Introduction to the question of Italianità, or Italian-ness, through the intersection of photography with modern Italian literature and cinema. Includes an exploration of alternative identities and visual culture in Italy. Excerpts from seminal pieces of Italian literature, women writers, hybrid works such as phototexts, and Italian films. A gateway course to a major or minor in Italian studies and forum for improving written and oral proficiency. Lecture, discussions and readings in Italian. Prerequisite: students must have two years of college-level Italian (or equivalent).

4 units, Aut (Carey, S)

## JAPANESE GENERAL INTRODUCTORY COURSES

### JAPANGEN 82N. *Joys and Pains of Growing Up and Older: Secret Lives of Old People in Japan*

(F,Sem) Stanford Introductory Seminar. Lives of older individuals, their responses to changing social and physical realities and self image, particularly through verbal communication. Special focus on Japan, which is the world's fastest growing elderly population, as a point of comparison in terms of culture, including issues of gender. Introduction to recent multidisciplinary studies on aging and concepts such as frame analysis as a tool to interpret verbal interactions. Through qualitative cross-generational and cross-cultural examinations of lives and verbal representations of old people, students will gain a deeper understanding of the complex human quality of older people and of the relevance of elders' lives to their own. GER:DB-Hum

3 units, Win (Matsumoto, Y)

## JEWISH STUDIES INTRODUCTORY COURSES

### JEWISHST 15N. *Travels through the Afterlife*

(F,Sem) (Same as RELIGST 15N) Stanford Introductory Seminar. Since the beginning of civilization, humans have refused to believe that physical death is the end of life and have sought in various ways to travel into the afterlife. We cannot know what lies beyond death, but there are other kinds of insights to be learned from these otherworldly journeys. The first part of the course will explore the origins and history of the afterlife, going back in time to ancient Egypt, Mesopotamia, Israel, Greece, and medieval Europe to survey these cultures' view of death and what lies beyond it. The second part of the course will investigate what has happened to belief in the afterlife in modern American culture. Our ultimate goal is to confront one of the most difficult aspects of life--our fear of death and oblivion--and also to explore the power of thought and imagination to move beyond the confines of mortality. GER:DB-Hum

4 units, Win (Weitzman, S)

## LAW, NONPROFESSIONAL INTRODUCTORY COURSES

### LAWGEN 103Q. *Depth Psychology*

(S,Sem) Stanford Introductory Seminar. Powerful unconscious forces impact human and social life. Depth psychology, founded by Sigmund Freud, Carl Jung, Wilhelm Reich, and others, studies these forces and how they shape inner life, personal relationships, religion, politics, art, and many other domains. The course draws from the founders, particularly Jung, and then goes on to include materials from modern theorists, primarily neo-Jungian. The starting point is how the unconscious and conscious mind interact in the individual person's life. We consider the implications of this interaction for psychotherapy and pathology as well as for ordinary life. On the social side, several sessions focus on religion and, to a lesser extent, mythology from a depth psychology perspective. The inquiry is open-ended throughout, encouraging personal reflection and engagement.

3 units, Aut (Strnad, J)

### LAWGEN 113Q. *Law and the Changing American Family*

(S,Sem) Stanford Introductory Seminar. This course will examine the many unprecedented changes in American family patterns during the past half century. Particular attention will be given to the role of law as it reflects and facilitates these developments. Topics to be covered include: same-sex marriage, no fault divorce, reproductive technologies, adoption, interracial relationships and mixed race families, the decline in marriage, and the changing economic positions of men and women.

3 units, Win (Banks, R)

## LINGUISTICS INTRODUCTORY COURSES

### LINGUIST 62N. *The Language of Food*

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. The relationship between food and language around the globe. The vocabulary of food and prepared dishes, and crosslinguistic similarities and differences, historical origins, forms and meanings, and relationship to cultural and social variables. The structure of cuisines viewed as meta-languages with their own vocabularies and grammatical structure. The language of menus; their historical development and crosslinguistic differences.

3 units, Win (Jurafsky, D)

### LINGUIST 83N. *Translation*

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. What is a translation? The increased need for translations in the modern world due to factors such as tourism and terrorism, localization and globalization, diplomacy and treaties, law and religion, and literature and science. How to meet this need; different kinds of translation for different purposes; what makes one translation better than another; why some texts are more difficult to translate than others. Can some of this work be done by machines? Are there things that cannot be said in some languages? GER:DB-SocSci

3 units, Aut (Kay, M)

## MANAGEMENT SCIENCE AND ENGINEERING INTRODUCTORY COURSES

### MS&E 22Q. *The Flaw of Averages*

(S,Sem) Stanford Introductory Seminar. Uncertain assumptions in business and public policy are often replaced with single best guess or average numbers. This leads to a fallacy as fundamental as the belief that the earth is flat, which I call the Flaw of Averages. It states, in effect, that: plans based on average assumptions are wrong on average. This class will discuss mitigations of the flaw of averages using simulation and other methods from probability management.

3 units, Aut (Savage, S)

### MS&E 92Q. *International Environmental Policy*

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Science, economics, and politics of international environmental policy. Current negotiations on global climate change, including actors and potential solutions. Sources include briefing materials used in international negotiations and the U.S. Congress.

3 units, Win (Weyant, J)

### MS&E 93Q. Nuclear Weapons, Energy, Proliferation, and Terrorism

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. What are nuclear weapons; what do they do? How are they different from other weapons? What drives proliferation of nuclear weapons? Why do countries want them? Can they be eliminated? What about Iran and North Korea? What role does nuclear energy play? Can it help combat global climate change? What are the risks of nuclear terrorism? Recommended: a course in international relations, engineering, or physical science. GER:DB-EngrAppSci, DB-EngrAppSci

3 units, Spr (Hecker, S)

### MS&E 94Q. The Public Use and Misuse of Mathematics: How to Interpret Numbers as Used by Media and Politicians

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. How to unearth and interpret relevant math to illuminate underlying political and economic issues. How to interpret public budgets, whether jury pool selection is biased, estimate pollution risks, and when to believe poll results and statistical relationships; how to deal with rare but high-consequence eventualities such as terrorism, a nuclear meltdown, or a possible pandemic. How to determine how much to pay to reduce carbon emissions, when a medicine should be withdrawn, and what is a useful forecast.

3 units, Spr (May, M)

## MATERIALS SCIENCE AND ENGINEERING INTRODUCTORY COURSES

### MATSCI 159Q. Japanese Companies and Japanese Society

(S,Sem) (Same as ENGR 159Q) Stanford Introductory Seminar. Preference to sophomores. The structure of a Japanese company from the point of view of Japanese society. Visiting researchers from Japanese companies give presentations on their research enterprise. The Japanese research ethic. The home campus equivalent of a Kyoto SCTI course. GER:DB-SocSci

3 units, Spr (Sinclair, R)

## MATHEMATICS INTRODUCTORY COURSES

### MATH 87Q. Mathematics of Knots, Braids, Links, and Tangles

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Types of knots and how knots can be distinguished from one another by means of numerical or polynomial invariants. The geometry and algebra of braids, including their relationships to knots. Topology of surfaces. Brief summary of applications to biology, chemistry, and physics.

3 units, Win (Wieczorek, W)

## MECHANICAL ENGINEERING INTRODUCTORY COURSES

### ME 14N. How Stuff Is Made

(F,Sem) Stanford Introductory Seminar. The design and engineering of products and processes, such as machining, fabric, food, and electrical goods. Tradeoffs in choice of materials, features, and process selection. Final project: students research and redesign the engineering and manufacturing aspects of a product and its processes with an eye toward sustainability. Includes several field trips to manufacturing facilities. GER:DB-EngrAppSci

3 units, Aut (Pruitt, B)

### ME 18Q. Teamology: Creative Teams and Individual Development

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Roles on a problem solving team that best suit individual creative characteristics. Two teams are formed for teaching experientially how to develop less conscious abilities from teammates creative in those roles. Reinforcement teams have members with similar personalities; problem solving teams are composed of people with maximally different personalities.

3 units, Aut (Wilde, D)

### ME 25N. Global Warming and Climate Change: Fact or

### Fiction

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Scientific arguments concerning debates between the view that anthropogenic activities are not causing global warming versus the view that these activities are responsible for a global warming that results in significant climate change. Consequences of increased demand for energy. Prerequisites: high school physics, chemistry, and biology.

3 units, Win (Bowman, C)

### ME 26N. Think Like a Designer

(F,Sem) Stanford Introductory Seminar. Introduces students to techniques designers use to create highly innovative solutions across domains. The project-based class will emphasize approaches to problem identification and problem solving. Topics include need-finding, structured brainstorming, synthesis, rapid prototyping, and visual communication; field trips to a local design firm, a robotics lab, and a machining lab. A secondary goal of the seminar is to introduce students to the pleasures of creative design and hands-on development of tangible solutions.

3 units, Aut (Banerjee, S)

## MEDICINE INTRODUCTORY COURSES

### MED 70Q. Cancer and the Immune System

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Myths and facts surrounding the idea that the immune system is capable of recognizing malignant cells. The biological basis and function of effector arms of the immune system; how these mechanisms may be used to investigate the biological basis and potential therapy of cancer. How the immune system functions.

3 units, Win (Negrin, R)

### MED 86Q. Seeing the Heart

(F,Dial) Stanford Introductory Dialogue. Introduction to biomedical technology, science, clinical medicine, and public policy through cardiovascular imaging. Invasive and noninvasive techniques to detect early stage heart disease and to see inside the heart and blood vessels. Topics include: common forms of heart disease, how they develop, and why they affect so many people; imaging technologies such as ultrasound, CT, MRI, PET, and optical; a cost-effective public screening program. Field trips to Stanford Medical Center imaging centers.

2 units, Win (McConnell, M)

### MED 87Q. Women and Aging

(S,Sem) (Same as HUMBIO 87Q) Stanford Introductory Seminar. Preference to sophomores. Biology, clinical issues, social and health policies of aging; relationships, lifestyles, and sexuality; wise women and grandmothers. Sources include scientific articles, essays, poetry, art, and film. Service-learning experience with older women. Service Learning Course (certified by Haas Center). GER:EC-Gender

5 units, Spr (Winograd, C)

### MED 88Q. Dilemmas in Current Medical Practice

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Social, political, scientific, and economic forces influencing medical practice. Spiraling costs, impaired access to health care, and disillusionment toward the health care system. Attempts by government and medical insurers to control costs through managed care and health maintenance organizations. Medical education and how it has affected the practice of medicine. Alternative health care, preventive medicine, and the doctor-patient relationship. The paradox of health in America: why do so many people who are healthy feel unhealthy? Mandatory observation of instructors in their medical practices.

3 units, Aut (Croke, J; Jones, E)

### MED 108Q. Human Rights and Health

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. History of human-rights law. International conventions and treaties on human rights as background for social and political changes that could improve the health of groups and individuals. Topics such as: regional conflict and health, the health status of refugees and internally displaced persons; child labor; trafficking in women and children; HIV/AIDS; torture; poverty, the environment and health; access to clean water; domestic violence and sexual assault; and international availability of drugs. Possible optional opportunities to observe at community sites where human rights

and health are issues. Guest speakers from national and international NGOs including Doctors Without Borders; McMaster University Institute for Peace Studies; UC Berkeley Human Rights Center; Kiva. PowerPoint presentation on topic of choice required.  
3 units, Spr (Laws, A)

## **MICROBIOLOGY AND IMMUNOLOGY INTRODUCTORY COURSES**

### **MI 70Q. Photographing Nature**

(S,Sem) Stanford Introductory Seminar. Utilizes the idiom of photography to learn about nature, enhance observation, and explore scientific concepts. Builds upon the pioneering photographic work of Eadward J. Muybridge on human and animal locomotion. A secondary goal is to learn the grammar, syntax, composition, and style of nature photography to enhance the use of this medium as a form of scientific communication and also to explore the themes of change across time and space. Scientific themes to be explored include: taxonomy, habitat preservation, climate change; species diversity; survival and reproductive strategies; ecological niches and coevolution, carrying capacity and sustainability, population densities, predation, and predator-prey relationships, open-space management, the physics of photography. Extensive use of field trips and class critique.

3 units, Aut (Siegel, R)

## **MUSIC INTRODUCTORY COURSES**

**MUSIC 11N. A View from the Podium: The Art of Conducting**  
(F,Sem) Stanford Introductory Seminar. How a conductor interprets music, realizes a personal vision through the rehearsal process, and communicates with orchestra and audience. Conducting as based on human communication skills. How to apply these lessons to other fields of endeavor. GER:DB-Hum  
3 units, Aut (Cai, J)

### **MUSIC 13N. South Asian Regional and Popular Music on the Move**

(F,Sem) Stanford Introductory Seminar. Introduction to regional and popular musical styles of India and Pakistan, including Marathi kirtan, Punjabi bhangra, Manganiyar music of Rajasthan, Bhojpuri wedding songs, Tamil drum ensembles, Baul music of Bengal, Sufi qawwali, and Hindi film music, and explores how these musics are woven into the fabric of social life in South Asia and its diaspora. How people perform music to: articulate relationship to the divine; make social commentary; effect political change; bring families together; celebrate rites of passage; and, cope with rapid socio-economic changes. GER:DB-Hum  
3 units, Aut (Schultz, A)

### **MUSIC 13Q. Classical Music and Politics: Western Music in Modern China**

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Social history, cultural studies, China studies, international relations, and music. From the Italian Jesuit, Matteo Ricci who presented a clavichord to the Chinese emperor to the emergence of a modern generation of Chinese musicians. GER:DB-Hum, EC-GlobalCom  
3 units, Spr (Cai, J)

### **MUSIC 15N. The Aesthetics of Data**

(F,Sem) Stanford Introductory Seminar. Focus on visual and auditory display of data, specifically, the importance of aesthetic principles in effective data display, and the creative potential of scientific, biological, environmental and other data as inspiration for artistic expression. GER:DB-Hum  
3 units, Win (Berger, J)

### **MUSIC 17Q. Perspectives in North American Taiko**

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Taiko, or Japanese drum, is a newcomer to the American music scene. Emergence of the first N. American taiko groups coincided with increased Japanese American activism, and to some it is symbolic of Japanese American identity. N. American taiko is associated with Japanese American Buddhism. Musical, cultural, historical, and political perspectives of taiko. Hands-on drumming. Japanese music and Japanese American history, and relations among performance, cultural expression, community, and identity.

GER:DB-Hum, EC-AmerCul  
4 units, Win (Sano, S; Uyechi, L)

### **MUSIC 34N. Performing America: The Broadway Musical from Little Johnny Jones to American Idiot**

(F,Sem) Stanford Introductory Seminar. 20th C. musical comedy in dialogue with American culture at large. How themes, characters, stories, and songs of the Broadway musical reflect, and construct, ideas of American identity over the last hundred years. Intersections with jazz, movies, rock, and popular song. Social themes of race, class, gender roles, and sexual identity. Works of Gershwin, Cole Porter, Irving Berlin, Rodgers and Hammerstein, and Lerner and Lowe. Includes opportunities to perform, arrange, direct scenes, as well as to attend one or more local productions. GER:DB-Hum

3-4 units, Spr (Staff)

### **MUSIC 36N. Humor in Music**

(F,Sem) Stanford Introductory Seminar. Through theoretical readings the course will touch on psychological and neurological bases of humor, explore contingent, tactical, modal, and ontological difficulties in the apprehension of humor, and address ethical issues surrounding humor in music. In addition to in-class listening and screening sessions, analytic discussions will be led by students who will find and present examples of humor in music. Students will also be invited to compose original humorous song lyrics and to create collaborative works of musical humor. GER:DB-Hum

3 units, Aut (Applebaum, M)

## **NEUROLOGY AND NEUROLOGICAL SCIENCES INTRODUCTORY COURSES**

### **NENS 67N. Intracellular Trafficking and Neurodegeneration**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Cell structures and functions, the intracellular trafficking system that maintains exchanges of materials and information inside cells, and clinical features and pathologies of neurodegenerative diseases. Techniques for examining cellular and subcellular structures, especially cytoskeletons; functional insights generated from structural explorations. Prerequisite: high school biology.

3 units, Spr (Yang, Y)

## **NEUROSURGERY INTRODUCTORY COURSES**

### **NSUR 70Q. Experimental Stroke**

(F,Dial) Stanford Introductory Dialogue. Preference to sophomores. How stroke is studied in the laboratory; advances in stroke research over the last two decades; and future directions. Topics include: cellular and molecular mechanisms of neuronal death and survival in the brain after stroke, including necrosis, apoptosis, inflammation, and cell signaling pathways; experimental tools for stroke treatment, such as gene therapy, cell therapy, hypothermia, preconditioning, postconditioning, and other pharmacological treatments; the gap and barrier between laboratory research and clinical translation.

2 units, Spr (Zhao, H)

## **ORTHOPEDIC SURGERY INTRODUCTORY COURSES**

### **ORTHO 97Q. Sport, Exercise, and Health: Exploring Sports Medicine**

(S,Sem) (Same as HUMBIO 97Q) Stanford Introductory Seminar. Preference to sophomores. Sports medicine is the practice of clinical medicine at the interface between health and performance, competition and well-being. While sports medicine had its origins in providing care to athletes, medical advances developed in care of athletes exerted a great effect on the nature and quality of care to the broader community. Topics include sports injuries, medical conditions associated with sport and exercise, ethics, coaching, women's issues, fitness and health, and sports science. Case studies.

3 units, Aut (Matheson, G), Win (Matheson, G), Spr (Matheson, G)

## **PATHOLOGY INTRODUCTORY COURSES**

### **PATH 103Q. Lymphocyte Migration**

(F,Dial) Stanford Introductory Dialogue. Preference to sophomores. Lymphocytes migrate from blood vessels into tissues to participate in immune surveillance and the development of inflammation. The lymphocyte and blood vessel endothelia molecules that control lymphocyte migration, and are implicated in the development of human diseases such as asthma, type 1 diabetes, and multiple sclerosis are discussed.

*1 unit, Aut (Michie, S)*

## **PEDIATRICS INTRODUCTORY COURSES**

### **PEDS 65N. Understanding Children's Health Disparities**

(F,Sem) Stanford Introductory Seminar. The social and economic factors that affect children and their health status. The principal sources of disparities in the health of children in the U.S. are not biologic, but social and economic. Topics include ethnic, cultural, and behavioral factors that affect children's health, both directly and indirectly; lack of health insurance; and current proposals for health care reform, focusing specifically on how they will impact existing health disparities among children.

*3 units, Win (Barr, D)*

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*3 units, Aut (Barr, D)*

## **PHILOSOPHY INTRODUCTORY COURSES**

### **PHIL 7N. What is Truth**

(F,Sem) Stanford Introductory Seminar. This question can be answered precisely in some important cases. We begin with the language of propositional logic where truth is defined by simple tables. This is already sufficient for description of many important problems and leads to a famous (\$1 000 000) problem  $P=NP$ . We use Sudoku puzzles for illustration. Close connection between propositional truth and proof is established by the resolution method forming a basis of most automated theorem provers. The language of predicate logic covers much more and illustrates the notion of completeness. Register machines provide connection with computations and lead to a fundamental classification of problems of truth with respect to decidability. The language of arithmetic exhibits a new phenomenon of incompleteness that changed significant part of philosophy in 20-th century. GER:DB-Hum

*3 units, Spr (Mints, G)*

### **PHIL 11N. Skepticism**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Historical and contemporary philosophical perspectives on the limits of human knowledge of a mind-independent world and causal laws of nature. The nature and possibility of a priori knowledge. GER:DB-Hum

*3 units, Win (De Pierris, G)*

### **PHIL 15N. Freedom, Community, and Morality**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Does the freedom of the individual conflict with the demands of human community and morality? Or, as some philosophers have maintained, does the freedom of the individual find its highest expression in a moral community of other human beings? Readings include Camus, Mill, Rousseau, and Kant. GER:DB-Hum, EC-EthicReas

*3 units, Aut (Friedman, M)*

## **PHYSICS INTRODUCTORY COURSES**

### **PHYSICS 18N. Revolution in Concepts of the Cosmos**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. The evolution of concepts of the cosmos and its origin, from the

Copernican heliocentric model to the current view based on Hubble's discovery of expansion of the Universe. Recent cosmological observations and the relevance of laboratory experiments in particle physics. One night of observations at the Stanford Observatory. GER: DB-NatSci

*3 units, Win (Roodman, A)*

### **PHYSICS 43N. Understanding Electromagnetic Phenomena**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Expands on the material presented in 43; applications of concepts in electricity and magnetism to everyday phenomena and to topics in current physics research. Corequisite: 43 or advanced placement.

*1 unit, Spr (Cabrera, B)*

### **PHYSICS 45N. Advanced Topics in Light and Heat**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Expands on the subject matter presented in 45 to include optics and thermodynamics in everyday life, and applications from modern physics and astrophysics. Corequisite: 45 or advanced placement.

*1 unit, Aut (Romani, R)*

### **PHYSICS 70N. Modern Physics in Your Life**

(S,Sem) Stanford Introductory Seminar. How does modern physics intersect with your everyday life? Topics may include the quantum nature of light, atomic physics and an introduction to semiconductor physics, applications to light sources (incandescent, fluorescent, light-emitting diodes, lasers) and light sensors (photodiodes and solar cells), introduction to nuclear physics (e.g., fission, fusion, interaction of radiation with matter). Co- or pre-requisite: Physics 70, Physics 65, or similar high-school physics preparation.

*1 unit, Aut (Raghu, S)*

### **PHYSICS 80N. The Technical Aspects of Photography**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen and sophomores with some background in photography. How cameras record photographic images on film and electronically. Technical photographic processes to use cameras effectively. Camera types and their advantages, how lenses work and their limitations, camera shutters, light meters and the proper exposure of film, film types, depth of focus, control of the focal plane and perspective, and special strategies for macro and night photography. View cameras and range finder technical cameras. Students take photographs around campus. Prerequisite: high school physics.

*3 units, Spr (Osheroff, D)*

### **PHYSICS 83N. Physics in the 21st Century**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Current topics at the frontier of modern physics. Topics include subatomic particles and the standard model, symmetries in nature, extra dimensions of space, string theory, supersymmetry, the big bang theory of the origin of the universe, black holes, dark matter, and dark energy of the universe. Why the sun shines. Cosmology and inflation. GER: DB-NatSci

*3 units, Aut (Kallosh, R)*

### **PHYSICS 87N. The Physics of One: Nanoscale Science and Technology**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Contemporary interdisciplinary research in nanoscience and nanotechnology; the manipulation of nature's fundamental building blocks. Accomplishments and questions engendered by knowledge at the discrete limit of matter. Prerequisite: high school physics. GER: DB-NatSci

*3 units, Spr (Goldhaber-Gordon, D)*

## **POLITICAL SCIENCE INTRODUCTORY COURSES**

### **POLISCI 15N. Explaining Ethnic Violence**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Over the last twenty years, more than one third of all countries had a violent civil conflict ongoing in which at least 1,000 people had died. More than half of these conflicts killed tens of thousands and produced massive refugee flows, and some caused mass starvation. Analysts describe the violence in many of these conflicts as ethnic and the parties to the violence as ethnic groups. In ordinary language, however, the term ethnic violence can be used to refer to

an extraordinary range of phenomena, from certain barroom brawls to the Nazi genocide. This course begins with an examination of the meaning of ethnic violence and related terms like ethnic group. We will consider case histories of three large-scale civil conflicts commonly described as ethnic. These case materials will then be used to work through a range of possible explanations, from the individual psychology of ethnic violence to various political, military, GER:DB-SocSci

5 units, Win (Fearon, J)

#### **POLISCI 24N. The Politics of Communication**

(F,Sem) Stanford Introductory Seminar. This course will explore how elected officials present and explain their work to constituents and how this communication shapes American politics. Elected officials use press releases, newsletters, press conferences, and public events to connect with their constituents. While almost none of this communication is formally required, it can have important consequences on what elected officials do in office and how constituents perceive their representatives' activities. We will explore the strategies elected officials use when communicating with constituents and identify the consequences of these strategies on the process of representation. GER:DB-SocSci

3 units, Win (Grimmer, J)

#### **POLISCI 24Q. Law and Order**

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. The role of law in promoting social order. What is the rule of law? How does it differ from the rule of men? What institutions best support the rule of law? Is a state needed to ensure that laws are enforced? Should victims be allowed to avenge wrongs? What is the relationship between justice and mercy? GER:DB-SocSci

3 units, Aut (Rutten, A)

#### **POLISCI 25N. The US Congress in Historical and Comparative Perspective**

(F,Sem) Stanford Introductory Seminar. This course traces the development of legislatures from their medieval European origins to the present, with primary emphasis on the case of the U.S. Congress. Students will learn about the early role played by assemblies in placing limits on royal power, especially via the power of the purse. About half the course will then turn to a more detailed consideration of the U.S. Congress's contemporary performance, analyzing how that performance is affected by procedural legacies from the past that affect most democratic legislatures worldwide. GER:DB-SocSci

3 units, Spr (Cox, G)

#### **POLISCI 26N. American Transportation Politics**

(F,Sem) Stanford Introductory Seminar. Politics has been defined as who gets what, when, and how. In the process of resolving this question, the political process also ends up deciding who goes where, and how. This course will draw upon American debates over transportation policy to guide an exploration of major research themes in American politics. We'll examine how American transportation controversies from debates over 19th century canal financing to the 21st-century fight over high-speed rail have cast into relief the major problems that shape decision making in a representative democracy. GER:DB-SocSci

3 units, Aut (Nall, C)

#### **POLISCI 43N. Oil, Regime Change, and Conflict**

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Relationships among dependence on oil export, democratization and authoritarian rule, and rising conflict. Case studies including Venezuela, Nigeria, Iran, Iraq, Chad, and Indonesia. The resource curse: the impact of oil on a country's political economy. The relationship between such economic dependence and regime type. Why oil exporting countries are more prone to conflict and civil war than other countries. Research paper. GER:DB-SocSci

5 units, Win (Karl, T)

## **PORTUGUESE LANGUAGE INTRODUCTORY COURSES**

#### **PORTLANG 193Q. Spaces and Voices of Brazil through Film**

(S,Sem) (Same as ILAC 193Q) Stanford Introductory Seminar. The manners in which a country is perceived and defines itself is a result of many complex forces, and involves the reproduction of social relations and complex social constructions both on the part of those who live there and those who see it from a distance. The

perceptions of what Brazil is and what defines the country has changed throughout times, but has conserved some clear pervasive defining traits. This course is an introduction to the history, culture, politics and artistic production of Brazil as seen through feature films, documentaries and some complementary readings. Movies include, among others, Banana is my Business, Black Orpheus, Olga, They Don't Use Black-Tie, City of God, Central Station, Gaijin, and Four Days in September-among others. In English. GER:DB-Hum, EC-GlobalCom

3-4 units, Aut (Wiedemann, L)

## **PSYCHIATRY INTRODUCTORY COURSES**

#### **PSYC 76Q. Temperament and Creativity in Mood Disorders**

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Western cultural notions of mad geniuses and artistic temperaments. How many individuals who suffer from depression, bipolar disorder, and related problems are nonetheless productively creative. Current psychological and neurobiological research, and assessment of mood, temperament, and creativity. Emphasis is on written and oral communications and multimedia presentations. Write 2. Prerequisite: PWR 1.

4 units, Win (Ketter, T)

#### **PSYC 77Q. Deviants in Literature**

(S,Sem) Stanford Introductory Seminar. Many literary works are enhanced by, in fact demand, a psychological perspective to achieve a fully informed reading. In *The Devils* Dostoevsky uses the issues and process of anarchy as a platform on which to develop some of the most unforgettable characters in literary history. *Death in Venice* contains among its many themes the darker dynamic of paraphilia. *Guilt* searches for a validating crime in Kafka's *The Penal Colony*. *Capote* uses a journalistic style to manage horrible fact during *In Cold Blood*. *Conrad* shows that telling a story of the journey outward is more nearly an analysis of the journey inward in *Heart of Darkness*. *Albee's Zoo Story* asks whether the man on the street is prepared to confront his own worst nightmare. Close reading of works such as these presents opportunities to learn about character pathology and to expand traditional approaches to literary criticism by applying a psychological perspective.

3 units, Aut (Van Natta, J)

#### **PSYC 78Q. Mental Health in Collegiate Athletes**

(S,Sem) Stanford Introductory Seminar. Developmental, psychological, social, and performance issues in collegiate sports. Topics include transition to Stanford, time management, optimizing mental fitness, coping with injuries.

3 units, Win (Steiner, H)

#### **PSYC 81Q. Fate of Orphans and Vulnerable Children in Sub Saharan Africa: The HIV/AIDS Pandemic**

(S,Sem) Stanford Introductory Seminar. The complicated forces, shaped by geopolitical history and current events, that frame all social programs, the care of orphans in the context of the AIDS pandemic in particular; history of the care of orphans; developmental effects of deprivation of care and nurturing. Guest speakers.

2 units, Win (Solvason, H; Reicherter, D)

#### **PSYC 111Q. Madness and the Womb: Medical and Artistic Approaches to Mental Illness in Women Through the Ages**

(S,Sem) Stanford Introductory Seminar. Historical and current concepts of mental illness in women. Premenstrual dysphoric disorder (PMS), postpartum depression, menopausal mood disorders, and eating disorders. Historical biopsychosocial approach. Readings include women's diaries and advice books, physicians' casebooks, and 19th- and 20th-century medical texts. Guest speakers from art and literature departments. Literary and artistic images, and the social and cultural contexts of these disorders during the last 300 years.

3 units, Win (Williams, K)

## **PSYCHOLOGY INTRODUCTORY COURSES**

#### **PSYCH 7Q. Language Understanding by Children and Adults**

(S,Sem) Stanford Introductory Seminar. How do we first learn to find meaning in strings of speech sounds? Understanding spoken



language requires the rapid integration of acoustic information with linguistic knowledge and with conceptual knowledge based on experience with how things happen in the world. Topics include research on early development of language understanding and laboratory methods of how young children make sense of speech. Observations of preschool children and visits to Stanford laboratories. Might be repeatable for credit.

3 units, Aut (Fernald, A)

### PSYCH 11N. Origin of Mental Life

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Mental life in infancy; how thinking originates. How do babies construe the objects, events, people, and language that surround them? Recent advances in psychological theory, hypotheses, and evidence about how the infant human mind develops. GER:DB-SocSci

3 units, Spr (Markman, E)

### PSYCH 12N. Self Theories

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. The impact of people's belief in a growing versus fixed self on their motivation and performance in school, business, sports, and relationships. How such theories develop and can be changed. GER:DB-SocSci

3 units, Aut (Dweck, C)

### PSYCH 26N. Language Acquisition: Exploring the Minds of Children

(F,Sem) Stanford Introductory Seminar. Language is an extraordinary competence distinguishing humans from other species, yet there is debate about the role of biology in guiding language acquisition. Does language development follow an innate *bioprogram*, or does it build on more general cognitive abilities, influenced by early experience? Topics include biological and experiential influences on the emergence of linguistic ability as children learn a first language. Discussions of theory and research, visits to Stanford laboratories and observations of very young language learners.

3 units, Win (Fernald, A)

### PSYCH 28N. The Cultural Shaping of Mental Health and Illness

(F,Sem) (Same as CSRE 28N) Stanford Introductory Seminar. This seminar examines how our cultural ideas and practices shape our conceptions, perceptions, experiences, and treatment of emotional wellness and distress. We will read and discuss empirical research and case studies from psychology, anthropology, sociology, and medicine. Course requirements include weekly reading and thought papers, weekly discussion, and a final research project and presentation.

3 units, Win (Tsai, J)

### PSYCH 29N. Growing Up in America

(F,Sem) (Same as ENGLISH 64N) Stanford Introductory Seminar. Preference to freshmen. To what extent is it possible to describe an American experience? How are different people included in or excluded from the imagined community that is America? How do a person's race, class, gender and sexuality affect his or her experience of belonging to this country? These are just some of the questions we will consider as we familiarize ourselves with the great diversity of childhood and young adult experiences of people who have grown up in America. We will read and discuss narratives written by men and women, by urban, suburban, and rural Americans, and by Asian Americans, African Americans, Syrian Americans, Native Americans, Latina/os, and European Americans. Throughout the course, we will explore how these writers write the self in literature. GER:DB-Hum, EC-AmerCul

3 units, Spr (Markus, H; Moya, P)

## RELIGIOUS STUDIES INTRODUCTORY COURSES

### RELIGST 11N. The Meaning of Life: Philosophical, Aesthetic, and Religious Perspectives

(F,Sem) Stanford Introductory Seminar. Raise ultimate questions about life. Yes, the unexamined life is not worth living, but also the un-lived life is not worth examining. Students and professor examine their own lives in the light of questions that the readings and lectures bring up: 1. The big picture: Is there such a thing as the meaning of life? 2. What is entailed in making personal-

existential sense of one's own life? 3. What constitutes the good life, lived in society? 4. How can a university education bear upon the search for a meaningful life? 5. What methods for or approaches to life can one learn from studies in the humanities? After introductory lectures, the seminar studies a series of artworks, poems, diverse texts, and a film, all of which bear on the questions mentioned above -- works such: 1. Plato's Allegory of the Cave, from The Republic 2. Manet's A bar at the Folies Bergere 3. A comparison/contrast of Monet's early (1862) Still Life and van Gogh's late (18

3 units, Win (Sheehan, T)

### RELIGST 12N. Perspectives on the Good Life

(F,Sem) Stanford Introductory Seminar. The question is how to approach and evaluate different perspectives on the good life, especially when those perspectives are beautifully, and elusively, presented to us as texts. We will consider both classic and modern writers, from the West and from China; some are explicitly religious, some explicitly secular; some literary, some philosophical. Most of the class will revolve around our talk with each other, interpreting and questioning relatively short texts. The works we will read  $\frac{1}{2}$  by Dante, Dickenson, Zhuangzi, Shklar, and others - are not intended to be representative of traditions, of eras, or of disciplines. They do, however, present a range of viewpoint and of style that will help frame and re-frame our views on the good life. They will illustrate and question the role that great texts can play in a modern 'art of living.' Perhaps most important, they will develop and reward the skills of careful reading, attentive listening, and thoughtful disc GER:DB-Hum

3-4 units, Aut (Yearley, L)

### RELIGST 15N. Travels through the Afterlife

(F,Sem) (Same as JEWISHST 15N) Stanford Introductory Seminar. Since the beginning of civilization, humans have refused to believe that physical death is the end of life and have sought in various ways to travel into the afterlife. We cannot know what lies beyond death, but there are other kinds of insights to be learned from these otherworldly journeys. The first part of the course will explore the origins and history of the afterlife, going back in time to ancient Egypt, Mesopotamia, Israel, Greece, and medieval Europe to survey these cultures' view of death and what lies beyond it. The second part of the course will investigate what has happened to belief in the afterlife in modern American culture. Our ultimate goal is to confront one of the most difficult aspects of life--our fear of death and oblivion--and also to explore the power of thought and imagination to move beyond the confines of mortality. GER:DB-Hum

4 units, Win (Weitzman, S)

## SCIENCE, TECHNOLOGY, AND SOCIETY INTRODUCTORY COURSES

### STS 101Q. Technology in Contemporary Society

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Introduction to the STS field. The natures of science and technology and their relationship, what is most distinctive about these forces today, and how they have transformed and been affected by contemporary society. Social, cultural, and ethical issues raised by recent scientific and technological developments. Case studies from areas such as information technology and biotechnology, with emphasis on the contemporary U.S. Unexpected influences of science and technology on contemporary society and how social forces shape scientific and technological enterprises and their products. Enrollment limited to 12. GER:DB-SocSci

4 units, Aut (McGinn, R)

## SLAVIC GENERAL INTRODUCTORY COURSES

### SLAVGEN 77Q. Russia's Weird Classic: Nikolai Gogol

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. The work and life of Nikolai Gogol, the eccentric founder of Fantastic Realism. The relationship between romanticism and realism in Russian literature, and between popular Ukranian culture and high Russian and W. European traditions in Gogol's oeuvre. The impact of his work on 20th-century modernist literature, music, and art, including Nabokov, literature of the



absurd, Shostakovich, Meyerhold, and Chagall. GER:DB-Hum  
3-4 units, *Win (Fleishman, L)*

**SLAVGEN 78N. Poetry to Prose: The Birth of the Great Russian Novel in Alexander Pushkin's Eugene Onegin**

(F,Sem) Stanford Introductory Seminar. This course will be devoted to a close reading and detailed discussion of Alexander Pushkin's masterpiece, Eugene Onegin, in the context of nineteenth-century Russian and continental literary history. We will discuss major theoretical and literary-historical questions: What is realism in literature? How does it differ from other literary epochs, movements and styles? What is the novel and how does it relate to other genres? In what way does the novel in verse differ from the novel in prose? We will also explore the relationships between the narrator and the author and between the narrator and the characters in the text. Through examination of the constituent elements of verse language, we will see Pushkin's inventive contributions to world literature. GER:IHUM-3  
4 units, *Spr (Fleishman, L)*

**SOCIOLOGY INTRODUCTORY COURSES**

**SOC 15N. The Transformation of Socialist Societies**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. The impact of societal organization on the lives of ordinary people in socialist societies and in the new societies arising through the processes of political, economic, and social transformation. Do the concepts of democratization and marketization suffice to characterize ongoing changes? Enrollment limited to 16. GER:DB-SocSci, EC-GlobalCom  
3 units, *Win (Tuma, N)*

**SOC 16N. African Americans and Social Movements**

(F,Sem) (Same as AFRICAAM 16N, CSRE 16N) Stanford Introductory Seminar. Theory and research on African Americans' roles in post-Civil Rights, US social movements. Topics include women's right, LGBT rights, environmental movement, and contemporary political conservatism. GER:DB-SocSci  
3 units, *Aut (Fields, C)*

**SOC 25N. Understanding the Sixties**

(F,Sem) (Same as AMSTUD 25N) Stanford Introductory Seminar. Preference to freshmen. The tendency of critics to view the 60s through ideological lenses as either the best or worst of times has made a balanced perspective difficult to achieve. Goal is to provide a sociological explanation for the political and cultural turbulence that marked the era. The confluence of demographic, political, economic, and cultural trends that date back to at least the 30s. The ambiguous legacy of the 60s. Using the 60s to shed light on the 80s and 90s. Enrollment limited to 16. GER:DB-SocSci  
3 units, *Win (Staff)*

**SOC 45Q. Understanding Race and Ethnicity in American Society**

(S,Sem) (Same as CSRE 45Q) Stanford Introductory Seminar. Preference to sophomores. Historical overview of race in America, race and violence, race and socioeconomic well-being, and the future of race relations in America. Enrollment limited to 16. GER:DB-SocSci  
5 units, *Aut (Snipp, C)*

**SPECIAL LANGUAGE PROGRAM INTRODUCTORY COURSES**

**SPECLANG 198Q. Modern Greece in Film and Literature**

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Cultural and literary highlights. Filmmakers include Kakoyannis, Dassen, Boulmetis, Angelopoulos, and Scorsese; readings from Eugenides, Gage, Kavafis, Kazantzakis, Samarakis, Seferis, and Elytis. GER:DB-Hum, DB-Hum, EC-GlobalCom  
3-5 units, *Aut (Prionas, E)*

**STATISTICS INTRODUCTORY COURSES**

**STATS 47N. Breaking the Code?**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Cryptography and its counterpart, cryptanalysis or code breaking. How the earliest cryptanalysts used statistical tools to decrypt messages by uncovering recurring patterns. How such frequency-analysis tools have been used to analyze biblical texts to produce a

Bible code, and to detect genes in the human genome. Overview of codes and ciphers. Statistical tools useful for code breaking. Students use simple computer programs to apply these tools to break codes and explore applications to various kinds of data. GER:DB-Math

3 units, *Aut (Holmes, S)*

**STEM CELL BIOLOGY AND REGENERATIVE MEDICINE INTRODUCTORY COURSES**

**STEMREM 83Q. The Stem Cell: Biological, Social, and Practical Aspects of Stem Cell Research**

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Ethical, legal, social, and economic dimensions of stem cell research such as the discovery of human embryonic stem cells and the international landscape of public policy. How stem cells work, their role in the upkeep of the human body, and current and future uses in medicine. Issues at the intersection of science and society such as human-animal hybrids, notions of justice in intellectual property law, distribution of health care, and the major ethical frameworks defining the debate. Prerequisite: AP Biology  
3 units, *Spr (Scott, C)*

**SURGERY INTRODUCTORY COURSES**

**SURG 68Q. Current Concepts in Transplantation**

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Biological aspects of cell and organ transplantation, including issues that arise in the media. Diseases for which transplantation is a treatment, the state of the art in human transplantation, transplantation of animal tissue into humans (xenotransplantation), development of new tissue and organs in the laboratory (tissue engineering and cloning), and development of drugs and biological strategies to promote long-term survival of the tissue or organ (tolerance). How to write a scientific abstract, critique scientific literature, and research and present topics in contemporary transplantation.  
3 units, *Spr (Martinez, O; Krams, S)*

**SURG 70Q. Surgical Anatomy of the Hand: From Rodin to Reconstruction**

(F,Dial) Stanford Introductory Dialogue. The surgical anatomy of the hand is extremely complex in terms of structure and function. Exploration of the anatomy of the hand in different contexts: its representation in art forms, the historical development of the study of hand anatomy, current operative techniques for reconstruction, advances in tissue engineering, and the future of hand transplantation.  
2 units, *Win (Chang, J)*

**ITALIAN GENERAL (ITALGEN) COURSES**

**UNDERGRADUATE COURSES IN ITALIAN GENERAL**

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**ITALGEN 41N. Imagining Italy**

Preference to freshmen. Literary responses to Italy by writers in English during the past hundred years and how they continue to construct myths of Italy. How these myths have been transformed into commodities in consumer culture, making Italy a profitable fiction. Authors include Hawthorne, Howells, James, Wharton, Forster, Unsworth, Hellenga, and Mayes. GER:DB-Hum  
3-4 units, *not given this year*

**ITALGEN 52N. Life is a Play: Identity, Persona, and Improvisation in Luigi Pirandello**

(F,Sem) Stanford Introductory Seminar. Stanford Introductory Seminar. Preference to freshmen. For Pirandello (1867-1936; Nobel Prize, 1934), to suddenly realize your entire life has been a performance is a moment of utmost horror, comedy, and

opportunity for self-awareness. In a quintessentially modern fashion, he claims that the performance cannot be stopped, that authenticity is a mirage, and that learning to laugh at oneself is the only liberation. Materials include Pirandello's existential theater within the theater, his novels, and their film adaptations, which we will study in their cultural context. GER:IHUM-3

3-5 units, *Spr (Wittman, L)*

#### **ITALGEN 149. New Frontiers in Italian Cinema**

A new generation of Italian filmmakers who examine the contradictory encounters between Italians and the migrant others in contemporary Italy. Critical texts from film studies, gender studies, ethnic and cultural studies, psychoanalysis, and history. I English; films, in Italian with English subtitles, by Amelio, Ozpetek, Munzi, Garrone, Melliti, Tornatore, and Giordana. GER:DB-Hum

3-5 units, *not given this year*

#### **ITALGEN 153. Dante in the Modern Imagination**

Dante's Divine Comedy and its grip on the 20th-century imagination. How is Dante co-opted by modern literary tradition? To what extent is Dante a poet of modernity? Emphasis is first on Dante's texts, then on modern literary reinterpretations of them. Authors include Dante, Cavalcanti, Levi, Pound, Eliot, Beckett, Birk and Sanders. Course in English with optional discussion section in Italian.

4 units, *Spr (Coggeshall, E)*

#### **ITALGEN 172. Dream Visions: The Roman de la Rose**

(Same as FRENGEN 172, FRENGEN 272, ITALGEN 272) What truths are in dreams? How does the quest for a symbolic object embody a moral struggle? What motivates a personal search for divine love? Study of arguably the most influential work of the European Middle Ages, the Roman de la Rose of Guillaume de Lorris and Jean de Meun. Focus on the work as erotic, allegorical quest for the mystical Rose, and scholastic encyclopedia through close analysis, secondary readings, and study of manuscript illumination. Use of medieval and modern French edition.

3-5 units, *not given this year*

#### **ITALGEN 181. Philosophy and Literature**

(Same as CLASSGEN 81, COMPLIT 181, ENGLISH 81, FRENGEN 181, GERGEN 181) Required gateway course for Philosophical and Literary Thought; crosslisted in departments sponsoring the Philosophy and Literature track: majors should register in their home department; non-majors may register in any sponsoring department. Introduction to major problems at the intersection of philosophy and literature. Issues may include authorship, selfhood, truth and fiction, the importance of literary form to philosophical works, and the ethical significance of literary works. Texts include philosophical analyses of literature, works of imaginative literature, and works of both philosophical and literary significance. Authors may include Plato, Montaigne, Nietzsche, Borges, Beckett, Barthes, Foucault, Nussbaum, Walton, Nehamas, Pavel, and Pippin. GER:DB-Hum

4-5 units, *Win (Staff)*

## **GRADUATE COURSES IN ITALIAN GENERAL**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

#### **ITALGEN 242. Women Mystics from the Middle Ages to the Present**

(Same as FRENGEN 242) The predominantly female mystical experience or direct-embodied encounter with a spiritual reality that is difficult, perhaps impossible, to reduce to words, or to explain rationally. Sources include European texts from the Middle Ages to the present by women and men who attempt to convey the experience metaphorically, to interpret it theologically and philosophically, and to transmit it actively to others.

3-5 units, *not given this year*

#### **ITALGEN 245. Contemporary Italian Cinema: Politics & Spectacle**

Introduction to Italian films from the past twenty years. Emphasis on the sexual, political and cultural politics of late-twentieth and twenty-first century Italy. Analysis of variations in cinematic style and in thematic content in works by Marco Bellocchio, Marco Tullio Giordana, Daniele Luchetti, Matteo Garrone, and Paolo

Sorrentino. Critical texts from film and cultural studies. English; films in Italian with English subtitles; readings in English. Mandatory evening film screenings.

3-5 units, *Spr (Carey, S)*

#### **ITALGEN 259. Tasso and the Italian Baroque**

An in-depth reading of Torquato Tasso's *Gerusalemme liberata* in the cultural and political context of the Counter-Reformation. Conducted in English; requires advanced reading knowledge of Italian.

3-5 units, *Spr (Springer, C)*

#### **ITALGEN 264E. Petrarch and Petrarchism**

(Same as COMPLIT 216) The works of Petrarch (1304-1374), acknowledged as the founder of Renaissance humanism, and a bibliophile, collector of manuscripts, and devotee of erudition. How he dedicated his life to harmonizing the Christian faith with classical learning. Sources include his Latin moral works, epistles, and treatises on illustrious men, and the *Triumphs* and *Canzoniere*.

5 units, *not given this year*

#### **ITALGEN 266. Fascism and Culture**

In this seminar we will examine several aspects of cultural life under Italian fascism, both in terms of primary materials (literary, cinematic, and architectural), and with respect to the rich historiography and analysis of these materials. Our questions will range from 'what defined Italian fascism? to 'how did artistic and cultural production function under Mussolini, and what do we need to know in order to decipher it in context?', and beyond that, to 'how has fascist-era cultural production been appropriated, disavowed, and otherwise (mis)understood in the decades since the end of fascism?'. Materials will include works (in Italian) by Silone, Gramsci, Moravia, Carlo Levi, Rosetta Loy, and Antonio Pennacchi, as well as secondary sources (in Italian and English) by Emilio Gentile, R.J.B. Bosworth, Schnapp, Stone, Ben-Ghiat, Fogu, and Falasca-Zamponi.

3-5 units, *Aut (Fuller, M)*

#### **ITALGEN 272. Dream Visions: The Roman de la Rose**

(Same as FRENGEN 172, FRENGEN 272, ITALGEN 172) What truths are in dreams? How does the quest for a symbolic object embody a moral struggle? What motivates a personal search for divine love? Study of arguably the most influential work of the European Middle Ages, the Roman de la Rose of Guillaume de Lorris and Jean de Meun. Focus on the work as erotic, allegorical quest for the mystical Rose, and scholastic encyclopedia through close analysis, secondary readings, and study of manuscript illumination. Use of medieval and modern French edition.

3-5 units, *not given this year*

#### **ITALGEN 278. European Nihilism**

(Same as FRENGEN 278) This course will probe the thought of nothingness in various European writers and thinkers. The main authors include Giacomo Leopardi, Nietzsche, Michelstader, Heidegger, Beckett, and Emile Cioran.

3-5 units, *Win (Harrison, R)*

#### **ITALGEN 288. Decadence and Modernism from Mallarme to Marinetti**

(Same as FRENGEN 288) How the notion of decadence, initially a term of derision, shapes and underlies the positive terms of symbolism and modernism. Readings include theories of decadence and examples of symbolist and modernist texts that attempt to exorcise decadent demons, such as lust, mysticism, and the retreat into artificiality. Authors include Huysmans, Poe, Mallarmé, Nietzsche, Nordau, d'Annunzio, Valry, Ungaretti, Marinetti, and Breton.

3-5 units, *Aut (Wittman, L)*

#### **ITALGEN 289. French and Italian Women Writers**

(Same as FRENGEN 289) How does women's writing evolve from the very early 20th century, when women's liberation movements first began and WW I brought major social changes, to the flowering of feminine writing in the 70s and beyond? What is the relationship between women writers and filmmakers, and feminism? Is it legitimate to consider women writers in a separate category? To what extent does a reevaluation of women writers mean reconsidering modern literary history? Authors and filmmakers include Aleramo, Yourcenar, de Beauvoir, Banti, Duras, Cavani.

3-5 units, not given this year

### **ITALGEN 301E. New Methods and Sources in French and Italian Studies**

(Same as FRENGEN 301E) Based on student interest. Changes in research methods: the use of digitized texts, resources, and databases available through Stanford Libraries; gateways. Emphasis is on strategies for exploration of broad and specialized topics through new and traditional methods. Using a flexible schedule based on enrollment and the level of students; knowledge, may be offered in forms including a shortened version on the basics, independent study, or a syllabus split over two quarters. Unit levels adjusted accordingly.

1-4 units, Spr (Sussman, S)

### **ITALGEN 369. Introduction to Graduate Studies: Criticism as Profession**

(Same as COMPLIT 369, FRENGEN 369, GERLIT 369) Based on a survey of (and a conversation about) the history of academic Literary Criticism, and on presentation (and discussion) of contemporary ;theoretical; positions, this seminar will try to enhance a reflection on the conditions, difficulties, and rewards of Literary Criticism as a profession ; and as an intellectual life form. Attention will be paid to the most relevant (and most pressing) institutional frame-conditions ; but this attention will not prevent us from trying to explore a (seldom used) potential of eccentricity and freedom that has always been inherent to (although sometimes dormant in) Literary Criticism.

5 units, Aut (Gumbrecht, H)

### **ITALGEN 395. Philosophical Reading Group**

(Same as COMPLIT 359A, FRENGEN 395) Discussion of one contemporary or historical text from the Western philosophical tradition per quarter in a group of faculty and graduate students. For admission of new participants, a conversation with H. U. Gumbrecht is required. May be repeated for credit.

1 unit, Aut (Gumbrecht, H), Win (Gumbrecht, H)

## ITALIAN LANGUAGE (ITALLANG) COURSES

### **UNDERGRADUATE COURSES IN ITALIAN LANGUAGE**

Primarily for undergraduates; graduate students may enroll with consent of adviser.

#### **ITALLANG 1. First-Year Italian, First Quarter**

All-in-Italian communicative and interactive approach. Emphasis is on the development of appropriate discourse in contemporary cultural contexts. Interpretation of authentic materials, written and oral presentations, and plenty of conversational practice. Language lab, multimedia, and online activities. requirement.

5 units, Aut (Montanari, D), Win (Tempesta, G), Spr (McCarty, A)

#### **ITALLANG 1A. Accelerated First-Year Italian, Part 1**

Accelerated sequence that completes first-year Italian in two rather than three quarters. For students with previous knowledge of Italian or with a strong background in another Romance language. Prerequisite: advanced-level proficiency in another Romance language Prerequisite placement test or consent of instructor.

5 units, Aut (Baldocchi, M), Win (Cellinese, A)

#### **ITALLANG 2. First-Year Italian, Second Quarter**

Continuation of 1. All-in-Italian communicative and interactive approach. Emphasis is on the development of appropriate discourse in contemporary cultural contexts. Interpretation of authentic materials, written and oral presentations, and plenty of conversational practice. Language lab, multimedia, and online activities. Prerequisite: placement test, 2 or consent of instructor.

5 units, Aut (Baldocchi, M), Win (Staff), Spr (Tempesta, G)

#### **ITALLANG 2A. Accelerated First-Year Italian, Part 2**

Continuation of 1A. Accelerated sequence that completes first-year Italian in two rather than three quarters. For students with previous knowledge of Italian or with a strong background in another Romance language. Prerequisite: placement test, 1A or consent of

instructor.. Fulfills the University language requirement.

5 units, Win (Baldocchi, M), Spr (Ferrando, S)

#### **ITALLANG 3. First-Year Italian, Third Quarter**

Continuation of 2. All-in-Italian communicative and interactive approach. Emphasis is on the development of appropriate discourse in contemporary cultural contexts. Interpretation of authentic materials, written and oral presentations, and plenty of conversational practice. Language lab, multimedia, and online activities. Prerequisite: placement test 2 or consent of instructor.. Fulfills the University language requirement.

5 units, Aut (Tempesta, G), Win (Alberti, G), Spr (Staff)

#### **ITALLANG 5A. Intensive First-Year Italian, Part A**

Same as ITALLANG 1. Accelerated. Covers 1 quarter of Italian. Emphasis is on the development of authentic discourse. Online activities, conversational practice, and interpretation and production of oral and written materials. Only Stanford graduate students restricted to 9 units may register for 205A,B,C.

5 units, Sum (Staff)

#### **ITALLANG 5B. Intensive First-Year Italian, Part B**

Same as ITALLANG 2. Continuation of 5A. Accelerated. Emphasis is on the development of authentic discourse. Online activities, conversational practice, and interpretation and production of oral and written materials. Only Stanford graduate students restricted to 9 units may register for 205A,B,C. Prerequisite 1 or 5A.

5 units, Sum (Staff)

#### **ITALLANG 5C. Intensive First-Year Italian, Part C**

Same as ITALLANG 3.. Continuation of 5B. Accelerated. Emphasis is on the development of authentic discourse. Online activities, conversational practice, and interpretation and production of oral and written materials. Only Stanford graduate students restricted to 9 units may register for 205A,B,C. Prerequisite 2 or 5B. Fulfills the University language requirement.

5 units, Sum (Staff)

#### **ITALLANG 15S. Intermediate Italian Oral Conversation**

May be repeated once for credit.

3 units, not given this year

#### **ITALLANG 20. Intermediate Oral Communication: Italy Today**

Second-year conversational and presentational skills developed through exposure to based on movie clips, slide shows, and other authentic multimedia materials. Guest lectures on Italian culture including opera, pop music, wine, and food culture. Preview of the Florentine experience with Florence returnees sharing their experiences in Italy. Prerequisite: 2A, 3 or consent of instructor.

3 units, Aut (Cellinese, A), Win (Tempesta, G), Spr (Tempesta, G)

#### **ITALLANG 21. Second Year Italian, First Quarter**

Second-Year Italian, First Quarter - Sequence integrating culture and language in the development of socioculturally appropriate discourse. Authentic materials include news and film clips, video and audio files, and short stories. Reading, writing, listening, and speaking competence based on cross cultural understanding. Prerequisite: placement test, 3 or consent of instructor.

3-4 units, Aut (Aquilanti, A)

#### **ITALLANG 21A. Accelerated Second-Year Italian, Part 1**

For students going to Florence. Completes second-year sequence in two rather than three quarters. Prerequisite: placement test, 2A,3 or consent of instructor.

4-5 units, Aut (McCarty, A), Win (McCarty, A), Spr (McCarty, A)

#### **ITALLANG 22. Second-Year Italian, Second Quarter**

Sequence integrating culture and language in the development of socioculturally appropriate discourse. Authentic materials include news and film clips, video and audio files, and short stories. Reading, writing, listening, and speaking competence based on cross-cultural understanding. Prerequisite: placement test, 21 or equivalent consent of instructor.

3-4 units, Win (Cellinese, A)

#### **ITALLANG 22A. Accelerated Second-Year Italian, Part 2**

Continuation of 21A or 21F (for Florence returnees). Part A of a second-year sequence in two rather than three quarters. Satisfies the foreign language requirement for International Relations

majors. Prerequisite: placement test, 21A or 21F.

4-5 units, *Aut (Baldocchi, M), Win (Baldocchi, M), Spr (Baldocchi, M)*

### ITALLANG 23. Second-Year Italian, Third Quarter

Continuation of 22. Sequence integrating culture and language in the development of socioculturally appropriate discourse. Authentic materials include news and film clips, video and audio files, and short stories. Reading, writing, listening, and speaking competence based on cross cultural understanding. Prerequisite: placement test, 22 or equivalent. Satisfies the foreign language requirement for International Relations majors.

3-4 units, *Spr (Baldocchi, M)*

### ITALLANG 99. Language Specials

Prerequisite: consent of instructor.

1-5 units, *Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

### ITALLANG 101. Advanced Oral Communication: Italian Opera

For Florence returnees or those who have completed second-year Italian. Use of opera excerpts by Leoncavallo, Puccini, Rossini, and Verdi to improve communication skills and review language functions. Emphasis is on presentation, conversation, and debate. Prerequisites: second-year Italian or equivalent.

3 units, *Aut (Cellinese, A)*

### ITALLANG 102. Advanced Oral Communication: Modern Cinema

For Florence returnees or those who have completed second-year Italian. Use of movie sequences by Italian film directors such as Benigni, Moretti, Salvatores, Soldini, and Tornatore to improve communication skills and review language functions. Emphasis is on presentation, conversation, and debate. Prerequisite: placement test, 101 or consent of instructor.

3 units, *not given this year*

### ITALLANG 103. Advanced Oral Communication: Italian Classic Cinema

For Florence returnees or those who have completed second-year Italian. Use of classical movie sequences by Italian film directors such as Antonioni, De Sica, Fellini, Rossellini, and Visconti to improve communication skills and review language functions. Emphasis is on presentation, conversation, and debate. Prerequisites: second-year Italian or consent of instructor.

3 units, *Aut (Cellinese, A)*

### ITALLANG 113. Italian Cultural Studies

Literary texts, news reports, comic books, film reviews, music lyrics, and sociological surveys used to examine Italy's language, culture, and society today. Advanced grammatical analysis and reading comprehension. Prerequisite: second-year Italian or equivalent.

3-4 units, *not given this year*

### ITALLANG 114. Advanced Stylistics and Composition

Goal is advanced proficiency in written Italian. Textual and grammatical analysis of literary and non-literary texts, oral reports, translations, and writing assignments. Prerequisite: second-year Italian or equivalent.

3-4 units, *Win (Baldocchi, M)*

### ITALLANG 115. Academic and Creative Writing

Continuation of 114. Academic prose: formal structures and academic terminology. Creative prose: short stories, expressive language, and when and how to break the rules for effect. Prerequisite: second-year Italian or equivalent.

3-4 units, *Spr (Baldocchi, M)*

### ITALLANG 126. Italy and Italians Today

May be repeated for credit.

2 units, *Aut (Aquilanti, A), Win (Aquilanti, A), Spr (Aquilanti, A)*

## GRADUATE COURSES IN ITALIAN LANGUAGE

Primarily for graduate students; undergraduates may enroll with consent of instructor.

### ITALLANG 205A. Intensive First-Year Italian for Stanford Grads, Part A

Same as ITALLANG 5A. Accelerated. Emphasis is on the development of authentic discourse. Online activities,

conversational practice, and interpretation and production of oral and written materials. Only Stanford graduate students restricted to 9 units may register for 205A,B,C or 2 of the courses for a total of 9 units.

3-5 units, *Sum (Staff)*

### ITALLANG 205B. Intensive First-Year Italian for Stanford Grads, Part B

Same as ITALLANG 5B. Accelerated. Emphasis is on the development of authentic discourse. Online activities, conversational practice, and interpretation and production of oral and written materials. Only Stanford graduate students restricted to 9 units may register for 205A,B,C or 2 of the courses for a total of 9 units Prerequisite 205A or equivalent.

3-5 units, *Sum (Staff)*

### ITALLANG 205C. Intensive First-Year Italian for Stanford Grads, Part C

Same as ITALLANG 5C. Accelerated. Emphasis is on the development of authentic discourse. Online activities, conversational practice, and interpretation and production of oral and written materials. Only Stanford graduate students restricted to 9 units may register for 205A,B,C or 2 of the courses for a total of 9 units Prerequisite 205B or equivalent.

3-5 units, *Sum (Staff)*

### ITALLANG 250. Reading Italian

For seniors or graduate students seeking to meet the University reading requirement for advanced degrees. Reading strategies for comprehension of secondary literature for academic research. Fulfills the University foreign language requirement for advanced degrees if student earns a grade of 'B.' Prerequisite: one year of Italian or reading proficiency in another Romance language.

3 units, *Spr (Staff)*

### ITALLANG 394. Graduate Studies in Italian Conversation

Prerequisite: consent of instructor. (Staff)

1-3 units, *Aut (Staff), Win (Staff), Spr (Staff)*

### ITALLANG 395. Graduate Studies in Italian

Prerequisite: consent of instructor. (Staff)

2-5 units, *Aut (Staff), Win (Staff), Spr (Staff)*

## ITALIAN LITERATURE (ITALLIT) COURSES

### UNDERGRADUATE COURSES IN ITALIAN LITERATURE

Primarily for undergraduates; graduate students may enroll with consent of adviser.

### ITALLIT 45N. Italianità: Photography / Literature / Film

(F,Sem) Stanford Introductory Seminar. Stanford Introductory Seminar. Preference to freshmen. Introduction to the question of Italianità, or Italian-ness, through the intersection of photography with modern Italian literature and cinema. Includes an exploration of alternative identities and visual culture in Italy. Excerpts from seminal pieces of Italian literature, women writers, hybrid works such as phototexts, and Italian films. A gateway course to a major or minor in Italian studies and forum for improving written and oral proficiency. Lecture, discussions and readings in Italian. Prerequisite: students must have two years of college-level Italian(or equivalent).

4 units, *Aut (Carey, S)*

### ITALLIT 127. Inventing Italian Literature: Dante, Boccaccio, Petrarca

The origins of Italian literature. Poetry such as 13th-century love lyrics, Dante's Vita Nuova, and Petrarca's Canzoniere; prose such as stories from Boccaccio's Decameron. Prerequisite: ITALLANG 22A or equivalent. GER:DB-Hum, WIM

4 units, *Aut (Springer, C)*

### ITALLIT 128. The Italian Renaissance and the Path to Modernity

The literature, art, and history of the Renaissance and beyond. Readings from the 15th through 18th centuries include Moderata

Fonte, Machiavelli, Ariosto, Tasso, Galileo, and Goldoni. Prerequisite: ITALLANG 22A or equivalent. GER:DB-Hum, WIM

4 units, Win (Springer, C)

#### **ITALLIT 129. Modern Italian History and Literature**

The history of the Italian nation and national literary identity in the 19th and 20th centuries. The relationship between literary texts and their historical context from the Risorgimento to the Resistance. Focus is on the romantic lyric, futurism, fascism, and the changing status of women. Authors include Foscolo, Leopardi, D'Annunzio, Aleramo, Marinetti, Pirandello, Ungaretti, and Montale. Prerequisite: ITALLANG 22A or equivalent. GER:DB-Hum, WIM

4 units, Spr (Staff)

#### **ITALLIT 189A. Honors Research**

Senior honors students enroll for 5 units in Winter while writing the honors thesis, and may enroll in 189B for 2 units in Spring while revising the thesis. Prerequisite: DLCL 189.

5 units, Win (Staff)

#### **ITALLIT 189B. Honors Research**

Open to juniors with consent of adviser while drafting honors proposal. Open to senior honors students while revising honors thesis. Prerequisites for seniors: 189A, DLCL 189.

2 units, Spr (Staff)

#### **ITALLIT 199. Individual Work**

1-12 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

## **GRADUATE COURSES IN ITALIAN LITERATURE**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

#### **ITALLIT 260. «Noi credevamo»: Images of the Italian Risorgimento**

Senso by Boito and Visconti, Nievo's Confessioni, the new interpretations of the historian Alberto Maria Banti, Mario Martone's Noi credevamo, Umberto Eco's Il cimitero di Praga.

3-5 units, Win (Ceserani, R)

#### **ITALLIT 285. Identity in Modern Italian Fiction**

The quest for a modern identity in the 20th-century Italian novel. The construction of subjectivity as it relates to changes brought about by modernity in Italy, such as mass culture, nationalism, industrialization, feminism, war, secularization, migration, and ethnic diversity. Fiction by Svevo, Pirandello, Calvino, Banti, and Tabucchi. In Italian.

3-5 units, Win (Wittman, L)

#### **ITALLIT 299. Individual Work**

1-12 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

#### **ITALLIT 399. Individual Work**

For graduate students working on a special project or predissertation research. May be repeated for credit.

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

#### **ITALLIT 802. TGR Dissertation**

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

## **JAPANESE GENERAL (JAPANGEN) COURSES**

### **UNDERGRADUATE COURSES IN JAPANESE GENERAL**

Primarily for undergraduates; graduate students may enroll with consent of adviser.

#### **JAPANGEN 51. Japanese Business Culture**

(Same as JAPANGEN 251) Japanese group dynamics in industrial and corporate structures, negotiating styles, decision making, and crisis management. Strategies for managing intercultural differences.

3-5 units, Win (Dasher, R)

#### **JAPANGEN 60. Asian Art and Culture**

(Same as ARTHIST 2) The religious and philosophical ideas and social attitudes of India, China, and Japan and how they are expressed in architecture, painting, woodblock prints, sculpture, and in such forms as garden design and urban planning. GER:DB-Hum, EC-GlobalCom

5 units, Win (Vinograd, R)

#### **JAPANGEN 75N. Around the World in Seventeen Syllables:**

##### **Haiku in Japan, the U.S., and the Digital World**

Preference to freshmen. Origins of the haiku form in Japan, its place in the discourse of Orientalism during the 19th and early 20th centuries in the West, its appropriation by U.S. devotees of Zen and the beat poets after WW II, and its current transformation into a global form through the Internet. GER:DB-Hum

3-4 units, not given this year

#### **JAPANGEN 79. Japanese Ghosts: The Supernatural in**

##### **Japanese Art and Entertainment**

(Same as JAPANGEN 179) The complex meanings of ghosts in Japanese culture. Representations of the supernatural in images, drama, oral narratives, prose, film, comics and animation at different moments in Japanese history. GER:DB-Hum, EC-GlobalCom

4 units, not given this year

#### **JAPANGEN 82N. Joys and Pains of Growing Up and Older:**

##### **Secret Lives of Old People in Japan**

(F,Sem) Stanford Introductory Seminar. Lives of older individuals, their responses to changing social and physical realities and self image, particularly through verbal communication. Special focus on Japan, which is the world's fastest growing elderly population, as a point of comparison in terms of culture, including issues of gender. Introduction to recent multidisciplinary studies on aging and concepts such as frame analysis as a tool to interpret verbal interactions. Through qualitative cross-generational and cross-cultural examinations of lives and verbal representations of old people, students will gain a deeper understanding of the complex human quality of older people and of the relevance of elders' lives to their own. GER:DB-Hum

3 units, Win (Matsumoto, Y)

#### **JAPANGEN 84. Aristocrats, Warriors, Sex Workers, and**

##### **Barbarians: Lived Life in Early Modern Japanese Painting**

Changes marking the transition from medieval to early modern Japanese society that generated a revolution in visual culture, as exemplified in subjects deemed fit for representation; how commoners joined elites in pictorializing their world, catalyzed by interactions with the Dutch. GER:DB-Hum

4 units, not given this year

#### **JAPANGEN 92. Traditional East Asian Culture: Japan**

Required for Chinese and Japanese majors. Introduction to Japanese culture in historical context. Previous topics include: shifting paradigms of gender relations and performance, ancient mythology, court poetry and romance, medieval war tales, and the theaters of Noh, Bunraku, and Kabuki. GER:DB-Hum, EC-GlobalCom

5 units, Win (Takeuchi, M)

#### **JAPANGEN 121. Translating Japan, Translating the West**

(Same as JAPANGEN 221) Translation lies at the heart of all intercultural exchange. This course introduces students to the specific ways in which translation has shaped the image of Japan in the West, the image of the West in Japan, and Japan's self-image in the modern period. What texts and concepts were translated by each side, how, and to what effect? No prior knowledge of Japanese language necessary. GER:DB-Hum

3-4 units, Aut (Levy, I)

#### **JAPANGEN 124. Manga as Literature**

Analysis of representative manga as narratives that combine verbal and visual elements, with attention to historical and cultural background. Representative manga by Tezuka Osamu, Tatsumi Yoshihiro, Koike Kazuo, Taniguchi Jiro, Natsume Ono, Kono Fumiyo, and others. All readings in English. GER:DB-Hum

3-5 units, Spr (Carter, S)

#### **JAPANGEN 137. Classical Japanese Literature in Translation**

(Same as JAPANGEN 237) Prose, poetry, and drama from the 10th-19th centuries. Historical, intellectual, and cultural context.

Works vary each year. May be repeated for credit with consent of instructor. GER:DB-Hum, DB-Hum

*4 units, not given this year*

**JAPANGEN 138. Survey of Modern Japanese Literature in Translation**

(Same as JAPANGEN 238) Required for Japanese majors. Japanese literature since 1868. Authors include Futabatei Shimei, Higuchi Ichiyo, Natsume Soseki, and Yoshimoto Banana. GER:DB-Hum, EC-GlobalCom

*3-4 units, Spr (Reichert, J)*

**JAPANGEN 141. Japanese Performance Traditions**

(Same as JAPANGEN 241) Major paradigms of gender in Japanese performance traditions from ancient to modern times, covering Noh, Kabuki, Bunraku, and Takarazuka. GER:DB-Hum

*3-4 units, Spr (Levy, I)*

**JAPANGEN 148. Modern Japanese Narratives: Literature and Film**

(Same as JAPANGEN 248) Central issues in modern Japanese visual and written narrative. Focus is on competing views of modernity, war, and crises of individual and collective identity and responsibility. Directors and authors include Kurosawa, Mizoguchi, Ozu, Ogai, Akutagawa, Tanizaki, Abe, and Oe. GER:DB-Hum, EC-GlobalCom

*3-5 units, not given this year*

**JAPANGEN 149. Screening Japan: Issues in Crosscultural Interpretation**

(Same as JAPANGEN 249) Is the cinematic language of moving images universal? How have cultural differences, political interests, and genre expectations affected the ways in which Japanese cinema makes meaning across national borders? Sources include the works of major Japanese directors and seminal works of Japanese film criticism, theory, and scholarship in English. No Japanese language skills required. GER:DB-Hum

*3-4 units, not given this year*

**JAPANGEN 160. Early Modern Japan: The Floating World of Chikamatsu**

(Same as JAPANGEN 260) Early modern Japan as dramatized in the puppet theater of Chikamatsu Monzaemon (1653-1725), Japan's leading dramatist, who depicted militarization, commercialization, and urbanization in the Tokugawa period (1603-1868). Emperors, shogun, daimyo, samurai, merchants, monks, geisha, and masterless ronin in his bunraku plays as denizens of a floating world. Themes of loyalty, love, heroism, suicide, and renunciation in the early modern world. In English.

*4 units, not given this year*

**JAPANGEN 179. Japanese Ghosts: The Supernatural in Japanese Art and Entertainment**

(Same as JAPANGEN 79) The complex meanings of ghosts in Japanese culture. Representations of the supernatural in images, drama, oral narratives, prose, film, comics and animation at different moments in Japanese history. GER:DB-Hum, EC-GlobalCom

*4 units, not given this year*

**JAPANGEN 185. Arts of War and Peace: Late Medieval and Early Modern Japan, 1500-1868**

(Same as ARTHIST 187, ARTHIST 387) Narratives of conflict, pacification, orthodoxy, nostalgia, and novelty through visual culture during the change of episteme from late medieval to early modern, 16th through early 19th centuries. The rhetorical messages of castles, teahouses, gardens, ceramics, paintings, and prints; the influence of Dutch and Chinese visuality; transformation in the roles of art and artist; tensions between the old and the new leading to the modernization of Japan. GER:DB-Hum, EC-GlobalCom

*4 units, not given this year*

**JAPANGEN 186. Theme and Style in Japanese Art**

(Same as ARTHIST 186, ARTHIST 386, JAPANGEN 286) Monuments in traditional Japanese architecture, sculpture, garden design, painting, prints, and pots, through the 19th century. Chronological framework emphasizes the role of these objects play in visualizing the ideals of the society they represent. GER:DB-Hum

*4 units, Aut (Takeuchi, M)*

**JAPANGEN 187. Romance, Desire, and Sexuality in Modern Japanese Literature**

(Same as JAPANGEN 287) Constructions of romance, desire, and sexuality such as sexual connoisseurship, love suicide, and nanshoku in Edo Japan. How these paradigms are reconfigured by modern writers. Readings: Saikaku, Chikamatsu, Ichiyo, Soseki, Tanizaki, and Mishima. GER:DB-Hum, EC-Gender

*3-4 units, Aut (Reichert, J)*

**JAPANGEN 198. Senior Colloquium in Japanese Studies**

(Same as KORGEN 198) Research, write, and present capstone essay or honors thesis.

*1 unit, Win (Matsumoto, Y)*

**GRADUATE COURSES IN JAPANESE GENERAL**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**JAPANGEN 200. Directed Reading in Asian Languages**

For Japanese literature. Prerequisite: consent of instructor. (Staff)

*1-12 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**JAPANGEN 201. Teaching Japanese Humanities**

Prepares graduate students to teach humanities at the undergraduate level. Topics include syllabus development and course design, techniques for generating discussion, effective grading practices, and issues particular to the subject matter.

*1 unit, not given this year*

**JAPANGEN 220. The Situation of the Artist in Traditional Japan**

(Same as ARTHIST 485) Topics may include: workshop production such as that of the Kano and Tosa families; the meaning of the signature on objects including ceramics and tea wares; the folk arts movement; craft guilds; ghost painters in China; individualism versus product standardization; and the role of lineage. How works of art were commissioned; institutions supporting artists; how makers purveyed their goods; how artists were recognized by society; the relationship between patrons, desires and artists; modes of production.

*5 units, not given this year*

**JAPANGEN 221. Translating Japan, Translating the West**

(Same as JAPANGEN 121) Translation lies at the heart of all intercultural exchange. This course introduces students to the specific ways in which translation has shaped the image of Japan in the West, the image of the West in Japan, and Japan's self-image in the modern period. What texts and concepts were translated by each side, how, and to what effect? No prior knowledge of Japanese language necessary.

*3-4 units, Aut (Levy, I)*

**JAPANGEN 237. Classical Japanese Literature in Translation**

(Same as JAPANGEN 137) Prose, poetry, and drama from the 10th-19th centuries. Historical, intellectual, and cultural context. Works vary each year. May be repeated for credit with consent of instructor.

*4 units, not given this year*

**JAPANGEN 238. Survey of Modern Japanese Literature in Translation**

(Same as JAPANGEN 138) Required for Japanese majors. Japanese literature since 1868. Authors include Futabatei Shimei, Higuchi Ichiyo, Natsume Soseki, and Yoshimoto Banana.

*3-4 units, Spr (Reichert, J)*

**JAPANGEN 241. Japanese Performance Traditions**

(Same as JAPANGEN 141) Major paradigms of gender in Japanese performance traditions from ancient to modern times, covering Noh, Kabuki, Bunraku, and Takarazuka.

*3-4 units, Spr (Levy, I)*

**JAPANGEN 248. Modern Japanese Narratives: Literature and Film**

(Same as JAPANGEN 148) Central issues in modern Japanese visual and written narrative. Focus is on competing views of modernity, war, and crises of individual and collective identity and responsibility. Directors and authors include Kurosawa, Mizoguchi, Ozu, Ogai, Akutagawa, Tanizaki, Abe, and Oe.

*3-5 units, not given this year*

**JAPANGEN 249. Screening Japan: Issues in Crosscultural Interpretation**

(Same as JAPANGEN 149) Is the cinematic language of moving images universal? How have cultural differences, political interests, and genre expectations affected the ways in which Japanese cinema makes meaning across national borders? Sources include the works of major Japanese directors and seminal works of Japanese film criticism, theory, and scholarship in English. No Japanese language skills required.

*3-4 units, not given this year*

**JAPANGEN 251. Japanese Business Culture**

(Same as JAPANGEN 51) Japanese group dynamics in industrial and corporate structures, negotiating styles, decision making, and crisis management. Strategies for managing intercultural differences.

*3-5 units, Win (Dasher, R)*

**JAPANGEN 260. Early Modern Japan: The Floating World of Chikamatsu**

(Same as JAPANGEN 160) Early modern Japan as dramatized in the puppet theater of Chikamatsu Monzaemon (1653-1725), Japan's leading dramatist, who depicted militarization, commercialization, and urbanization in the Tokugawa period (1603-1868). Emperors, shogun, daimyo, samurai, merchants, monks, geisha, and masterless ronin in his bunraku plays as denizens of a floating world. Themes of loyalty, love, heroism, suicide, and renunciation in the early modern world. In English.

*4 units, not given this year*

**JAPANGEN 286. Theme and Style in Japanese Art**

(Same as ARTHIST 186, ARTHIST 386, JAPANGEN 186) Monuments in traditional Japanese architecture, sculpture, garden design, painting, prints, and pots, through the 19th century. Chronological framework emphasizes the role of these objects play in visualizing the ideals of the society they represent.

*4 units, Aut (Takeuchi, M)*

**JAPANGEN 287. Romance, Desire, and Sexuality in Modern Japanese Literature**

(Same as JAPANGEN 187) Constructions of romance, desire, and sexuality such as sexual connoisseurship, love suicide, and nanshoku in Edo Japan. How these paradigms are reconfigured by modern writers. Readings: Saikaku, Chikamatsu, Ichiyo, Soseki, Tanizaki, and Mishima.

*3-4 units, Aut (Reichert, J)*

**JAPANGEN 287A. The Japanese Tea Ceremony: The History, Aesthetics, and Politics Behind a National Pastime**

(Same as ARTHIST 287A) The tea ceremony, a premodern multimedia phenomenon, integrates architecture, garden design, ceramics, painting, calligraphy, and treasured objects into a choreographed ritual wherein host, objects, and guests perform roles on a tiny stage. Aesthetic, philosophical, and political dimensions. The evolution of tea taste including its inception in Zen monasteries, use for social control during the 16th century, the development of a class of tea connoisseurs, and 20th-century manipulation by the emerging industrialist class.

*5 units, Spr (Takeuchi, M)*

## JAPANESE LANGUAGE (JAPANLNG) COURSES

### UNDERGRADUATE COURSES IN JAPANESE LANGUAGE

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**JAPANLNG 4A. First -Year Japanese Language Essentials, First Quarter**

(Formerly JAPANLNG 7A.) For students who want to build communication skills in limited time. Online listening exercises, audiovisual materials, kanji exercises. See [http://japanese.stanford.edu/?page\\_id=73](http://japanese.stanford.edu/?page_id=73).

*3 units, Aut (Yasumoto Magnani, E)*

**JAPANLNG 4B. First-Year Japanese Language Essentials,**

**Second Quarter**

(Formerly JAPANLNG 8A.) Continuation of 4A. For students who want to build communication skills in limited time. Online listening exercises, audiovisual materials, kanji exercises. Prerequisite JAPANLNG 4A or consent of instructor. See [http://japanese.stanford.edu/?page\\_id=73](http://japanese.stanford.edu/?page_id=73).

*3 units, Win (Yasumoto Magnani, E)*

**JAPANLNG 4C. First-Year Japanese Language Essentials, Third Quarter**

(Formerly JAPANLNG 9A.) Continuation of 4B. For students who want to build communication skills in limited time. Online listening exercises, audiovisual materials, kanji exercises. Prerequisite JAPANLNG 4B or consent of instructor. See [http://japanese.stanford.edu/?page\\_id=73](http://japanese.stanford.edu/?page_id=73).

*3 units, Spr (Yasumoto Magnani, E)*

**JAPANLNG 5. Intensive First-Year Japanese Language**

Equivalent to 7, 8, and 9 combined. See [http://japanese.stanford.edu/?page\\_id=323](http://japanese.stanford.edu/?page_id=323). Same as 305.

*12-15 units, Sum (Staff)*

**JAPANLNG 7. First-Year Japanese Language, Culture, and Communication, First Quarter**

(Formerly JAPANLNG 7B.) First-year sequence enables students to converse, write, and read essays on topics such as personal history, experiences, familiar people. 300 kanji characters. See [http://japanese.stanford.edu/?page\\_id=5](http://japanese.stanford.edu/?page_id=5).

*5 units, Aut (Lipton, H; Yasumoto Magnani, E)*

**JAPANLNG 8. First-Year Japanese Language, Culture, and Communication, Second Quarter**

(Formerly JAPANLNG 8B.) Continuation of 7. First-year sequence enables students to converse, write, and read essays on topics such as personal history, experiences, familiar people. Prerequisite: placement test, 7 or consent of instructor. 300 kanji characters. [http://japanese.stanford.edu/?page\\_id=5](http://japanese.stanford.edu/?page_id=5).

*5 units, Win (Lipton, H)*

**JAPANLNG 9. First-Year Japanese Language, Culture, and Communication, Third Quarter**

(Formerly JAPANLNG 9B.) Continuation of 8. First-year sequence enables students to converse, write, and read essays on topics such as personal history, experiences, familiar people. Fulfills University Foreign Language Requirement. Prerequisite: placement test, 8 or consent of instructor. 300 kanji characters. [http://japanese.stanford.edu/?page\\_id=5](http://japanese.stanford.edu/?page_id=5).

*5 units, Spr (Lipton, H)*

**JAPANLNG 11A. Intermediate Japanese Conversation, First Quarter**

(Formerly JAPANLNG 27.) Develops oral proficiency through simple sentence patterns, audio materials, and oral presentations. For the practical use of Japanese. Prerequisite: 3, 9, or consent of instructor.

*2 units, Aut (Busbin, K)*

**JAPANLNG 11B. Intermediate Japanese Conversation, Second Quarter**

(Formerly JAPANLNG 28.) Continuation of 11A. Develops oral proficiency through simple sentence patterns, audio materialstapes, and oral presentations. For the practical use of Japanese. Prerequisite: 11A or consent of the instructor.

*2 units, Win (Busbin, K)*

**JAPANLNG 11C. Intermediate Japanese Conversation, Third Quarter**

(Formerly JAPANLNG 29.) Continuation of 11B. Develops oral proficiency through simple sentence patterns, audio materials, and oral presentations. For the practical use of Japanese. Prerequisite: 11B or consent of instructor.

*2 units, Spr (Busbin, K)*

**JAPANLNG 14A. Second-Year Japanese Language Essentials, First Quarter**

(Formerly JAPANLNG 17A.) Continuation of 4C. For students who want to build communication skills in limited time. Prerequisite: 4C or consent of instructor. [http://japanese.stanford.edu/?page\\_id=89](http://japanese.stanford.edu/?page_id=89).

*3 units, Aut (Fu, M)*

**JAPANLNG 14B. Second-Year Japanese Language Essentials,**



**Second Quarter**

(Formerly JAPANLNG 18A.) Continuation of 14A. For students who want to build communication skills in limited time. Prerequisite: 14A or consent of instructor. [http://japanese.stanford.edu/?page\\_id=89](http://japanese.stanford.edu/?page_id=89)  
3 units, Win (Yasumoto Magnani, E)

**JAPANLNG 14C. Second-Year Japanese Language Essentials, Third Quarter**

(Formerly JAPANLNG 19A.) Continuation of 14B. For students who want to build communication skills in limited time. Prerequisite: 14B or consent of instructor. [http://japanese.stanford.edu/?page\\_id=89](http://japanese.stanford.edu/?page_id=89).  
3 units, Spr (Fu, M)

**JAPANLNG 15A. Accelerated Japanese, Part 1**

Recommended for students with previous knowledge of Japanese who place into 15A on the placement test. The completion of 15A and 15B (offered in the subsequent quarter) fulfills the University foreign language requirement. Prerequisite: Japanese placement test. See [http://japanese.stanford.edu/g/?page\\_id=259](http://japanese.stanford.edu/g/?page_id=259).  
5 units, Win (Staff)

**JAPANLNG 15B. Accelerated Japanese, Part 2**

Continuation of 15A. Second half of the two-quarter sequence. Recommended for students with previous knowledge of Japanese who place into 15B on the placement test or who have completed 15A. Completion of 15B fulfills the University foreign language requirement. Prerequisite: 15A or Japanese placement test. See [http://japanese.stanford.edu/g/?page\\_id=259](http://japanese.stanford.edu/g/?page_id=259).  
5 units, Spr (Staff)

**JAPANLNG 17. Second-Year Japanese Language, Culture, and Communication, First Quarter**

(Formerly JAPANLNG 17B.) Goal is to further develop and enhance spoken and written Japanese in order to handle advanced concepts such as comparison and contrast of the two cultures, descriptions of incidents, and social issues. 800 kanji, 1,400 new words, and higher-level grammatical constructions. Readings include authentic materials such as newspaper articles, and essays. Prerequisite: 9 or consent of instructor. See [http://japanese.stanford.edu/?page\\_id=23](http://japanese.stanford.edu/?page_id=23)  
5 units, Aut (Lowdermilk, M; Yamamoto, C)

**JAPANLNG 18. Second-Year Japanese Language, Culture, and Communication, Second Quarter**

Goal is to further develop and enhance spoken and written Japanese in order to handle advanced concepts such as comparison and contrast of the two cultures, descriptions of incidents, and social issues. 800 kanji, 1,400 new words, and higher-level grammatical constructions. Readings include authentic materials such as newspaper articles, and essays. Prerequisite: 17 or consent of instructor. See [http://japanese.stanford.edu/?page\\_id=23](http://japanese.stanford.edu/?page_id=23).  
5 units, Win (Lowdermilk, M)

**JAPANLNG 19. Second-Year Japanese Language, Culture, and Communication, Third Quarter**

Goal is to further develop and enhance spoken and written Japanese in order to handle advanced concepts such as comparison and contrast of the two cultures, descriptions of incidents, and social issues. 800 kanji, 1,400 new words, and higher-level grammatical constructions. Readings include authentic materials such as newspaper articles, and essays. (Formerly JAPANLNG 18B.) Prerequisite: 18 or consent of instructor. [http://japanese.stanford.edu/?page\\_id=23](http://japanese.stanford.edu/?page_id=23).  
5 units, Spr (Lowdermilk, M)

**JAPANLNG 20. Intensive Second-Year Japanese**

JAPANLNG 20: Intensive Second-Year Japanese Equivalent to 17,18,19 combined. Prerequisite: 9 or consent of instructor. Same as 320. See [http://japanese.stanford.edu?page\\_id=323](http://japanese.stanford.edu?page_id=323).  
12-15 units, Sum (Staff)

**JAPANLNG 31A. Intermediate to Advanced Conversation, First Quarter**

Oral proficiency through role play, oral presentations, and discussion. Recommended for those who have participated in Kyoto SCTI program May be taken concurrently with 17, 18, and 19. Prerequisite: 9K, or consent of instructor. [http://japanese.stanford.edu/?page\\_id=421](http://japanese.stanford.edu/?page_id=421).  
2 units, Aut (Tomiyama, Y)

**JAPANLNG 31B. Intermediate to Advanced Conversation, Second Quarter**

Continuation of 31A. (Oral proficiency through role play, oral presentations, and discussion. Recommended for those who have participated in Kyoto SCTI program May be taken concurrently with 17, 18, and 19. Prerequisite: 31A or consent of instructor. [http://japanese.stanford.edu/?page\\_id=421](http://japanese.stanford.edu/?page_id=421).  
2 units, Win (Tomiyama, Y)

**JAPANLNG 31C. Intermediate to Advanced Conversation, Third Quarter**

(Continuation of 31B. Oral proficiency through role play, oral presentations, and discussion. Recommended for those who have participated in Kyoto SCTI program May be taken concurrently with 17, 18, and 19. Prerequisite: 32B or consent of instructor. [http://japanese.stanford.edu/?page\\_id=421](http://japanese.stanford.edu/?page_id=421)  
2 units, Spr (Tomiyama, Y)

**JAPANLNG 99. Language Specials**

Prerequisite: consent of instructor. (Staff)  
1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**JAPANLNG 104A. Japanese for Professionals, First Quarter**

Recommended for students who have the basic grammatical foundation (equivalent to completion of 14C or 9), and are ready to develop further communication skills in a limited time not only in their field of interest but also in a professional environment. Prerequisite: 14C, 9 or consent of instructor. See [http://japanese.stanford.edu/?page\\_id=223](http://japanese.stanford.edu/?page_id=223).  
3 units, Aut (Knickerbocker, N)

**JAPANLNG 104B. Japanese for Professionals, Second Quarter**

Continuation of 104A. Recommended for students who have the basic grammatical foundation, and are ready to develop further communication skills in a limited time not only in their field of interest but also in a professional environment. Prerequisite: 104A or consent of instructor. See [http://japanese.stanford.edu/?page\\_id=223](http://japanese.stanford.edu/?page_id=223).  
3 units, Win (Staff)

**JAPANLNG 104C. Japanese for Professionals, Third Quarter**

Continuation of 104B. Recommended for students who have the basic grammatical foundation, and are ready to develop further communication skills in a limited time not only in their field of interest but also in a professional environment. Prerequisite: 104B or consent of instructor. See [http://japanese.stanford.edu/?page\\_id=223](http://japanese.stanford.edu/?page_id=223).  
3 units, Spr (Staff)

**JAPANLNG 111. Business Japanese, First Quarter**

Topics include cultural attitudes and approaches, work ethic, the stock market, import-export trade. Business letters, job interviews, and resume writing. May be repeated for credit. In Japanese. Prerequisite: 23, 29, or 19, or consent of instructor.  
3 units, not given this year

**JAPANLNG 111A. Advanced Japanese Conversation, First Quarter**

(Formerly JAPANLNG 121.) Focus is on improving speaking skills to narrate and describe things in detail. Audiovisual materials and oral presentations. Prerequisite: 19K, 31C, or consent of instructor. [http://japanese.stanford.edu/?page\\_id=417](http://japanese.stanford.edu/?page_id=417).  
2 units, Aut (Lipton, H)

**JAPANLNG 111B. Advanced Japanese Conversation, Second Quarter**

(Formerly JAPANLNG 122.) Continuation of 111A. Focus is on improving speaking skills to narrate and describe in detail. Audiovisual materials and oral presentations. Prerequisite: 19K, 31C, or consent of instructor Prerequisite: 111A or consent of instructor. [http://japanese.stanford.edu/?page\\_id=417](http://japanese.stanford.edu/?page_id=417).  
2 units, Win (Yasumoto Magnani, E)

**JAPANLNG 111C. Advanced Japanese Conversation, Third Quarter**

(Formerly JAPANLNG 123.) Continuation of 111B. Focus is on improving speaking skills to narrate and describe in detail. Audiovisual materials and oral presentations. Prerequisite: 111B, or consent of instructor. [http://japanese.stanford.edu/?page\\_id=417](http://japanese.stanford.edu/?page_id=417).  
2 units, Spr (Lowdermilk, M)



**JAPANLNG 112. Business Japanese, Second Quarter**

Continuation of 111. Topics include cultural attitudes and approaches, work ethic, the stock market, import-export trade. Business letters, job interviews, and resume writing. May be repeated for credit. In Japanese. Prerequisite: 111 or consent of instructor.

3 units, not given this year

**JAPANLNG 113. Business Japanese, Third Quarter**

Continuation of 112. Topics include cultural attitudes and approaches, work ethic, the stock market, import-export trade. Business letters, job interviews, and resume writing. May be repeated for credit. In Japanese. Prerequisite: 112, or consent of instructor.

3 units, not given this year

**JAPANLNG 114F. Japanese Through Film, Part 1**

Contemporary Japanese culture through Japanese films, documentaries, news, and TV dramas. Structured for students with a strong desire to advance their Japanese communication skills quickly and who have limited class preparation time. In-depth discussion and exploration of current issues, cultural icons, idiomatic expressions and nonverbal social cues. Prerequisite: 19 or consent of instructor. See

[http://japanese.stanford.edu/?page\\_id=255](http://japanese.stanford.edu/?page_id=255).

4 units, Win (Nakamura, K)

**JAPANLNG 115F. Japanese Through Film, Part 2**

Continuation of 114F. Contemporary Japanese culture through Japanese films, documentaries, news, and TV dramas. Structured for students with a strong desire to advance their Japanese communication skills quickly and who have limited class preparation time. In-depth discussion and exploration of current issues, cultural icons, idiomatic expressions and nonverbal social cues. Prerequisite: 114F, 117 or consent of instructor.

4 units, Spr (Staff)

**JAPANLNG 117. Third-Year Japanese Language, Culture, and Communication, First Quarter**

(Formerly JAPANLNG 127B.) Goal is to express thoughts and opinions in paragraph length in spoken and written forms. Materials include current Japanese media and literature for native speakers of Japanese. Cultural and social topics related to Japan and its people. Prerequisite 19, or consent of instructor. See

[http://japanese.stanford.edu/?page\\_id=39](http://japanese.stanford.edu/?page_id=39).

5 units, Aut (Nakamura, K; Tomiyama, Y)

**JAPANLNG 118. Third-Year Japanese Language, Culture, and Communication, Second Quarter**

(Formerly JAPANLNG 128B.) Continuation of 117. Goal is to express thoughts and opinions in paragraph length in spoken and written forms. Materials include current Japanese media and literature for native speakers of Japanese. Cultural and social topics related to Japan and its people. Prerequisite: 117 or consent of instructor. See

[http://japanese.stanford.edu/?page\\_id=39](http://japanese.stanford.edu/?page_id=39).

5 units, Win (Tomiyama, Y)

**JAPANLNG 119. Third-Year Japanese Language, Culture, and Communication, Third Quarter**

(Formerly JAPANLNG 129B.) Continuation of 118. Goal is to express thoughts and opinions in paragraph length in spoken and written forms. Materials include current Japanese media and literature for native speakers of Japanese. Cultural and social topics related to Japan and its people. Prerequisite: 118 or consent of instructor. See

[http://japanese.stanford.edu/?page\\_id=39](http://japanese.stanford.edu/?page_id=39) Prerequisite: 5 units, Spr (Nakamura, K)

**GRADUATE COURSES IN JAPANESE LANGUAGE**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**JAPANLNG 32G. Accelerated Beginning Business Japanese II**

For GSB students only. Limited enrollment.

4 units, not given this year

**JAPANLNG 33G. Accelerated Beginning Business Japanese III**

For GSB students only. Limited enrollment.

4 units, not given this year

**JAPANLNG 200. Directed Reading**

Prerequisite: 213 and consent of instructor.

1-5 units, Aut (Staff), Win (Staff), Spr (Staff)

**JAPANLNG 211. Advanced Japanese, First Quarter**

Structure of Japanese, writings in different genres and styles, using such knowledge in writing, and expressing opinions on a variety of topics. Original writings, including fiction, essays, newspaper, and journal articles. Recommended taken in sequence. Prerequisite: 119 or consent of instructor. See

[http://japanese.stanford.edu/?page\\_id=263](http://japanese.stanford.edu/?page_id=263).

3-5 units, Aut (Nakamura, K)

**JAPANLNG 212. Advanced Japanese, Second Quarter**

Continuation of 211 Structure of Japanese, writings in different genres and styles, using such knowledge in writing, and expressing opinions on a variety of topics. Original writings, including fiction, essays, newspaper, and journal articles. Recommended taken in sequence. Prerequisite: 211 or consent of instructor. See

[http://japanese.stanford.edu/?page\\_id=263](http://japanese.stanford.edu/?page_id=263).

3-5 units, Win (Nakamura, K)

**JAPANLNG 213. Advanced Japanese, Third Quarter**

Continuation of 212. Structure of Japanese, writings in different genres and styles, using such knowledge in writing, and expressing opinions on a variety of topics. Original writings, including fiction, essays, newspaper, and journal articles. Recommended taken in sequence. Prerequisite: 212 or consent of instructor. See

[http://japanese.stanford.edu/?page\\_id=263](http://japanese.stanford.edu/?page_id=263).

3-5 units, Spr (Nakamura, K)

**JAPANLNG 305. Intensive First-Year Japanese for Stanford Graduate Students**

Equivalent to 3 quarters of JAPANLNG 395 combined. Same as JAPANLNG5. Stanford Grads only. See

[http://japanese.stanford.edu/?page\\_id=323](http://japanese.stanford.edu/?page_id=323). Sum

6-15 units, Sum (Staff)

**JAPANLNG 320. Intensive Second-Year Japanese for Stanford Graduate Students**

Equivalent to 3 quarters of JAPANLNG 395 combined. Same as 20. Stanford Grads only. See

[http://japanese.stanford.edu/?page\\_id=323](http://japanese.stanford.edu/?page_id=323).

6-15 units, Sum (Staff)

**JAPANLNG 394. Graduate Studies in Japanese Conversation**

Prerequisite: consent of instructor. (Staff)

1-3 units, Aut (Staff), Win (Staff), Spr (Staff)

**JAPANLNG 395. Graduate Studies in Japanese**

Prerequisite: consent of instructor. (Staff)

2-5 units, Aut (Staff), Win (Staff), Spr (Staff)

**JAPANESE LITERATURE (JAPANLIT) COURSES**

**UNDERGRADUATE COURSES IN JAPANESE LITERATURE**

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**JAPANLIT 146. Introduction to Premodern Japanese**

(Same as JAPANLIT 246) Readings from Heian, Kamakura, Muromachi, and early Edo periods with focus on grammar and reading comprehension. Prerequisite: JAPANLNG 129B or 103, or equivalent.

3-5 units, not given this year

**JAPANLIT 157. Points in Japanese Grammar**

(Same as JAPANLIT 257) Meaning and grammatical differences of similar expressions, and distinctions that may not be salient in English. Prerequisite: JAPANLNG 18B or 22, or equivalent. GER:DB-SocSci

3-4 units, not given this year

**JAPANLIT 170. The Tale of Genji and Its Historical Reception**

(Same as JAPANLIT 270) Approaches to the tale including 12th-

century allegorical and modern feminist readings. Influence upon other works including poetry, Noh plays, short stories, modern novels, and comic book (manga) retellings. Prerequisite for graduate students: JAPANLNG 129B or 103, or equivalent. GER:DB-Hum

*4 units, not given this year*

**JAPANLIT 189A. Honors Research**

*2-5 units, Aut (Staff), Spr (Staff)*

**JAPANLIT 189B. Honors Research**

Open to senior honors students to write thesis.

*5 units, Win (Staff)*

**JAPANLIT 199. Individual Reading in Japanese**

Asian Languages majors only. May be repeated for credit. Prerequisites: JAPANLNG 129B or 103, and consent of instructor.

*1-4 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**GRADUATE COURSES IN JAPANESE LITERATURE**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**JAPANLIT 200. Directed Reading in Japanese**

*1-12 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**JAPANLIT 201. Proseminar: Introduction to Graduate Study in Japanese**

Bibliographical and research methods; major trends in literary and cultural theory and critical practice. May be repeated once for credit. Prerequisite: JAPANLNG 103 or 129B, or consent of instructor.

*2-5 units, Win (Levy, I)*

**JAPANLIT 202. Bibliographic and Research Methods in Japanese**

The use of library and online resources for the study of Japanese literature, language, and culture. Prerequisite: JAPANLNG 103 or 129B, or consent of instructor.

*1-3 units, not given this year*

**JAPANLIT 235. Academic Readings in Japanese I**

Strategies for reading academic writings in Japanese. Readings of scholarly papers and advanced materials in Japanese in students' research areas in the humanities and social sciences. Prerequisites: JAPANLNG 103, 129B, or equivalent; and consent of instructor.

*2-4 units, not given this year*

**JAPANLIT 236. Academic Readings in Japanese II**

Strategies for reading academic writings in Japanese. Readings of scholarly papers and advanced materials in Japanese in students' research areas in the humanities and social sciences. May be taken independently of 264. May be repeated for credit. Prerequisites: JAPANLNG 103, 129B, or equivalent; and consent of instructor.

*2-4 units, not given this year*

**JAPANLIT 246. Introduction to Premodern Japanese**

(Same as JAPANLIT 146) Readings from Heian, Kamakura, Muromachi, and early Edo periods with focus on grammar and reading comprehension. Prerequisite: JAPANLNG 129B or 103, or equivalent.

*3-5 units, not given this year*

**JAPANLIT 247. Readings in Premodern Japanese**

Edo and Meiji periods with focus on grammar and reading comprehension. May be repeated for credit. Prerequisite: 246 or equivalent.

*2-5 units, Aut (Reichert, J)*

**JAPANLIT 257. Points in Japanese Grammar**

(Same as JAPANLIT 157) Meaning and grammatical differences of similar expressions, and distinctions that may not be salient in English. Prerequisite: JAPANLNG 18B or 22, or equivalent.

*3-4 units, not given this year*

**JAPANLIT 260. Japanese Poetry and Poetics**

Heian through Meiji periods with emphasis on relationships between the social and aesthetic. Works vary each year. This year's genre is the diary. Prerequisites: 246, 247, or equivalent.

*2-4 units, Win (Carter, S)*

**JAPANLIT 266. Introduction to Sino-Japanese**

Readings in Sino-Japanese (kambun) texts of the Heian,

Kamakura, and Muromachi periods, with focus on grammar and reading comprehension. Prerequisite: 246 or equivalent.

*3-5 units, Aut (Carter, S)*

**JAPANLIT 267. Readings in Sino-Japanese**

Readings in Sino-Japanese (kambun) texts of the Edo and Meiji periods, with focus on grammar and reading comprehension. Prerequisite: 264 or equivalent.

*2-4 units, not given this year*

**JAPANLIT 270. The Tale of Genji and Its Historical Reception**

(Same as JAPANLIT 170) Approaches to the tale including 12th-century allegorical and modern feminist readings. Influence upon other works including poetry, Noh plays, short stories, modern novels, and comic book (manga) retellings. Prerequisite for graduate students: JAPANLNG 129B or 103, or equivalent.

*4 units, not given this year*

**JAPANLIT 276. Modern Japanese Short Stories**

This course explores the postwar Japanese short story. We will read representative works by major authors, such as Ishikawa Jun, Hayashi Fumiko, Abe Kobe and Murakami Haruki. Attention will be devoted to both accurate reading of the Japanese prose and more general discussion of the literary features of the texts.

*2-4 units, not given this year*

**JAPANLIT 279. Research in Japanese Linguistics**

Introduction to graduate research in Japanese linguistics. Fields of research, methods and bibliographical background. Conduct a pilot research project in a chosen area. May be repeated for credit. Prerequisite: JAPANLNG 119 or consent of instructor.

*2-4 units, Spr (Staff)*

**JAPANLIT 281. Japanese Pragmatics**

Sociocultural and discourse factors reflected in the choice of linguistic forms, and their theoretical implications. Prerequisites: one year of Japanese and a course in linguistics, or two years of Japanese, or consent of instructor.

*2-4 units, Spr (Matsumoto, Y)*

**JAPANLIT 287. Pictures of the Floating World: Images from Japanese Popular Culture**

(Same as ARTHIST 287) Printed objects produced during the Edo period (1600-1868), including the Ukiyo-e (pictures of the floating world) and lesser-studied genres such as printed books (ehon) and popular broadsheets (kawaraban). How a society constructs itself through images. The borders of the acceptable and censorship; theatricality, spectacle, and slippage; the construction of play, set in conflict against the dominant neo-Confucian ideology of fixed social roles. Prerequisites: 2, 186, 187, 188.

*5 units, not given this year*

**JAPANLIT 292. Acquisition of Japanese as a Second Language**

(Same as EDUC 292A) Provides students with a broad overview of second language acquisition (SLA) research and introduces recent SLA studies on Japanese as a second language.

*2-4 units, Aut (Ishida, M)*

**JAPANLIT 298. The Theory and Practice of Japanese Literary Translation**

Theory and cultural status of translation in modern Japanese and English. Comparative analysis of practical translation strategies. Final project is a literary translation of publishable quality. Prerequisite: fourth-year Japanese or consent of instructor.

*2-5 units, not given this year*

**JAPANLIT 299. Master's Thesis or Translation**

A total of 5 units, taken in one or more quarters. (Staff)

*1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**JAPANLIT 350. Japanese Historical Fiction**

Authors include Mori Ogai, Akutagawa Ryunosuke, Tanizaki Jun'ichiro, Enchi Fumiko, Shiba Ryotaro, Fujisawa Shuhei, and Hiraiwa Yumie. Genre theory, and historical and cultural context. Works vary each year. May be repeated for credit.

*3-5 units, not given this year*

**JAPANLIT 377. Seminar: Structure of Japanese**

Linguistic constructions in Japanese. Topics vary annually. In 2009-10, focus is on noun-modifying constructions in Japanese from multiple perspectives including syntax, semantics,

pragmatics, and acquisition. Contrasts with similar constructions in other languages. Typological implications. Prerequisites: courses in Japanese linguistics, consent of instructor.

*2-4 units, not given this year*

**JAPANLIT 381. Topics in Pragmatics and Discourse Analysis**

Naturally occurring discourse (conversational, narrative, or written) and theoretical implications. Discourse of different age groups, expressions of identity and persona, and individual styles. May be repeated for credit.

*2-4 units, not given this year*

**JAPANLIT 395. Early Modern Japanese Literature**

May be repeated for credit. Prerequisite: 247.

*2-4 units, not given this year*

**JAPANLIT 396. Love and Revolution in a Translated Modernity**

Works and topics vary each year. May be repeated for credit. Prerequisite: fourth-year Japanese or consent of instructor.

*2-5 units, Spr (Levy, I)*

**JAPANLIT 396. Modern Japanese Literature**

May be repeated for credit. Prerequisite: JAPANLNG 213.

*2-5 units, Win (Reichert, J)*

**JAPANLIT 399. Dissertation Research**

For doctoral students in Japanese working on dissertations.

*1-12 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**JAPANLIT 400. Advanced Language Training**

For students at the Yokohama Center. For more information, see the Inter-University Center for Japanese Studies in Yokohama at <http://stanford.edu/dept/IUC/>.

*1-15 units, Aut (Staff), Win (Staff), Spr (Staff)*

**JAPANLIT 801. TGR Project**

*0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**JAPANLIT 802. TGR Dissertation**

*0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

## JEWISH STUDIES (JEWISHST) COURSES

### UNDERGRADUATE COURSES IN JEWISH STUDIES

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**JEWISHST 15A. The Bible and Archaeology**

(Same as CLASSGEN 15, RELIGST 15A) An introduction to how archaeology has been used to illumine the Bible and biblical history. Did Abraham exist? Was there an Exodus? Did Joshua really conquer Canaan? What does archaeology reveal about ancient Israel beyond what is recorded in the Bible? This course will address such questions as it seeks to introduce biblical archaeology to students with no prior introduction to either the Bible or to archaeology.

*4 units, Spr (Lederman, Z)*

**JEWISHST 15N. Travels through the Afterlife**

(F,Sem) (Same as RELIGST 15N) Stanford Introductory Seminar. Since the beginning of civilization, humans have refused to believe that physical death is the end of life and have sought in various ways to travel into the afterlife. We cannot know what lies beyond death, but there are other kinds of insights to be learned from these otherworldly journeys. The first part of the course will explore the origins and history of the afterlife, going back in time to ancient Egypt, Mesopotamia, Israel, Greece, and medieval Europe to survey these cultures' view of death and what lies beyond it. The second part of the course will investigate what has happened to belief in the afterlife in modern American culture. Our ultimate goal is to confront one of the most difficult aspects of life--our fear of death and oblivion--and also to explore the power of thought and imagination to move beyond the confines of mortality. GER:DB-Hum

*4 units, Win (Weitzman, S)*

**JEWISHST 16SI. Religion and Spirituality: LGBTQ**

**Perspectives,**

(Same as RELIGST 16SI) Many lesbian, gay, bisexual, transgender, and queer (LGBTQ) people today are finding that mainstream religious institutions do not meet their unique spiritual needs, and they are looking elsewhere to create meaningful spiritual lives. Examine various ways that LGBTQ people are creating and practicing religion and spirituality in the United States. Explore the diversity of American LGBTQ religious and spiritual traditions, both within and beyond the boundaries of traditional religions. Religious and spiritual practices created by and for LGBTQ people and communities, rather than the responses of religious institutions towards the reality of LGBTQ people in their midst. Students will be required to attend an LGBTQ worship service in a tradition of their choice. By the end of the course, students will have a better understanding of, and appreciation for, the diversity of religious and spiritual traditions within LGBTQ communities.

*1-2 units, not given this year*

**JEWISHST 50A. Reading Hebrew, First Quarter**

(Same as AMELANG 50A) Introduction to Hebrew literature through short stories and poetry by notable Israeli writers. In Hebrew. Prerequisite: one year of Hebrew or equivalent.

*2-4 units, not given this year*

**JEWISHST 95. How to Read the Bible**

(Same as RELIGST 95) What does the Bible mean? Seeks to help students answer this question for themselves by introducing some of the many ways in which the Bible has been read over the ages. The focus will be the book of Genesis, but the real subject is the history of biblical interpretation; how Genesis has been understood by theologians, writers, artists, scholars and others; and the ultimate goal is not merely to engage the Bible itself but to gain a better appreciation of the act of reading, why people read differently and the consequences of that difference for religious history. GER:DB-Hum

*4 units, not given this year*

**JEWISHST 101A. Beginning Hebrew, First Quarter**

(Same as AMELANG 128A)

*5 units, Aut (Porat, G; Greif, E)*

**JEWISHST 101B. Beginning Hebrew, Second Quarter**

(Same as AMELANG 128B)

*5 units, Win (Greif, E; Keydar, R)*

**JEWISHST 101C. Beginning Hebrew, Third Quarter**

(Same as AMELANG 128C)

*5 units, Spr (Porat, G; Greif, E)*

**JEWISHST 102. Land and Literature**

(Same as AMELANG 127) Israel has captured the imagination of writers throughout the generations. It has been portrayed as promised land, holy land, homeland, empty land, occupied land, and land of dreams. Ideological views and political events have shaped writers' conception of Israel. Readings include poems, prose, and theoretical texts about place and literature. No knowledge of Hebrew required. GER:DB-Hum, EC-GlobalCom

*4 units, not given this year*

**JEWISHST 102A. Intermediate Hebrew, First Quarter**

(Same as AMELANG 129A)

*4 units, Aut (Shemtov, V)*

**JEWISHST 102B. Intermediate Hebrew, Second Quarter**

(Same as AMELANG 129B)

*4 units, Win (Shemtov, V)*

**JEWISHST 102C. Intermediate Hebrew, Third Quarter**

(Same as AMELANG 129C)

*4 units, Spr (Porat, G)*

**JEWISHST 103A. Advanced Hebrew, First Quarter**

(Same as AMELANG 130A)

*1-4 units, not given this year*

**JEWISHST 104. Hebrew Forum**

(Same as AMELANG 131) Intermediate and advanced level. Bi-weekly Hebrew discussion on contemporary issues with Israeli guest speakers. Vocabulary enhancement. Focus on exposure to academic Hebrew.

*2-4 units, Aut (Shemtov, V)*

**JEWISHST 104A. Beginning Yiddish, First Quarter**

(Same as AMELANG 140A) Reading, writing, and speaking.  
4 units, Aut (Levitow, J)

**JEWISHST 104B. Beginning Yiddish, Second Quarter**

(Same as AMELANG 140B) Reading, writing, and speaking.  
4 units, Win (Levitow, J)

**JEWISHST 104C. Beginning Yiddish, Third Quarter**

(Same as AMELANG 140C) Reading, writing, and speaking.  
4 units, Spr (Levitow, J)

**JEWISHST 107A. Biblical Hebrew, First Quarter**

(Same as AMELANG 170A, RELIGST 170A) Establish a basic familiarity with the grammar and vocabulary of Biblical Hebrew and will begin developing a facility with the language. This course requires no prior knowledge of Hebrew and will begin with learning the alphabet. By the end of the quarter, students will be able to translate basic biblical texts, will be familiar with common lexica and reference grammars, and will have sufficient foundational knowledge to enable them to continue expanding their knowledge either in a subsequent course or own their own.

2-4 units, Aut (Weitzman, S; DeBold, R)

**JEWISHST 107B. Biblical Hebrew, Second Quarter**

(Same as AMELANG 170B) Continuation of 170A  
2-4 units, Spr (Porat, G)

**JEWISHST 107C. Biblical Hebrew, Third Quarter**

(Same as AMELANG 170C) Continuation of 170B.  
2-4 units, Spr (Staff)

**JEWISHST 120. Genesis and Gender: Male and Female in Judaism, Christianity, and Islam**

(Same as RELIGST 130) What does it mean to be a man or a woman? And what role have classical and religious traditions played in shaping understandings of gender differences? Investigation of the construction of gender identities, roles, and differences in Greek and Roman sources and three monotheistic faiths. Interpretation and retellings of the story of Adam and Eve in the Bible and the Qur'an, commentaries, lives and practices of religious communities, religious iconography down to the present.

GER:DB-Hum, EC-Gender

4 units, not given this year

**JEWISHST 122B. Early Christianity, Early Judaism, and Gender**

(Same as CLASSGEN 134, RELIGST 132B) An exploration of gender in Early Christianity and Early Judaism. Possible topics include: an examination of Pre-Christian writings which are indicative of the foundational social contexts in which early Christian and Jewish writers operated; how women's preaching was portrayed in Paul's letters and the implications for what was actually going on in the community in Corinth; later interpretations of Paul's attitudes towards women and marriage, which diverge between a pro-marriage and further restrictive understanding of women's involvement in the Church in the pastorals (1 and 2 Timothy and Titus) and a pro-ascetic, cross-dressing, understanding of greater women's freedom in the Acts of Paul and Thecla; female Christian martyrs who had visions of themselves as men entering battle and male Rabbis who understood themselves as female virgins and who hid in whorehouses to avoid martyrdom; and a survey of early Rabbinic laws pertaining to men and women and what they reveal about early Jew

GER:DB-Hum  
4 units, Win (Copeland, K)

**JEWISHST 132D. Sociology of Judaism and Jewish Identity**

(Same as RELIGST 112D, SOC 112D) Examines the place of the Jewish people in society throughout various locales and historical periods to understand how interactions among Jews and with other groups have shaped Jewish identities. Topics include modernism, the Holocaust, Israel/nationhood, race/ethnicity, intermarriage, and assimilation. Uses theoretical, empirical, and historical material from multiple social scientific fields of study and explores the study of Judaism from several major sociological lenses.

5 units, Sum (Staff)

**JEWISHST 139. Rereading Judaism in Light of Feminism**

(Same as FEMST 139) During the past three decades, Jewish feminists have asked new questions of traditional rabbinic texts, Jewish law, history, and religious life and thought. Analysis of the legal and narrative texts, rituals, theology, and community to better

understand contemporary Jewish life as influenced by feminism.  
GER:EC-Gender

4-5 units, NEXTYEAR

**JEWISHST 148. Writing Between Languages: The Case of Eastern European Jewish Literature**

(Same as JEWISHST 248, SLAVLIT 198, SLAVLIT 298) Eastern European Jews spoke and read Hebrew, Yiddish, and their co-territorial languages (Russian, Polish, etc.). In the modern period they developed secular literatures in all of them, and their writing reflected their own multilinguality and evolving language ideologies. We focus on major literary and sociolinguistic texts. Reading and discussion in English; students should have some reading knowledge of at least one relevant language as well.

GER:DB-Hum

3-5 units, Spr (Safran, G)

**JEWISHST 153C. Feminism and American Literature**

(Same as AMSTUD 183C, ENGLISH 183C) Exploration of the ways in which an eclectic group of American writers from the 19th century to the 20th have endeavored to enlarge the canvas on which women can paint their lives. Readings include stories, novels, journalism, poetry and drama that engage the social cultural, and political forces that can shape the kinds of futures students can imagine for themselves--forces that are further inflected by issues of race, ethnicity and class.

GER:DB-Hum, EC-Gender

5 units, Win (Fishkin, S)

**JEWISHST 182A. In Search of David and Solomon**

(Same as CLASSGEN 182, CLASSGEN 282, JEWISHST 382A, RELIGST 182A, RELIGST 382A) In recent years, the existence of King David and Solomon has become a hotly contested subject, with some scholars questioning whether they were real-life historical figures and others claiming to have found evidence that corroborates their existence. Drawing on the most recent archaeological research, this course will involve students in the quest for the historical David and Solomon as a way to introduce them to the challenges of using the Bible as an historical source.

4 units, Spr (Lederman, Z)

**JEWISHST 183. The Holocaust**

(Same as HISTORY 237, HISTORY 337, JEWISHST 383) The emergence of modern racism and radical anti-Semitism. The Nazi rise to power and the Jews. Anti-Semitic legislation in the 30s. WW II and the beginning of mass killings in the East. Deportations and ghettos. The mass extermination of European Jewry.

GER:DB-Hum

4-5 units, Aut (Zipperstein, S)

**JEWISHST 185B. Jews in the Modern World**

(Same as HISTORY 185B, HISTORY 385C) (Same as HISTORY 85B. History majors and others taking 5 units, register for 185B.) Topics include the restructuring of Jewish existence during the Enlightenment and legal emancipation at the end of the 18th century in W. Europe; the transformation of Jewish life in E. Europe under the authoritarian Russian regime; colonialism in the Sephardic world; new ideologies (Reform Judaism and Jewish nationalisms); the persistence and renewal of antisemitism; the destruction of European Jewry under the Nazis; new Jewish centers in the U.S.; and the State of Israel.

GER:DB-Hum, EC-GlobalCom

5 units, Aut (Zipperstein, S)

**JEWISHST 187D. Zionism and Its Critics**

(Same as HISTORY 187D) Zionism from its genesis in the 1880s up until the establishment of the state of Israel in May, 1948, exploring the historical, ideological and political dimensions of Zionism. Topics include: the emergence of Zionist ideology in connection to and as a response to challenges of modernity; emancipation; Haskalah (Jewish enlightenment); other national and ideological movements of the period; the ideological crystallization of the movement; and the immigration waves to Palestine.

4-5 units, not given this year

**JEWISHST 199B. Directed Reading in Yiddish, Second Quarter**

For intermediate or advanced students. May be repeated for credit.

1-5 units, Win (Staff)

**JEWISHST 221C. Aramaic Jewish texts**

(Same as JEWISHST 321C, RELIGST 221C, RELIGST 321C) Reading of Aramaic Jewish texts with special focus on grammar and syntax. Foundations of classical Aramaic, the two major dialects of rabbinic Aramaic, the Palestinian (Galilean) and the Babylonian. Readings from Midrash, Piyyut, Talmud and Geonic materials and attempt to follow the development of the language through time. The course is intended for students with substantial knowledge of Hebrew. GER:DB-Hum

2-5 units, not given this year

**JEWISHST 225. Research Methods and Resources in Jewish Studies**

(Same as JEWISHST 325, RELIGST 265, RELIGST 365) Enhance students' research skills in the interdisciplinary field of Jewish Studies, emphasizing electronic reference sources, but also archival resources and print publications. Coverage includes: Basic reference sources in Jewish Studies, History and bibliography of the Hebrew book, Hebrew Bible, Talmud, Religious studies (post-Talmudic), Jewish philosophy, Jewish history (by period; by region), Jewish languages, Hebrew literature, Yiddish literature, Zionism and Israel, Sephardic Jewry, women, Holocaust, miscellaneous topics (art, music, folklore and ethnography, sociology, genealogy, geography, pseudonyms, honorifics, abbreviations). Class sessions will also include special workshops on Hebrew / Yiddish / Ladino romanization (transliteration/transcription).

1-3 units, not given this year

**JEWISHST 226B. Judaism and Christianity in the Mediterranean World: Contact, Competition, and Conflict**

(Same as CLASSGEN 126, CLASSGEN 226, JEWISHST 326B, RELIGST 226B, RELIGST 326B) Jewish beginnings of Christianity in the first century C.E.; process of differentiation between various Jewish and Christian groups; effect of Roman-Jewish wars on Jewish and Christian identity formation; Jewish Christians, Christian Jews, and other heretics; rise of the discourse of orthodoxy and heresy; the emergence of the Adversus Iudaeos tradition; theology as a realm of mutual attraction and conflict. Readings include Epistles of Paul in the New Testament, Christian authors from Justin through Augustine, excerpts from Rabbinic Texts (Mishnah, Midrash and Talmud), along with current literature on religion, ethnicity, and identity in the Roman world. GER:DB-Hum

5 units, not given this year

**JEWISHST 226C. Mystics and Merry-makers: Innovations in Modern Judaism**

(Same as JEWISHST 326C, RELIGST 226C, RELIGST 326C) How does a tradition many thousands of years old make a space for itself in the dynamic landscape of contemporary America? Judaism has continually adapted to its surroundings, and in the twentieth century new movements have reconstructed, revised, and renewed Jewish practice. A space within has been claimed by a series of previously disenfranchised Jews including women, queer Jews, and Jews of color. Examine some of the most innovative of these changes from Jewish feminism to the Chabad Hasidic revival. GER:DB-Hum

3-4 units, not given this year

**JEWISHST 226D. Jewish-Christian Relations in Antiquity**

(Same as CLASSGEN 126B, RELIGST 226D) Constructions of identity, community, ethnicity: these considerations frame the investigation of ancient Christian rhetoric and theology contra Iudaeos. This historical project will be set within the larger intellectual and cultural context of a) learned Graeco-Roman traditions of ethnic stereotyping; b) forensic rhetoric; and c) philosophical paideia; and these traditions will be considered within their larger social context of the Mediterranean city (I-III). Specifically, various Christian, and especially Latin traditions contra Iudaeos (IV-VI) will be studied.

1-2 units, not given this year

**JEWISHST 228. King Solomon and the Search for Wisdom**

(Same as JEWISHST 328, RELIGST 282, RELIGST 382) What is wisdom according to the Bible? The course addresses this question by surveying various biblical and post-biblical texts associated with King Solomon. Other topics include the on-going debate over the historical existence of a Solomonic kingdom, the origins and history of the Jerusalem Temple, and Solomon's role in Jewish,

Christian and Islamic tradition.

4 units, not given this year

**JEWISHST 287D. Tel Aviv: Site, Symbol, City**

(Same as HISTORY 287D, HISTORY 387D, JEWISHST 387D) Tel Aviv, the first Israeli/Hebrew city, from a cultural history perspective combining high and low cultural artifacts, examining the symbolic constructions of the city as a site of Hebrew modernism and postmodernism. Topics include: the utopian origins behind the establishment of Tel Aviv in Zionist texts; artists, poets, and writers in Tel Aviv's coffee houses; as the capital of Bauhaus architecture; the emergence of Israeli pop culture in Tel Aviv of the late 60s and 70s; the effects of contemporary globalization and the reconstruction of Tel Aviv as the symbolic site of Israeli post-nationalism. Sources include art, cinema, and literature, pop music and archival materials from Green Library's Eliasaf Robinson Collection. Hebrew reading knowledge, although helpful, is not required. GER:DB-Hum

4-5 units, Spr (Dubnov, A)

**JEWISHST 287E. Jewish Intellectuals and the Crisis of Modernity**

(Same as HISTORY 287E, HISTORY 387E, JEWISHST 387E) Intellectual responses of Jewish political thinkers, historians and authors to the age of extremes. Readings include Theodor Adorno, Herbert Marcuse, Eric Fromm, Hannah Arendt, Leo Strauss, Karl Popper, Isaiah Berlin, Tony Judt, and George Steiner. Analyses of enlightenment, nationalism, socialism and totalitarianism; their life stories, and their direct and indirect role in creating a transatlantic political discourse in postwar years. Contextualizes historically the fundamental features of Jewish intellectual activity after 1945. No prior knowledge of political science, philosophy and/or Jewish studies is required. GER:DB-Hum

4-5 units, Spr (Dubnov, A)

**JEWISHST 287S. Research Seminar in Middle East History**

(Same as HISTORY 287S, HISTORY 481, JEWISHST 481) Student-selected research topics. GER:DB-SocSci

4-5 units, not given this year

**JEWISHST 288. Palestine and the Arab-Israeli Conflict**

(Same as HISTORY 288, HISTORY 388, IPS 388, JEWISHST 388) 1882 to the present. Comparison of representative expressions of competing historical interpretations. U.S. policy towards the conflict since 1948. (Beinin) GER:DB-Hum

4-5 units, not given this year

**JEWISHST 289. Poles and Jews**

(Same as HISTORY 229, HISTORY 329, JEWISHST 389) Focus is on the period since WW I. The place of the Jews in interwar Poland, WW II, surviving Jews after the war, Polish memorialization of the Holocaust, the reality and mythology of Jews in the communist apparatus, the manipulation of anti-Semitism by the communist government, and post-communist movement toward reconciliation. Memory and national mythology emphasizing Polish wartime behavior and the relationship of Jews to communism. The sources and uses of stereotypes, and the state of Polish-Jewish relations today. GER:DB-Hum, DB-Hum, EC-GlobalCom

4-5 units, Win (Jolluck, K)

**GRADUATE COURSES IN JEWISH STUDIES**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**JEWISHST 241. Memory, History, and the Contemporary Novel**

(Same as COMPLIT 221, GERLIT 246) How the watershed events of the 20th century, the philosophic linguistic turn, and the debate regarding the end of history left their mark on the novel. How does the contemporary novel engage with the past? How does its interest in memory and history relate to late- or postmodern culture of time or to political and ethical concerns? Novels by Toni Morrison, W. G. Sebald, J. M. Coetzee, Kazuo Ishiguro, and A. B. Yehoshua; theoretical works by Nietzsche, Freud, Heidegger, Hannah Arendt, Walter Benjamin, Fredric Jameson, Paul Ricoeur Awishai Margalit, and Walter Benn Michaels.

3-5 units, Spr (Eshel, A)

**JEWISHST 248. Writing Between Languages: The Case of Eastern European Jewish Literature**

(Same as JEWISHST 148, SLAVLIT 198, SLAVLIT 298) Eastern European Jews spoke and read Hebrew, Yiddish, and their co-territorial languages (Russian, Polish, etc.). In the modern period they developed secular literatures in all of them, and their writing reflected their own multilinguality and evolving language ideologies. We focus on major literary and sociolinguistic texts. Reading and discussion in English; students should have some reading knowledge of at least one relevant language as well.

3-5 units, *Spr (Safran, G)*

**JEWISHST 299A. Directed Reading in Yiddish, First Quarter**

Directed Reading in Yiddish, First Quarter

1-5 units, *Aut (Staff)*

**JEWISHST 321C. Aramaic Jewish texts**

(Same as JEWISHST 221C, RELIGST 221C, RELIGST 321C) Reading of Aramaic Jewish texts with special focus on grammar and syntax. Foundations of classical Aramaic, the two major dialects of rabbinic Aramaic, the Palestinian (Galilean) and the Babylonian. Readings from Midrash, Piyut, Talmud and Geonic materials and attempt to follow the development of the language though time. The course is intended for students with substantial knowledge of Hebrew.

2-5 units, *not given this year*

**JEWISHST 325. Research Methods and Resources in Jewish Studies**

(Same as JEWISHST 225, RELIGST 265, RELIGST 365) Enhance students' research skills in the interdisciplinary field of Jewish Studies, emphasizing electronic reference sources, but also archival resources and print publications. Coverage includes: Basic reference sources in Jewish Studies, History and bibliography of the Hebrew book, Hebrew Bible, Talmud, Religious studies (post-Talmudic), Jewish philosophy, Jewish history (by period; by region), Jewish languages, Hebrew literature, Yiddish literature, Zionism and Israel, Sephardic Jewry, women, Holocaust, miscellaneous topics (art, music, folklore and ethnography, sociology, genealogy, geography, pseudonyms, honorifics, abbreviations). Class sessions will also include special workshops on Hebrew / Yiddish / Ladino romanization (transliteration/transcription).

1-3 units, *not given this year*

**JEWISHST 326B. Judaism and Christianity in the Mediterranean World: Contact, Competition, and Conflict**

(Same as CLASSGEN 126, CLASSGEN 226, JEWISHST 226B, RELIGST 226B, RELIGST 326B) Jewish beginnings of Christianity in the first century C.E.; process of differentiation between various Jewish and Christian groups; effect of Roman-Jewish wars on Jewish and Christian identity formation; Jewish Christians, Christian Jews, and other heretics; rise of the discourse of orthodoxy and heresy; the emergence of the Adversus Judaeos tradition; theology as a realm of mutual attraction and conflict. Readings include Epistles of Paul in the New Testament, Christian authors from Justin through Augustine, excerpts from Rabbinic Texts (Mishnah, Midrash and Talmud), along with current literature on religion, ethnicity, and identity in the Roman world.

5 units, *not given this year*

**JEWISHST 326C. Mystics and Merrymakers: Innovations in Modern Judaism**

(Same as JEWISHST 226C, RELIGST 226C, RELIGST 326C) How does a tradition many thousands of years old make a space for itself in the dynamic landscape of contemporary America? Judaism has continually adapted to its surroundings, and in the twentieth century new movements have reconstructed, revisioned, and renewed Jewish practice. A space within has been claimed by a series of previously disenfranchised Jews including women, queer Jews, and Jews of color. Examine some of the most innovative of these changes from Jewish feminism to the Chabad Hasidic revival.

3-4 units, *not given this year*

**JEWISHST 328. King Solomon and the Search for Wisdom**

(Same as JEWISHST 228, RELIGST 282, RELIGST 382) What is wisdom according to the Bible? The course addresses this question by surveying various biblical and post-biblical texts associated with King Solomon. Other topics include the on-going debate over

the historical existence of a Solomonic kingdom, the origins and history of the Jerusalem Temple, and Solomon's role in Jewish, Christian and Islamic tradition.

4 units, *not given this year*

**JEWISHST 382A. In Search of David and Solomon**

(Same as CLASSGEN 182, CLASSGEN 282, JEWISHST 182A, RELIGST 182A, RELIGST 382A) In recent years, the existence of King David and Solomon has become a hotly contested subject, with some scholars questioning whether they were real-life historical figures and others claiming to have found evidence that corroborates their existence. Drawing on the most recent archaeological research, this course will involve students in the quest for the historical David and Solomon as a way to introduce them to the challenges of using the Bible as an historical source.

4 units, *Spr (Lederman, Z)*

**JEWISHST 383. The Holocaust**

(Same as HISTORY 237, HISTORY 337, JEWISHST 183) The emergence of modern racism and radical anti-Semitism. The Nazi rise to power and the Jews. Anti-Semitic legislation in the 30s. WW II and the beginning of mass killings in the East. Deportations and ghettos. The mass extermination of European Jewry.

4-5 units, *Aut (Zipperstein, S)*

**JEWISHST 385A. Core in Jewish History, 17th-19th Centuries**

(Same as HISTORY 385A)

4-5 units, *Aut (Rodrigue, A)*

**JEWISHST 385B. Core in Jewish History, 20th Century**

(Same as HISTORY 385B)

4-5 units, *Win (Zipperstein, S)*

**JEWISHST 387D. Tel Aviv: Site, Symbol, City**

(Same as HISTORY 287D, HISTORY 387D, JEWISHST 287D) Tel Aviv, the first Israeli/Hebrew city, from a cultural history perspective combining high and low cultural artifacts, examining the symbolic constructions of the city as a site of Hebrew modernism and postmodernism. Topics include: the utopian origins behind the establishment of Tel Aviv in Zionist texts; artists, poets, and writers in Tel Aviv's coffee houses; as the capital of Bauhaus architecture; the emergence of Israeli pop culture in Tel Aviv of the late 60s and 70s; the effects of contemporary globalization and the reconstruction of Tel Aviv as the symbolic site of Israeli post-nationalism. Sources include art, cinema, and literature, pop music and archival materials from Green Library's Eliasaf Robinson Collection. Hebrew reading knowledge, although helpful, is not required.

4-5 units, *Spr (Dubnov, A)*

**JEWISHST 387E. Jewish Intellectuals and the Crisis of Modernity**

(Same as HISTORY 287E, HISTORY 387E, JEWISHST 287E) Intellectual responses of Jewish political thinkers, historians and authors to the age of extremes. Readings include Theodor Adorno, Herbert Marcuse, Eric Fromm, Hannah Arendt, Leo Strauss, Karl Popper, Isaiah Berlin, Tony Judt, and George Steiner. Analyses of enlightenment, nationalism, socialism and totalitarianism; their life stories, and their direct and indirect role in creating a transatlantic political discourse in postwar years. Contextualizes historically the fundamental features of Jewish intellectual activity after 1945. No prior knowledge of political science, philosophy and/or Jewish studies is required.

4-5 units, *Spr (Dubnov, A)*

**JEWISHST 388. Palestine and the Arab-Israeli Conflict**

(Same as HISTORY 288, HISTORY 388, IPS 388, JEWISHST 288) 1882 to the present. Comparison of representative expressions of competing historical interpretations. U.S. policy towards the conflict since 1948. (Beinin)

4-5 units, *not given this year*

**JEWISHST 389. Poles and Jews**

(Same as HISTORY 229, HISTORY 329, JEWISHST 289) Focus is on the period since WW I. The place of the Jews in interwar Poland, WW II, surviving Jews after the war, Polish memorialization of the Holocaust, the reality and mythology of Jews in the communist apparatus, the manipulation of anti-Semitism by the communist government, and post-communist movement toward reconciliation. Memory and national mythology emphasizing Polish wartime behavior and the relationship of Jews to communism. The sources and uses of stereotypes, and the state

of Polish-Jewish relations today.

4-5 units, Win (Jolluck, K)

#### **JEWISHST 481. Research Seminar in Middle East History**

(Same as HISTORY 287S, HISTORY 481, JEWISHST 287S)  
Student-selected research topics.

4-5 units, not given this year

#### **JEWISHST 486A. Graduate Research Seminar in Jewish History**

(Same as HISTORY 486A)

4-5 units, Win (Zipperstein, S)

#### **JEWISHST 486B. Graduate Research Seminar in Jewish History**

(Same as HISTORY 486B) Prerequisite: HISTORY 486A.

4-5 units, Spr (Zipperstein, S)

## KOREAN GENERAL (KORGEN) COURSES

### UNDERGRADUATE COURSES IN KOREAN GENERAL

Primarily for undergraduates; graduate students may enroll with consent of adviser.

#### **KORGEN 170. Art and Archaeology of Korea**

(Same as ARCHLGY 201, KORGEN 270) Introduction to art and archaeology of Korean peninsula and adjacent continental northeast Asia from Bronze Age to early twentieth century. Topics include archaeology of the proto-Three Kingdoms period, state formation and Sinicization, introduction of Buddhism and its development to the Unified Silla period, the sophisticated tastes of the Koryo aristocrats, and the literati culture of Choson.

3-5 units, Win (Kim, M)

#### **KORGEN 198. Senior Colloquium in Japanese Studies**

(Same as JAPANEN 198) Research, write, and present capstone essay or honors thesis.

1 unit, Win (Matsumoto, Y)

### GRADUATE COURSES IN KOREAN GENERAL

Primarily for graduate students; undergraduates may enroll with consent of instructor.

#### **KORGEN 270. Art and Archaeology of Korea**

(Same as ARCHLGY 201, KORGEN 170) Introduction to art and archaeology of Korean peninsula and adjacent continental northeast Asia from Bronze Age to early twentieth century. Topics include archaeology of the proto-Three Kingdoms period, state formation and Sinicization, introduction of Buddhism and its development to the Unified Silla period, the sophisticated tastes of the Koryo aristocrats, and the literati culture of Choson.

3-5 units, Win (Kim, M)

## KOREAN LANGUAGE (KORLANG) COURSES

### UNDERGRADUATE COURSES IN KOREAN LANGUAGE

Primarily for undergraduates; graduate students may enroll with consent of adviser.

#### **KORLANG 1. First-Year Korean, First Quarter**

Communication skills, vocabulary, and grammar patterns. Culturally appropriate conduct relevant to contexts such as greetings, gestures, and body language.

5 units, Aut (Kim, H)

#### **KORLANG 1H. Beginning Korean for Heritage Learners, First Quarter**

For students with previous knowledge of Korean or a strong background in listening and speaking. Focus is on reading, writing, and spelling rather than speaking and listening. Sources include textbook, workbook, and digitized listening materials. Prerequisite: consent of instructor.

3 units, Aut (Kim, H)

#### **KORLANG 2. First-Year Korean, Second Quarter**

Continuation of 1. Communication skills, vocabulary, and grammar patterns. Culturally appropriate conduct relevant to contexts such as greetings, gestures, and body language. Prerequisite: placement test, 1 or consent of instructor.

5 units, Win (Kim, H)

#### **KORLANG 2H. Beginning Korean for Heritage Learners, Second Quarter**

Continuation of 1H. For students with previous knowledge of Korean or a strong background in listening and speaking. Focus is on reading, writing, and spelling rather than speaking and listening. Sources include textbook, workbook, and digitized listening materials. Prerequisite: 1H or consent of instructor.

3 units, Win (Kim, H)

#### **KORLANG 3. First-Year Korean, Third Quarter**

Continuation of 2. Communication skills, vocabulary, and grammar patterns. Culturally appropriate conduct relevant to contexts such as greetings, gestures, and body language. Prerequisite: placement test, 2 or consent of instructor. Fulfills the University language requirement.

5 units, Spr (Kim, H)

#### **KORLANG 3H. Beginning Korean for Heritage Learners, Third Quarter**

Continuation of 2H. For students with previous knowledge or a strong background in listening and speaking. Focus is on reading, writing, and spelling rather than speaking and listening. Sources include textbook, workbook, and digitized listening materials. Prerequisite: 2H or consent of instructor.

3 units, Spr (Kim, H)

#### **KORLANG 21. Second-Year Korean, First Quarter**

More complex sentences and grammatical patterns. Conversation in daily situations such as making a polite request or suggestion, reading simple texts, and Korean culture. Prerequisite: placement test, 3 or consent of instructor.

4-5 units, Aut (Staff)

#### **KORLANG 22. Second-Year Korean, Second Quarter**

Continuation of 21. More complex sentences and grammatical patterns. Conversation in daily situations such as making a polite request or suggestion, reading simple texts, and Korean culture. Prerequisite: placement test, 21 or consent of instructor.

4-5 units, Win (Kim, H)

#### **KORLANG 23. Second-Year Korean, Third Quarter**

Continuation of 22. More complex sentences and grammatical patterns. Conversation in daily situations such as making a polite request or suggestion, reading simple texts, and Korean culture. Prerequisite: placement test, 22 or consent of instructor.

4-5 units, Spr (Kim, S)

#### **KORLANG 101. Third-Year Korean, First Quarter**

Materials about Korean culture and society. Proficiency in interpersonal, interpretive, and presentational communication. Vocabulary, reading, and aural/oral skills. Prerequisite: placement test, 23 or consent of instructor.

3-4 units, Aut (Staff)

#### **KORLANG 102. Third-Year Korean, Second Quarter**

Continuation of 101. Materials about Korean culture and society. Proficiency in interpersonal, interpretive, and presentational communication. Vocabulary, reading, and aural/oral skills. Prerequisite: placement test, 101 or consent of instructor.

3-4 units, Win (Staff)

#### **KORLANG 103. Third-Year Korean, Third Quarter**

Continuation of 102. Materials about Korean culture and society. Proficiency in interpersonal, interpretive, and presentational communication. Vocabulary, reading, and aural/oral skills. Prerequisite: placement test, 102 or consent of instructor.

3-4 units, Spr (Kim, S)



**KORLANG 110. Korean Pronunciation and Intonation**

Goal is intelligibility and fluency. Lab assignments. Prerequisite: 3 or consent of instructor.

*1-2 units, not given this year*

**KORLANG 111. Medical Korean, First Quarter**

Medical vocabulary; cultural attitude. Video clips, technical journal and prescription reading, and class simulations. Prerequisite: 23 or consent of instructor.

*2-3 units, not given this year*

**KORLANG 112. Medical Korean, Second Quarter**

Medical vocabulary; cultural attitude. Video clips, technical journal and prescription reading, and class simulations. Prerequisite: 23 or consent of instructor.

*2 units, not given this year*

**KORLANG 120A. Korean Culture**

Examination of Korean culture and society to develop fluency and vocabulary through newspapers and short essays. May be repeated for credit. Prerequisites: 103 and consent of instructor.

*1-3 units, not given this year*

**KORLANG 120B. Korean Culture**

Examination of Korean culture and society to develop fluency and vocabulary through newspapers and short essays. May be repeated for credit. Prerequisites: 103 and consent of instructor.

*1-2 units, not given this year*

**KORLANG 120C. Korean Culture**

Examination of Korean culture and society to develop fluency and vocabulary through newspapers and short essays. May be repeated for credit. Prerequisites: 103 and consent of instructor.

*1-2 units, not given this year*

**KORLANG 120K. Korean Language and Culture through Drama and Film**

Korean culture and society through contemporary Korean drama and films. Advanced vocabulary, grammar, and idiomatic expressions. Prerequisite: placement test, 103 or consent of instructor.

*3-4 units, not given this year*

**KORLANG 130. Reading Korean**

Contemporary literature and academic texts. Prerequisite: 103 or consent of instructor.

*3-4 units, not given this year*

**KORLANG 141. Business Korean**

Business-related vocabulary and cultural etiquette. Business letters, mock interviews, and resumes. May be repeated for credit. Prerequisite: 103 or consent of instructor.

*3-4 units, not given this year*

**GRADUATE COURSES IN KOREAN LANGUAGE**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**KORLANG 200. Directed Reading in Korean**

Prerequisite: consent of instructor. (Staff)

*1-5 units, Aut (Staff), Win (Staff), Spr (Staff, 1), Sum (Staff)*

**KORLANG 395. Graduate Studies in Korean**

Prerequisite: consent of instructor.

*1-5 units, Aut (Staff), Win (Staff), Spr (Staff)*

**LATIN AMERICAN STUDIES (LATINAM) COURSES****UNDERGRADUATE COURSES IN LATIN AMERICAN STUDIES**

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**LATINAM 197. Directed Individual Research**

For students engaged in interdisciplinary work that cannot be arranged by department. May be repeated for credit. Prerequisite: consent of instructor.

*1-10 units, Aut (Staff), Win (Staff), Spr (Staff)*

**LATINAM 198. Honors Thesis**

Restricted to those writing an honors thesis in Latin American Studies.

*1-10 units, Aut (Staff), Win (Staff), Spr (Staff)*

**LATINAM 200. Seminar on Contemporary Issues in Latin American Studies**

Guest scholars present analyses of major Latin American themes.

*1 unit, Aut (Dirzo, R), Win (Dirzo, R), Spr (Dirzo, R)*

**GRADUATE COURSES IN LATIN AMERICAN STUDIES**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**LATINAM 398. Master's Thesis**

Restricted to students writing a master's thesis in Latin American Studies. May be repeated for credit.

*1-10 units, Aut (Staff), Win (Staff), Spr (Staff)*

**LATINAM 801. TGR Project**

*0 units*

**LAW, NONPROFESSIONAL (LAWGEN) COURSES****UNDERGRADUATE COURSES IN LAW, NONPROFESSIONAL**

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**LAWGEN 102Q. Pre-field Course for Alternative Spring Break**

Pre-field course for undergraduates participating in the Alternative Spring Break program.

*1 unit*

**LAWGEN 103Q. Depth Psychology**

(S,Sem) Stanford Introductory Seminar. Powerful unconscious forces impact human and social life. Depth psychology, founded by Sigmund Freud, Carl Jung, Wilhelm Reich, and others, studies these forces and how they shape inner life, personal relationships, religion, politics, art, and many other domains. The course draws from the founders, particularly Jung, and then goes on to include materials from modern theorists, primarily neo-Jungian. The starting point is how the unconscious and conscious mind interact in the individual person's life. We consider the implications of this interaction for psychotherapy and pathology as well as for ordinary life. On the social side, several sessions focus on religion and, to a lesser extent, mythology from a depth psychology perspective. The inquiry is open-ended throughout, encouraging personal reflection and engagement.

*3 units, Aut (Strnad, J)*

**LAWGEN 110Q. Criminal Justice and the Criminal Courts**

Preference to sophomores. This course is an introduction to the American criminal justice system, through the lens of the criminal courts. The course focuses on the structures and theories at play in the criminal court system, emphasizing court procedures, structures, constitutional guarantees, and the trial process. It examines the roles of individual agents - the police, prosecutors, defense attorneys, judges, probation officers, and corrections officials.

*3 units, not given this year*

**LAWGEN 111Q. Introduction to International Human Rights**

This course will study the main international human rights declarations, treaties, covenants, committees, courts and tribunals. It will look at the effect of nation states, regional bodies, and key economic and military organizations upon human rights. Categories of rights -- civil, political, social, economic and cultural -- will be analyzed, with a particular focus on the rights of women and children, and the right to culture.

*3 units*



**LAWGEN 113Q. Law and the Changing American Family**

(S,Sem) Stanford Introductory Seminar. This course will examine the many unprecedented changes in American family patterns during the past half century. Particular attention will be given to the role of law as it reflects and facilitates these developments. Topics to be covered include: same-sex marriage, no fault divorce, reproductive technologies, adoption, interracial relationships and mixed race families, the decline in marriage, and the changing economic positions of men and women.

3 units, Win (Banks, R)

**GRADUATE COURSES IN LAW, NONPROFESSIONAL**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**LAWGEN 206Q. Thinking Like a Lawyer**

(Same as GSBGEN 382). Open to all non-law graduate students at the University, this course provides students an analytical framework for understanding the core concepts of the law and familiarizes students with how lawyers analyze and structure their work. The course is taught by Dean Larry Kramer, Vice Dean Mark Kelman and Law School faculty in their areas of expertise, with one to two classes devoted to each topic. It introduces students to some of the foundational principles of law and reviews topics such as contracts, litigation, intellectual property, securities and employment law.

3-4 units, Win (Staff)

**LAWGEN 209Q. Community Police Academy**

The Stanford Department of Public Safety (SUDPS) has a long history of providing a wide variety of services to the Stanford community. The Community Police Academy is a combination of classroom instruction and hands-on activities that provides participants the opportunity to experience life as a police officer. This class is designed to expand the participant's knowledge of the duties, responsibilities, decisions and constraints that face law enforcement officers today. The goal of the Community Police Academy is to demystify public safety, build trust and develop partnerships between the Department of Public Safety and the Stanford community. While this course is open to all students throughout the University, the units will not accrue to Law Degree Candidates for credit toward a degree in Law (JD, JSM, JSD, or LLM). Prerequisites: minimum 18 years of age; valid driver's license; pass basic background check.

1 unit, Win (Wilson, L; Hernandez, J)

**LINGUISTICS (LINGUIST) COURSES****UNDERGRADUATE COURSES IN LINGUISTICS**

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**LINGUIST 1. Introduction to Linguistics**

The cognitive organization of linguistic structure and the social nature of language use. Why language learning is difficult. Why computers have trouble understanding human languages. How languages differ from one another. How and why speakers of the same language speak differently. How language is used strategically. GER:DB-SocSci

4 units, Aut (Eckert, P; Sag, I; Gafter, R; Spencer, J), Spr (Pereltsvaig, A)

**LINGUIST 5N. What's Your Accent? Investigations in Acoustic Phonetics**

Preference to freshmen. Phonetic variation across accents of English; experimental design; practical experience examining accents of seminar participants; acoustic analysis of speech using Praat. GER:DB-SocSci

3 units, not given this year

**LINGUIST 36. The Arabic Language and Culture**

(Same as AMELANG 36, LINGUIST 270) Arabic language from

historical, social, strategic, and linguistic perspectives. History of the Arabic language and the stability of classical Arabic over the last 15 centuries. Why the functionality of classical Arabic has not changed as Latin, Old English, and Middle English have. Social aspects of the Arabic language, Ferguson's notion of diglossia. The main varieties of Arabic, differences among them, and when and where they are spoken. Role of Arabic and culture in current world politics, culture, and economy. Linguistic properties of Arabic such as root-based morphology, lexical ambiguity, and syntactic structure relating it to current linguistic theories.

3 units, not given this year

**LINGUIST 62N. The Language of Food**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. The relationship between food and language around the globe. The vocabulary of food and prepared dishes, and crosslinguistic similarities and differences, historical origins, forms and meanings, and relationship to cultural and social variables. The structure of cuisines viewed as meta-languages with their own vocabularies and grammatical structure. The language of menus; their historical development and crosslinguistic differences.

3 units, Win (Jurafsky, D)

**LINGUIST 65. African American Vernacular English**

(Same as AFRICAAM 21, LINGUIST 265) The English vernacular spoken by African Americans in big city settings, and its relation to Creole English dialects spoken on the S. Carolina Sea Islands (Gullah), in the Caribbean, and in W. Africa. The history of expressive uses of African American English (in soundin' and rappin'), and its educational implications. Service Learning Course (certified by Haas Center). GER:DB-SocSci, EC-AmerCul

3-5 units, Win (Rickford, J)

**LINGUIST 66. Vernacular English and Reading**

(Same as LINGUIST 266) Discusses some of the literature on the relation between use of vernacular English varieties (e.g. African American Vernacular English, Chicano English) and the development of literacy (especially in Standard English). But our primary focus is on improving the reading skills of African American and Latino students in local schools through the Reading Road program developed at the University of Pennsylvania. Students must commit to tutoring one or more elementary students weekly, using the program. L65 AAVE recommended, but not required.

4-5 units, Spr (Rickford, J)

**LINGUIST 83N. Translation**

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. What is a translation? The increased need for translations in the modern world due to factors such as tourism and terrorism, globalization and globalization, diplomacy and treaties, law and religion, and literature and science. How to meet this need; different kinds of translation for different purposes; what makes one translation better than another; why some texts are more difficult to translate than others. Can some of this work be done by machines? Are there things that cannot be said in some languages? GER:DB-SocSci

3 units, Aut (Kay, M)

**LINGUIST 90. Teaching Spoken English**

Practical approach to teaching English to non-native speakers. Teaching principles and the features of English which present difficulties. Preparation of lessons, practice teaching in class, and tutoring of non-native speaker.

3-4 units, Spr (Romeo, K)

**LINGUIST 105. Phonetics**

(Same as LINGUIST 205A) The study of speech sounds: how to produce them, how to perceive them, and their acoustic properties. The influence of production and perception systems on sound change and phonological patterns. Acoustic analysis and experimental techniques. Lab exercises. Prerequisite: 110 or equivalent, or consent of instructor. GER:DB-SocSci

4 units, Spr (Podesva, R)

**LINGUIST 106. Introduction to Speech Perception**

Basics of acoustic phonetics and audition. What do listeners perceive when they perceive speech. Examine current research including: the categorical perception of speech, cross-language speech perception, infant speech perception. Theoretical questions

of interest to speech perception researchers and experimental methods used in the field.

*4 units, not given this year*

**LINGUIST 110. Introduction to Phonetics and Phonology**

Differences in the sounds of the world's languages and how these sounds are made by the human vocal tract. Theories that account for cross-linguistic similarities in the face of differences. GER:DB-SocSci

*4 units, Win (Anttila, A)*

**LINGUIST 112. Seminar in Phonology**

(Same as LINGUIST 212A) Topics vary each year. Previous topics include variation in the phonology of words according to their contexts within larger expressions and the place of these phenomena in a theory of grammar. May be repeated for credit.

*2-4 units, not given this year*

**LINGUIST 116. Morphology**

A survey of words including their structures, pronunciations, meanings, and syntactic possibilities in a wide sampling of languages to provide a laboratory for investigating the nature of morphology.

*4 units, not given this year*

**LINGUIST 120. Introduction to Syntax**

Grammatical constructions, primarily English, and their consequences for a general theory of language. Practical experience in forming and testing linguistic hypotheses, reading, and constructing rules. GER:DB-SocSci

*4 units, Aut (Wasow, T)*

**LINGUIST 121. Crosslinguistic Syntax**

A data-driven introduction to the methods of syntactic analysis, and their results. Emphasis is on understanding how languages are systematically alike and different in their basic sentence structure. Focuses on building up syntactic argumentation skills via the collective development of a partial formal theory of sentence structure, which attempts to model native speaker knowledge. Draws on data from a diverse array of the world's languages, including but not limited to English.

*3-4 units, Spr (Gribanov, V)*

**LINGUIST 124. Introduction to Lexical Function Grammar**

(Same as LINGUIST 224) Presentation of a formal model of grammar designed to allow precise, computationally tractable descriptions of cross-linguistic variation in syntactic structure. Concentration on the formal properties of the model, its flexibility in teasing out language specific and possibly universal characteristics of natural languages and the place of syntax as a component within a larger linguistic architecture. Prerequisite: 120 or consent of instructor

*2-4 units, not given this year*

**LINGUIST 125. Seminar in Syntax: Choosing a Variant**

(Same as LINGUIST 225) Cases where two or more expressions serving as alternatives seem to be in free variation, differing at most in stylistic value. The semantic, discourse function, syntactic, prosodic, and processing factors that favor the choice of one variant over the other. May be repeated for credit.

*2-4 units, not given this year*

**LINGUIST 130A. Introduction to Semantics and Pragmatics**

(Same as LINGUIST 230A) Linguistic meaning and its role in communication. Topics include ambiguity, vagueness, presupposition, intonational meaning, and Grice's theory of conversational implicature. Applications to issues in politics, the law, philosophy, advertising, and natural language processing. Those who have not taken logic, such as PHIL 150 or 151, should also enroll in 130C. Pre- or corequisite: 120, consent of instructor, or graduate standing in Linguistics. GER:DB-SocSci

*4 units, Win (Potts, C)*

**LINGUIST 130B. Introduction to Lexical Semantics**

Issues in the study of word meaning. Focus is on the core semantic properties and internal organization of the four major word categories in natural languages: nouns, verbs, adjectives, and prepositions. GER:DB-SocSci

*4 units, not given this year*

**LINGUIST 130C. Logic Laboratory**

Typically taken in conjunction with 130A/230A.

*1 unit, Win (Staff)*

**LINGUIST 140. Language Acquisition I**

(Same as LINGUIST 240) Processes of language acquisition in early childhood; stages in development; theoretical issues and research questions. Practical experience in data collection. GER:DB-SocSci

*4 units, Aut (Clark, E)*

**LINGUIST 141. Language and Gesture**

History of work on gesture, gestural systems associated with particular languages/cultures, and with specific activities - music, sports, traffic management, stock exchanges, etc. Examine gesture developmentally and how gesture is represented in painting and animation.

*3 units, Spr (Clark, E)*

**LINGUIST 142. Heritage Languages**

(Same as LINGUIST 242) The linguistic and cultural properties of Heritage languages, which are partially acquired and supplanted by a dominant language in childhood. Topics: Syntactic, phonological and morphological properties of heritage languages, implications from experimental HL research for language universals, cultural vs. linguistic knowledge, the role of schooling in HL competence, influence of the dominant language on the HL, and pedagogical issues for HL learners in the classroom. GER:DB-SocSci

*3-4 units, not given this year*

**LINGUIST 143. Sign Languages**

The linguistic structure of sign languages. How sign languages from around the world differ, and what properties they share. Accents and dialects in sign languages. How sign languages are similar to and different from spoken languages. How and why sign languages have emerged.

*4 units, not given this year*

**LINGUIST 144. Introduction to Cognitive and Information Sciences**

(Same as PHIL 190, PSYCH 132, SYMSYS 100) The history, foundations, and accomplishments of the cognitive sciences, including presentations by leading Stanford researchers in artificial intelligence, linguistics, philosophy, and psychology. Overview of the issues addressed in the Symbolic Systems major. GER:DB-SocSci

*4 units, Spr (Goodman, N)*

**LINGUIST 150. Language in Society**

How language and society affect each other. Class, age, ethnic, and gender differences in speech. Prestige and stigma associated with different ways of speaking and the politics of language. The strategic use of language. Stylistic practice; how speakers use language to construct styles and adapt their language to different audiences and social contexts. GER:DB-SocSci, WIM

*4 units, Win (Eckert, P)*

**LINGUIST 152. Sociolinguistics and Pidgin Creole Studies**

(Same as LINGUIST 252) Introduction to pidgins and creoles, organized around the main stages in the pidgin-creole life cycle: pidginization, creolization, and decreolization. Focus is on transformations in the English language as it was transported from Britain to Africa, Asia, the Caribbean, and the Pacific. Resultant pidginized and creolized varieties such as Nigerian Pidgin English, Chinese Pidgin English, New Guinea Tok Pisin, Suriname Sranan, and the creole continua of Guyana, Jamaica, and Hawaii. Also French, Dutch, Portugese, Chinook, Motu, and Sango.

*2-4 units, not given this year*

**LINGUIST 153. Language, Power & Politics**

The integral role language plays in politics; how power operates in linguistic practices and political interaction. Critical examination of how language is used to articulate, maintain and subvert relations of power in society, emphasizing language in the media, the political rhetoric associated with war, and the construction of 'truth' in politics. The role of ethnographic analysis in aiding sociolinguistic understandings of how social actors use and (re)interpret political language.

*3-4 units, not given this year*

**LINGUIST 154. Sociolinguistics of Language Contact**

(Same as LINGUIST 254) The role of contact between speakers of different languages in processes of language borrowing, convergence, and shift. Attending both to linguistic aspects and social contexts, examine: second-language acquisition, bilingualism, code-switching, lexical and grammatical borrowing,

first language attrition, language death, and the creation of new contact varieties such as jargons, mixed languages, pidgins, and creoles. Prerequisite: background in linguistics, at least one course in linguistics.

*2-4 units, not given this year*

**LINGUIST 155. Hip Hop, Youth Identities, and the Politics of Language**

(Same as AFRICAAM 121X, AMSTUD 121X, ANTHRO 121A, CSRE 121X, EDUC 121X) Focus is on issues of language, identity, and globalization, with a focus on Hip Hop cultures and the verbal virtuosity within the Hip Hop nation. Beginning with the U.S., a broad, comparative perspective in exploring youth identities and the politics of language in what is now a global Hip Hop movement. Readings draw from the interdisciplinary literature on Hip Hop cultures with a focus on sociolinguistics and youth culture.

*3-4 units, Spr (Alim, H)*

**LINGUIST 156. Language and Gender**

The role of language in the construction of gender, the maintenance of the gender order, and social change. Field projects explore hypotheses about the interaction of language and gender. No knowledge of linguistics required. GER:DB-SocSci, EC-Gender

*4 units, Spr (Eckert, P; Gafter, R)*

**LINGUIST 157. Sociophonetics**

(Same as LINGUIST 257) The study of phonetic aspects of sociolinguistic variation and the social significance of phonetic variation. Acoustic analysis of vowels, consonants, prosody, and voice quality. Hands-on work on collaborative research project. Prerequisite: 110 or equivalent, or consent of instructor.

*4 units, Spr (Podesva, R)*

**LINGUIST 160. Introduction to Language Change**

Principles of historical linguistics; the nature of language change. Kinds and causes of change, variation and diffusion of changes through populations, differentiation of dialects and languages, determination and classification of historical relationships among languages, rates of change, the reconstruction of ancestral languages and intermediate changes, parallels with cultural and genetic evolutionary theory, and implications of variation and change for the description and explanation of language in general. Prerequisite: introductory course in linguistics or evolutionary theory. GER:DB-SocSci

*4 units, Spr (Kiparsky, P)*

**LINGUIST 163. History of the English Language**

(Same as ENGLISH 171) This course traces the history of the English language from its roots through its earliest written records into the present. It will trace the fundamental changes that English has undergone in terms of morphology, phonology, syntax, semantics, and vocabulary. It will also explore some of the social, cultural, and historical forces that affect language. The course emphasizes the pre-modern history of English. GER:DB-Hum

*5 units, Spr (Karnes, M)*

**LINGUIST 167. Languages of the World**

The diversity of human languages, their sound systems, vocabularies, and grammars. Tracing historical relationships between languages and language families. Parallels with genetic evolutionary theory. Language policy, endangered languages and heritage languages. Classification of sign languages. GER:DB-SocSci

*3-4 units, Aut (Pereltsvaig, A)*

**LINGUIST 173. The Structure of Russian**

(Same as LINGUIST 273) A synchronic overview of contemporary standard Russian, including its sound system, word formation and grammatical structure. Emphasis is on problems presented by Russian for current linguistic theory. The acquisition of Russian as a first language.

*2-4 units, not given this year*

**LINGUIST 174. Linguistic Field Methods**

(Same as ANTHRO 30, LINGUIST 274A) Practical training in the collection and analysis of linguistic data from native speakers of a language largely unknown to the investigator. Documentation of endangered languages. Research goals, field trip preparation, ethics (including human subjects, cooperation with local investigators, and governmental permits), working in the

community, technical equipment, and analytical strategies. Emphasis is on the use of recording devices and computers in collection and analysis. Prerequisite: introductory course in linguistics.

*3-5 units, not given this year*

**LINGUIST 174. Linguistic Field Methods**

(Same as ANTHRO 71, LINGUIST 274) Workshop applying methods for gathering and analyzing linguistic data in the field, i.e., from consultants who are native speakers of a language essentially unknown to the investigator. Principles of language documentation. Students will do local field projects and work on these both in and out of class. Format involves lectures, discussion, working with native speakers, and student presentations. Topics include: choosing a language; planning the project; computerized collection, storage, and analysis of linguistic data; field recording equipment; interviews and elicitation; diagnostic vocabulary lists and grammatical schedules; field study of everyday communication and discourse; area surveys and the ethnography of communication; ethics, reflexivity, and bias; working with human subjects and governments. Prerequisite: a course in linguistics or in anthropological field methods.

*5 units, Spr (Fox, J)*

**LINGUIST 180. From Languages to Information**

(Same as CS 124, LINGUIST 280) Automated processing of less structured information: human language text and speech, web pages, social networks, genome sequences, with goal of automatically extracting meaning and structure. Methods include: string algorithms, automata and transducers, hidden Markov models, graph algorithms, XML processing. Applications such as information retrieval, text classification, social network models, machine translation, genomic sequence alignment, word meaning extraction, and speech recognition. Prerequisite: CS103, CS107, CS109.

*3-4 units, Win (Jurafsky, D)*

**LINGUIST 181. Grammar Engineering**

(Same as LINGUIST 281) Hands-on techniques for implementation of linguistic grammars, drawing on grammatical theory and engineering skills. The implementation of constraints in morphology, syntax, and semantics, working within a unification-based lexicalist framework. Focus is on developing small grammars for English and at least one other language. Prerequisite: basic syntactic theory or 120. No programming skills required.

*1-4 units, not given this year*

**LINGUIST 182. Computational Theories of Syntax**

(Same as LINGUIST 282) Salient features of modern syntactic theories, including HPSG, LFG, and TAG, motivated by computational concerns. Impact of work within these frameworks on the design of algorithms in computational linguistics, and its influence in both linguistics and computer science. Topics include: notions of unification; unification algorithms and their relation to linguistic theory; agenda-driven chart processing for analysis and synthesis; the interface with morphology, the lexicon, and semantics; and applications, notably machine translation.

*3-4 units, not given this year*

**LINGUIST 185. Writing Systems in a Digital World**

(Same as LINGUIST 284A) Writing systems and their behaviors. Classification of scripts as alphabetic, syllabic, and ideographic; what features typically belong to each group. What can be considered an ideal script. Topics include: why Japanese writing is considered a complex system; the influence of Indian writing on other syllabic scripts; how writing systems extend their reach to new languages; linguistic insights by studying this process; the Unicode standard; and font technology. Recommended: basic phonetics.

*2-3 units, not given this year*

**LINGUIST 188. Natural Language Understanding**

(Same as CS 224U, LINGUIST 288) Machine understanding of human language. Computational semantics (determination of word sense and synonymy, event structure and thematic roles, time, aspect, causation, compositional semantics, scopal operators), and computational pragmatics and discourse (coherence, coreference resolution, information packaging, dialogue structure). Theoretical issues, online resources, and relevance to applications including question answering and summarization. Prerequisites: one of

LINGUIST 180 / CS 124 / CS 224N,S: and logic such as LINGUIST 130A or B, CS 157, or PHIL150).

3-4 units, Win (MacCartney, W; Potts, C)

**LINGUIST 191. Linguistics and the Teaching of English as a Second/Foreign Language**

(Same as LINGUIST 291) Methodology and techniques for teaching languages, using concepts from linguistics and second language acquisition theory and research. Focus is on teaching English, but most principles and techniques applicable to any language. Optional 1-unit seminar in computer-assisted language learning. GER:DB-SocSci

4-5 units, Win (Hubbard, P; Rylance, C)

**LINGUIST 192. Language Testing**

(Same as LINGUIST 292) Measurement of production and reception of spoken and written language. Cross-disciplinary comparison of assessments in educational, clinical, and engineering contexts.

2-4 units, Spr (Staff)

**LINGUIST 197. Undergraduate Research Seminar**

Research goals and methods in linguistics and related disciplines. Students work on a small project to define a focus for their linguistic studies and prepare for honors research. Presentations; final paper.

2 units, Win (Gribanov, V)

**LINGUIST 198. Honors Research**

1-15 units, Win (Staff), Spr (Staff)

**LINGUIST 199. Independent Study**

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**GRADUATE COURSES IN LINGUISTICS**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**LINGUIST 200. Foundations of Linguistic Theory**

Theories that have shaped contemporary linguistics; recurrent themes and descriptive practice.

4 units, not given this year

**LINGUIST 205A. Phonetics**

(Same as LINGUIST 105) The study of speech sounds: how to produce them, how to perceive them, and their acoustic properties. The influence of production and perception systems on sound change and phonological patterns. Acoustic analysis and experimental techniques. Lab exercises. Prerequisite: 110 or equivalent, or consent of instructor.

4 units, Spr (Podesva, R)

**LINGUIST 205B. Advanced Phonetics**

Prerequisite: LINGUIST 205A.

2-4 units, not given this year

**LINGUIST 207. Seminar in Phonetics**

Topics vary. Current topic is phonetic variation in speech perception. Previous topics include ow variation is accommodated in current models of speech perception, and how perceptual models need to be altered to accommodate phonetic variation encountered by listeners. May be repeated for credit.

2-4 units, not given this year

**LINGUIST 210A. Phonology**

Introduction to phonological theory and analysis based on cross-linguistic evidence. Topics: phonological representations including features, syllables, metrical structure; phonological processes including assimilation and dissimilation; and phonological typology and universals; optimality theory.

4 units, Aut (Anttila, A)

**LINGUIST 210B. Advanced Phonology**

A comparison of Stratal OT, Transderivational OT, and rule-based approaches, primarily on the empirical basis of stress, syllable structure, and prosodic organization.

4 units, Win (Kiparsky, P)

**LINGUIST 211. Metrics**

Principles of versification from a linguistic point of view. Traditional and optimality-theoretic approaches. The canonical system of English metrics, and its varieties and offshoots. The typology of metrical systems and its linguistic basis. The ideology of normative prosodic discourse in relation to changing poetic

practice.

1-4 units, Aut (Kiparsky, P)

**LINGUIST 212. Seminar in Phonology**

Topics vary each year. Current topic is stress. Previous topics include variation in the phonology of words according to their contexts within larger expressions and the place of these phenomena in a theory of grammar. May be repeated for credit.

2-4 units, Spr (Anttila, A)

**LINGUIST 212A. Seminar in Phonology**

(Same as LINGUIST 112) Topics vary each year. Previous topics include variation in the phonology of words according to their contexts within larger expressions and the place of these phenomena in a theory of grammar. May be repeated for credit.

2-4 units, not given this year

**LINGUIST 212B. Seminar in Phonology**

May be repeated for credit.

1-4 units, not given this year

**LINGUIST 213. Corpus Phonology**

An introduction to constructing and using phonologically annotated corpora to test phonological hypotheses. Hands-on experience in corpus manipulation and phonological modeling.

2-4 units, not given this year

**LINGUIST 214. Phonology Workshop**

May be repeated for credit.

1-2 units, not given this year

**LINGUIST 216. Morphology**

How morphology fits into the lexicon and how the lexicon fits into grammar. Inflection and word-formation: blocking, productivity, analogy. Morphological categories. The interaction of morphology with phonology within the lexicon: level-ordering, prosodic morphology. Review of English morphology and analysis of representative material from languages with richer morphologies.

2-4 units, Spr (Kiparsky, P)

**LINGUIST 217. Morphosyntax**

The role of morphology in grammar: how word structure serves syntax in the expression of meaning. Lexical semantics, Theta-roles, argument structure, and grammatical relations. Licensing: case, agreement, word order, and their interaction.

2-4 units, not given this year

**LINGUIST 218. Seminar on Morphological Theories**

Word formation and the lexicon: empirical generalizations and theoretical approaches. Lexicalist and Distributed Morphology. How words are built and interpreted: constituency and headedness, morpheme order and scope, the mirror principle, bracketing paradoxes, the hierarchy of functional categories. Paradigms, blocking, gaps, periphrasis, syncretism. Locality, head movement vs. selection, constraints on allomorphy, incorporation, polysynthesis, cliticization and prosodic re-ordering phenomena.

2-4 units, not given this year

**LINGUIST 219. Frequency and the Grammar of Alternations**

Variationist, and psycholinguistic studies of how syntactic alternations (for example, the English dative, genitive, and passive) develop in time and space.

1-4 units, not given this year

**LINGUIST 221A. Foundations of English Grammar**

A systematic introduction to the formal analysis of English grammar using the framework of head-driven phrase structure grammar (HPSG). Topics: feature structure modeling, lexical and phrasal organization in terms of type hierarchies and constraint inheritance, clausal types, patterns of complementation, the auxiliary system, extraction dependencies, wh-constructions, and the syntax-semantics interface.

1-4 units, not given this year

**LINGUIST 221B. Studies in Universal Grammar**

Focus is on grammatical analysis of individual languages. Builds directly on the theoretical foundations presented in 221A. Topics vary each year.

1-4 units, not given this year

**LINGUIST 222A. Foundations of Syntactic Theory I**

The roles of the verb and the lexicon in the determination of sentence syntax and their treatment in modern grammatical theories. Empirical underpinnings of core phenomena, including

the argument/adjunct distinction, argument structure and argument realization, control and raising, operations on argument structure and grammatical function changing rules. Motivations for a lexicalist approach rooted in principles of lexical expression and subcategorization satisfaction. Prerequisite: 120 or permission of instructor.

*3-4 units, Aut (Gribanov, V)*

#### **LINGUIST 222B. Foundations of Syntactic Theory II**

The nature of unbounded dependency constructions and their treatment in modern grammatical theories. Filler-gap dependencies, island constraints, and the relation between grammar and processing. Prerequisite: 222A.

*2-4 units, Win (Sag, I)*

#### **LINGUIST 223. Introduction to Minimalist Syntax**

Introduces the basics of Minimalist architecture and structure-building operations, with attention to the communication of syntax with the phonological and semantic interfaces. Topics include phrase structure, locality and phases, phrasal and head movement, functional categories, and features. A previous graduate-level syntax course, or permission of the instructor required.

*2-4 units, not given this year*

#### **LINGUIST 224. Introduction to Lexical Function Grammar**

(Same as LINGUIST 124) Presentation of a formal model of grammar designed to allow precise, computationally tractable descriptions of cross-linguistic variation in syntactic structure. Concentration on the formal properties of the model, its flexibility in teasing out language specific and possibly universal characteristics of natural languages and the place of syntax as a component within a larger linguistic architecture. Prerequisite: 120 or consent of instructor

*2-4 units, not given this year*

#### **LINGUIST 224A. From Text to Natural Logic**

Integration of syntax and semantics using LFG (Lexical Functional Grammar) and CCG (Combinatory Categorical Grammar) as syntactic frameworks and Natural Logic as the semantic approach. Most of natural language semantics aims to specify the meaning of linguistic expressions in model-theoretic terms but formulas of first- or higher-order logics do not come with any effective procedures for reasoning that is required for drawing inferences or answering questions given some natural language input. Natural Logic is a cover term for a family of formal approaches to semantics and textual inferencing as currently practiced by computational linguists. They have in common a proof theoretical rather than a model-theoretic focus and an overriding concern with feasibility. Prerequisite: one syntax or one semantics course.

*2-4 units, Spr (Staff)*

#### **LINGUIST 224B. Advanced Topics in Lexical Functional Grammar**

May be repeated for credit.

*1-4 units, not given this year*

#### **LINGUIST 225. Seminar in Syntax: Choosing a Variant**

(Same as LINGUIST 125) Cases where two or more expressions serving as alternatives seem to be in free variation, differing at most in stylistic value. The semantic, discourse function, syntactic, prosodic, and processing factors that favor the choice of one variant over the other. May be repeated for credit.

*2-4 units, not given this year*

#### **LINGUIST 225A. Seminar in Syntax: Ellipsis**

Diverse kinds of elliptical utterances. The fundamental problems in grammatical analysis of ellipsis (primary focus: English). The clarification of key data relating to current theoretical controversies. May be repeated for credit.

*2-4 units, Spr (Sag, I)*

#### **LINGUIST 225B. SEMINAR IN SYNTAX: Phonology/Syntax Interface**

How syntax conditions phonology and how phonology conditions syntax. The role of the prosodic hierarchy and cyclic structure-building in mediating syntax-phonology interactions. Topics include: linearization, sentential stress, ellipsis, focus, word order, second-place effects. May be repeated for credit.

*2-4 units, Win (Gribanov, V)*

#### **LINGUIST 226. Construction Grammar**

An introduction to Sign-based Construction Grammar (SBCG), an

alternative to derivational (movement-based) theories of grammar that synthesizes ideas developed in Berkeley Construction Grammar and Head-Driven Phrase Structure Grammar. How SBCG can provide a comprehensive and precise account of complex data sets without appeal to the complex structures commonly assumed to be projected from empty elements, and without extravagant assumptions about the biological endowment for language. The relation between grammar design and both language processing and language learning. Prerequisite: Some background in syntax.

*2-4 units, Aut (Sag, I)*

#### **LINGUIST 227C. Projects in Syntax**

Group research projects using quantitative syntactic data from texts, recordings, experiments, or historical records. Skills in extracting, graphically exploring, and analyzing naturalistic syntactic data, and in presenting results. May be repeated for credit. Prerequisite: 229A, B, or D, or equivalent.

*2-4 units, not given this year*

#### **LINGUIST 229A. Laboratory Syntax I**

Critiques of the empirical foundations of syntax. The roles of introspective, usage-based, experimental, and typological evidence. Modern methods of data collection and analysis used in syntax. Hands-on, practical work with data sets. May be repeated for credit.

*1-4 units, not given this year*

#### **LINGUIST 229B. Laboratory Syntax II**

Hands-on use of methods for handling syntactic data, including corpus work on ecologically natural data and controlled experimental paradigms. Explanatory models of syntactic processing and their relation to theories of grammar. May be repeated for credit.

*1-4 units, not given this year*

#### **LINGUIST 229C. Laboratory Syntax III**

Hands-on use of methods for handling syntactic data, including corpus work on ecologically natural data and controlled experimental paradigms. Explanatory models of syntactic processing and their relation to theories of grammar. May be repeated for credit.

*1-4 units, not given this year*

#### **LINGUIST 229D. Empirical Syntax Research Seminar**

Recent work in syntax that employs data-rich methods like corpora and laboratory studies, emphasizing research by seminar participants. May be repeated for credit.

*1-2 units, not given this year*

#### **LINGUIST 230A. Introduction to Semantics and Pragmatics**

(Same as LINGUIST 130A) Linguistic meaning and its role in communication. Topics include ambiguity, vagueness, presupposition, intonational meaning, and Grice's theory of conversational implicature. Applications to issues in politics, the law, philosophy, advertising, and natural language processing. Those who have not taken logic, such as PHIL 150 or 151, should also enroll in 130C. Pre- or corequisite: 120, consent of instructor, or graduate standing in Linguistics.

*4 units, Win (Potts, C)*

#### **LINGUIST 230B. Advanced Semantics and Pragmatics**

Expands on 130A/230A. Detailed study of selected topics in formal semantics and pragmatics. Prerequisites: LINGUIST 130A/230A or permission from instructor.

*2-4 units, Spr (Potts, C)*

#### **LINGUIST 232A. Lexical Semantics**

Introduction to issues in word meaning, focused primarily around verbs. Overview of the core semantic properties of verbs and the organization of the verb lexicon. Approaches to lexical semantic representation, including semantic role lists, proto-roles, and causal and aspectual theories of event conceptualization.

*2-4 units, Aut (Levin, B)*

#### **LINGUIST 232B. Seminar in Lexical Semantics: Aspect**

Current topic: survey of research on various topics in aspect. May be repeated for credit.

*1-4 units, Win (Levin, B)*

#### **LINGUIST 234. Discourse Analysis**

The organization of language above the sentence level, and the manifestation of language in context. Practical experience in

working with discourse data.

*4 units, not given this year*

**LINGUIST 235. Semantic Fieldwork**

Techniques for evidence from less well-studied languages within formal semantic theory. Semantic phenomena, and techniques for investigating them, including scope, quantifiers, pronouns, focus, tense, aspect, mood, evidentiality, and information structure. Practical work on a language.

*2-4 units, not given this year*

**LINGUIST 236. Seminar in Semantics: Context Dependence in Language and Communication**

Exploring the role of context in language learning and language understanding using methods and results from cognitive psychology, language acquisition, and linguistics. Topics include discourse coherence and anaphora, conversational implicature, word learning, on-line sentence comprehension, and the influence of sociolinguistic variables. May be repeated for credit.

*3 units, Spr (Potts, C; Frank, M)*

**LINGUIST 237. Seminar in Semantics: Semantics of Questions and Commands**

Semantics of interrogatives and imperatives; propositional semantics of declaratives. Research emphasizing the meaning of questions. May be repeated for credit.

*1-4 units, not given this year*

**LINGUIST 239. Semantics Research Seminar**

Presentation of ongoing research in semantics. May be repeated for credit.

*1-2 units, not given this year*

**LINGUIST 240. Language Acquisition I**

(Same as LINGUIST 140) Processes of language acquisition in early childhood; stages in development; theoretical issues and research questions. Practical experience in data collection.

*4 units, Aut (Clark, E)*

**LINGUIST 241. Language Acquisition II**

Pragmatics and acquisition. May be repeated for credit.

*1-4 units, Win (Clark, E)*

**LINGUIST 242. Heritage Languages**

(Same as LINGUIST 142) The linguistic and cultural properties of Heritage languages, which are partially acquired and supplanted by a dominant language in childhood. Topics: Syntactic, phonological and morphological properties of heritage languages, implications from experimental HL research for language universals, cultural vs. linguistic knowledge, the role of schooling in HL competence, influence of the dominant language on the HL, and pedagogical issues for HL learners in the classroom.

*3-4 units, not given this year*

**LINGUIST 245. Experimental Design for Linguistics**

Hypothesis formation, confound avoidance, power, general methods, and analysis of results. Students complete a pilot experiment; write-up; peer review; presentation.

*4 units, not given this year*

**LINGUIST 249. Language Processing**

Understanding spoken or written language requires the rapid, incremental processing of novel compositional structures, as well as the integration of the incoming language stream with multiple sources of information, such as the prior discourse, physical context, social information, etc. How are humans able to efficiently accomplish this task? To address this question, this course will consider principles of sentence and discourse processing that guide language understanding and features of sentence & discourse structure that facilitate comprehension. Specific topics are likely to include reference processing, memory & forgetting, individual differences in comprehension ability, the role of context, and computational models of language comprehension.

*2-4 units, Aut (Hofmeister, P)*

**LINGUIST 250. Sociolinguistic Theory and Analysis**

Methods of modeling the patterned variation of language in society. Emphasis is on variation, its relation to social structure and practice, and its role in linguistic change. Intersection between quantitative and qualitative analysis, combining insights of sociology and linguistic anthropology with quantitative linguistic data. Prerequisite: graduate standing in Linguistics or consent of

instructor.

*2-4 units, Aut (Rickford, J)*

**LINGUIST 251. Sociolinguistic Field Methods**

Strengths and weaknesses of the principal methods of data collection in sociolinguistics.

*4 units, not given this year*

**LINGUIST 252. Sociolinguistics and Pidgin Creole Studies**

(Same as LINGUIST 152) Introduction to pidgins and creoles, organized around the main stages in the pidgin-creole life cycle: pidginization, creolization, and decreolization. Focus is on transformations in the English language as it was transported from Britain to Africa, Asia, the Caribbean, and the Pacific. Resultant pidginized and creolized varieties such as Nigerian Pidgin English, Chinese Pidgin English, New Guinea Tok Pisin, Suriname Sranan, and the creole continua of Guyana, Jamaica, and Hawaii. Also French, Dutch, Portuguese, Chinook, Motu, and Sango.

*2-4 units, not given this year*

**LINGUIST 253. Race, Ethnicity, and Language**

(Same as ANTHRO 320A, EDUC 389X) This seminar explores the linguistic construction of race and ethnicity across a wide variety of contexts and communities. Throughout the course, we will take a comparative perspective and highlight how different racial/ethnic formations participate in similar, yet different, ways of doing race through language, interaction and culture. Readings draw heavily from perspectives in (linguistic) anthropology and sociolinguistics.

*3-4 units, Win (Alim, H)*

**LINGUIST 253A. Workshop on Race, Ethnicity, and Language in Schools**

(Same as EDUC 301X) The Workshop on Race, Ethnicity, and Language in Schools is a new School of Education initiative that examines the profound and enduring relationships between race, ethnicity, and language in education in the U.S. and elsewhere. The seminar brings together an interdisciplinary group of leading scholars and graduate students in language in education to address the role of race and ethnicity in a host of complex and controversial language educational issues that cut across the areas of practice, policy, and pedagogy.

*1-4 units, Spr (Alim, H)*

**LINGUIST 254. Sociolinguistics of Language Contact**

(Same as LINGUIST 154) The role of contact between speakers of different languages in processes of language borrowing, convergence, and shift. Attending both to linguistic aspects and social contexts, examine: second-language acquisition, bilingualism, code-switching, lexical and grammatical borrowing, first language attrition, language death, and the creation of new contact varieties such as jargons, mixed languages, pidgins, and creoles. Prerequisite: background in linguistics, at least one course in linguistics.

*2-4 units, not given this year*

**LINGUIST 255. Seminar in Sociolinguistics: California Dialectology**

Topics vary by quarter. Current topic is based on sociolinguistic interviews gathered in the first two field seasons of the Voices of California project. May be repeated for credit.

*2-5 units, Aut (Eckert, P)*

**LINGUIST 257. Sociophonetics**

(Same as LINGUIST 157) The study of phonetic aspects of sociolinguistic variation and the social significance of phonetic variation. Acoustic analysis of vowels, consonants, prosody, and voice quality. Hands-on work on collaborative research project. Prerequisite: 110 or equivalent, or consent of instructor.

*4 units, Spr (Podesva, R)*

**LINGUIST 258. Analysis of Variation**

The quantitative study of linguistic variability in time, space, and society emphasizing social constraints in variation. Hands-on work with variable data. Prerequisites: 105/205 and 250, or consent of instructor.

*1-4 units, Win (Podesva, R)*

**LINGUIST 259. Topics in Sociolinguistics**

Topics vary by quarter. Current topic is language attitudes. Repeatable for credit

*2-4 units, Spr (Rickford, J)*

**LINGUIST 260A. Historical Morphology and Phonology**

Sound change and analogical change in the perspective of linguistic theory. Internal and comparative reconstruction.

*4 units, not given this year*

**LINGUIST 260B. Historical Morphosyntax**

Morphological and syntactic variation and change. Reanalysis, grammaticalization. The use of corpora and quantitative evidence.

*2-4 units, not given this year*

**LINGUIST 262. Constructionalization**

Discussion of recent proposals about how to enhance work on grammaticalization and lexicalization by adopting a construction grammar perspective.

*2-4 units, not given this year*

**LINGUIST 265. African American Vernacular English**

(Same as AFRICAAM 21, LINGUIST 65) The English vernacular spoken by African Americans in big city settings, and its relation to Creole English dialects spoken on the S. Carolina Sea Islands (Gullah), in the Caribbean, and in W. Africa. The history of expressive uses of African American English (in soundin' and rappin'), and its educational implications. Service Learning Course (certified by Haas Center).

*3-5 units, Win (Rickford, J)*

**LINGUIST 266. Vernacular English and Reading**

(Same as LINGUIST 66) Discusses some of the literature on the relation between use of vernacular English varieties (e.g. African American Vernacular English, Chicano English) and the development of literacy (especially in Standard English). But our primary focus is on improving the reading skills of African American and Latino students in local schools through the Reading Road program developed at the University of Pennsylvania. Students must commit to tutoring one or more elementary students weekly, using the program. L65 AAVE recommended, but not required.

*4-5 units, Spr (Rickford, J)*

**LINGUIST 270. The Arabic Language and Culture**

(Same as AMELANG 36, LINGUIST 36) Arabic language from historical, social, strategic, and linguistic perspectives. History of the Arabic language and the stability of classical Arabic over the last 15 centuries. Why the functionality of classical Arabic has not changed as Latin, Old English, and Middle English have. Social aspects of the Arabic language, Ferguson's notion of diglossia. The main varieties of Arabic, differences among them, and when and where they are spoken. Role of Arabic and culture in current world politics, culture, and economy. Linguistic properties of Arabic such as root-based morphology, lexical ambiguity, and syntactic structure relating it to current linguistic theories.

*3 units, not given this year*

**LINGUIST 271. Structure of Basque**

Introduction to key topics in Basque morphology, syntax, semantics and how they bear on current theoretical debates. Topics covered may include basic clause structure and word order, case-marking and ergativity, the expression of motion and location.

*2-4 units, Spr (Levin, B)*

**LINGUIST 272. Structure of Finnish**

Central topics in Finnish phonology/morphology and syntax/semantics and how they bear on current theoretical debates. Topics: stress; vowel harmony; clause structure; case; aspect; word order.

*2-4 units, not given this year*

**LINGUIST 273. The Structure of Russian**

(Same as LINGUIST 173) A synchronic overview of contemporary standard Russian, including its sound system, word formation and grammatical structure. Emphasis is on problems presented by Russian for current linguistic theory. The acquisition of Russian as a first language.

*2-4 units, not given this year*

**LINGUIST 274. Linguistic Field Methods**

(Same as ANTHRO 71, LINGUIST 174) Workshop applying methods for gathering and analyzing linguistic data in the field, i.e., from consultants who are native speakers of a language essentially unknown to the investigator. Principles of language documentation. Students will do local field projects and work on these both in and out of class. Format involves lectures, discussion,

working with native speakers, and student presentations. Topics include: choosing a language; planning the project; computerized collection, storage, and analysis of linguistic data; field recording equipment; interviews and elicitation; diagnostic vocabulary lists and grammatical schedules; field study of everyday communication and discourse; area surveys and the ethnography of communication; ethics, reflexivity, and bias; working with human subjects and governments. Prerequisite: a course in linguistics or in anthropological field methods.

*5 units, Spr (Fox, J)*

**LINGUIST 274A. Linguistic Field Methods**

(Same as ANTHRO 30, LINGUIST 174) Practical training in the collection and analysis of linguistic data from native speakers of a language largely unknown to the investigator. Documentation of endangered languages. Research goals, field trip preparation, ethics (including human subjects, cooperation with local investigators, and governmental permits), working in the community, technical equipment, and analytical strategies. Emphasis is on the use of recording devices and computers in collection and analysis. Prerequisite: introductory course in linguistics.

*3-5 units, not given this year*

**LINGUIST 274B. Field Methods II**

Continuation of 274A, with a focus on phonetic topics in a targeted language. Prerequisite: 274A or consent of instructor.

*2-4 units, not given this year*

**LINGUIST 275. Research Projects Practicum**

Forum for students with ongoing linguistic research projects, intended to provide participants with feedback on issues of study design, data collection and analysis. Some sessions will provide brief introductions to specific topics in research methodology, chosen based on student interest.

*1-2 units, Win (Bresnan, J)*

**LINGUIST 276. Corpus Methods in Syntax/Phonology**

Exploring theoretical questions in phonology, syntax, and their interaction, using annotated corpora. Hands-on experience in corpus work and linguistic modeling.

*2-4 units, Win (Staff)*

**LINGUIST 277. Laboratory Methods in Psycholinguistics**

Issues that commonly arise in the design and implementation of linguistic experiments and in the statistical analysis of empirical results. Topics in experimental design include selection of stimuli, blocking, and power analysis and sample size calculation. How to fit and interpret statistical models using the multilevel regression and Bayesian inference, as implemented in software packages R and Bugs. Topics include interpretation of model coefficients for fixed and random effects, collinearity, model criticism, as well as comparison and reporting of models. Theoretical issues worked out at lab sessions using examples from experiments and corpus studies, including those provided by students.

*2-4 units, not given this year*

**LINGUIST 278. Programming for Linguists**

Computer programming techniques for collecting and analyzing data in linguistic research. Introduction to the UNIX, regular expressions, and Python scripting. Hands-on experience gathering, formatting, and manipulating corpus, field, and experimental data, combining data from multiple sources, and working with existing tools. Knowledge of computer programming not required.

*1-4 units, not given this year*

**LINGUIST 280. From Languages to Information**

(Same as CS 124, LINGUIST 180) Automated processing of less structured information: human language text and speech, web pages, social networks, genome sequences, with goal of automatically extracting meaning and structure. Methods include: string algorithms, automata and transducers, hidden Markov models, graph algorithms, XML processing. Applications such as information retrieval, text classification, social network models, machine translation, genomic sequence alignment, word meaning extraction, and speech recognition. Prerequisite: CS103, CS107, CS109.

*3-4 units, Win (Jurafsky, D)*

**LINGUIST 281. Grammar Engineering**

(Same as LINGUIST 181) Hands-on techniques for implementation of linguistic grammars, drawing on grammatical



theory and engineering skills. The implementation of constraints in morphology, syntax, and semantics, working within a unification-based lexicalist framework. Focus is on developing small grammars for English and at least one other language. Prerequisite: basic syntactic theory or 120. No programming skills required.

*1-4 units, not given this year*

**LINGUIST 282. Computational Theories of Syntax**

(Same as LINGUIST 182) Salient features of modern syntactic theories, including HPSG, LFG, and TAG, motivated by computational concerns. Impact of work within these frameworks on the design of algorithms in computational linguistics, and its influence in both linguistics and computer science. Topics include: notions of unification; unification algorithms and their relation to linguistic theory; agenda-driven chart processing for analysis and synthesis; the interface with morphology, the lexicon, and semantics; and applications, notably machine translation.

*3-4 units, not given this year*

**LINGUIST 283. Basic Algorithms for Computational Linguistics**

Foundational algorithms of non-statistical computational linguistics, including string searching, suffix trees and suffix arrays, finite-state technology for phonology, morphology and dictionary access, classical back-tracking programs for sentence analysis, the use of charts in parsing, generation and translation. Students complete a programming project in one of these areas.

*2-4 units, Win (Kay, M)*

**LINGUIST 284. Natural Language Processing**

(Same as CS 224N) Methods for processing human language information and the underlying computational properties of natural languages. Syntactic and semantic processing from linguistic and algorithmic perspectives. Focus is on modern quantitative techniques in NLP: using large corpora, statistical models for acquisition, translation, and interpretation; and representative systems. Prerequisites: CS124 or CS121/221.

*3-4 units, Aut (Manning, C)*

**LINGUIST 284A. Writing Systems in a Digital World**

(Same as LINGUIST 185) Writing systems and their behaviors. Classification of scripts as alphabetic, syllabic, and ideographic; what features typically belong to each group. What can be considered an ideal script. Topics include: why Japanese writing is considered a complex system; the influence of Indian writing on other syllabic scripts; how writing systems extend their reach to new languages; linguistic insights by studying this process; the Unicode standard; and font technology. Recommended: basic phonetics.

*2-3 units, not given this year*

**LINGUIST 285. Speech Recognition and Synthesis**

(Same as CS 224S) Automatic speech recognition, speech synthesis, and dialogue systems. Focus is on key algorithms including noisy channel model, hidden Markov models (HMMs), Viterbi decoding, N-gram language modeling, unit selection synthesis, and roles of linguistic knowledge. Prerequisite: programming experience. Recommended: CS 221 or 229.

*2-4 units, not given this year*

**LINGUIST 286. Information Retrieval and Web Search**

(Same as CS 276) Text information retrieval systems; efficient text indexing; Boolean, vector space, and probabilistic retrieval models; ranking and rank aggregation; evaluating IR systems. Text clustering and classification: classification algorithms, latent semantic indexing, taxonomy induction; Web search engines including crawling and indexing, link-based algorithms, and web metadata. Prerequisites: CS 107, CS 109, CS 161.

*3 units, Spr (Nayak, P; Manning, C)*

**LINGUIST 287. Extracting Social Meaning and Sentiment**

(Same as CS 424P) Methods for extracting social meaning (speaker perspectives, emotions and attitudes) from text and speech. Topics include sentiment analysis and summarization, detection of deception, sarcasm, emotion, and personality. Analysis of meaning-bearing characteristics of the speaker and topic, including text, discourse, prosodic and other cues. Prerequisite: CS 124 or 221 or 229 or permission of instructors.

*3 units, not given this year*

**LINGUIST 288. Natural Language Understanding**

(Same as CS 224U, LINGUIST 188) Machine understanding of

human language. Computational semantics (determination of word sense and synonymy, event structure and thematic roles, time, aspect, causation, compositional semantics, scopal operators), and computational pragmatics and discourse (coherence, coreference resolution, information packaging, dialogue structure). Theoretical issues, online resources, and relevance to applications including question answering and summarization. Prerequisites: one of LINGUIST 180 / CS 124 / CS 224N,S: and logic such as LINGUIST 130A or B, CS 157, or PHIL150).

*3-4 units, Win (MacCartney, W; Potts, C)*

**LINGUIST 289. Topics in Computational Linguistics: History of Computational Linguistics**

Intellectual history of computational linguistics and natural language processing, together with related aspects of dialogue and speech processing, using primary sources. Reading of seminal early papers, interviews with historical figures, with the goal of understanding the origins and intellectual development of the field. Prerequisites: at least one of LING 180, 281, 283, 284, 286, or 288.

*3-4 units, not given this year*

**LINGUIST 291. Linguistics and the Teaching of English as a Second/Foreign Language**

(Same as LINGUIST 191) Methodology and techniques for teaching languages, using concepts from linguistics and second language acquisition theory and research. Focus is on teaching English, but most principles and techniques applicable to any language. Optional 1-unit seminar in computer-assisted language learning.

*4-5 units, Win (Hubbard, P; Rylance, C)*

**LINGUIST 292. Language Testing**

(Same as LINGUIST 192) Measurement of production and reception of spoken and written language. Cross-disciplinary comparison of assessments in educational, clinical, and engineering contexts.

*2-4 units, Spr (Staff)*

**LINGUIST 293. Research Seminar in Applied Linguistics**

(Same as EDUC 435X) For graduate students in the schools of Education and Humanities and Sciences who are engaged in research pertaining to applied linguistic topics in original research. Topics: language policies and planning, language and gender, writing and critical thinking, foreign language education, and social applications of linguistic science. (SSPEP)

*1-4 units, not given this year*

**LINGUIST 294. Linguistic Research Discussion Group**

Restricted to first-year Linguistics Ph.D. students.

*1 unit, Aut (Levin, B)*

**LINGUIST 390. M.A. Project**

*1-3 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**LINGUIST 394. TA Training Workshop**

For second-year graduate students in Linguistics

*1 unit, Aut (Levin, B)*

**LINGUIST 395. Research Workshop**

Restricted to students in the doctoral program. Student presentations of research toward qualifying papers.

*1-2 units, Spr (Levin, B; Sag, I)*

**LINGUIST 395C. Research Workshop III**

Restricted to students in the doctoral program. Student presentations of research toward qualifying papers.

*1-2 units, Sum (Staff)*

**LINGUIST 396. Research Projects in Linguistics**

Mentored research project for first-year graduate students in linguistics.

*2-3 units, Aut (Staff), Win (Staff)*

**LINGUIST 397. Directed Reading**

*1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**LINGUIST 398. Directed Research**

*1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**LINGUIST 399. Dissertation Research**

*1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*



# MANAGEMENT SCIENCE AND ENGINEERING (MS&E) COURSES

## UNDERGRADUATE COURSES IN MANAGEMENT SCIENCE AND ENGINEERING

Primarily for undergraduates; graduate students may enroll with consent of adviser.

### MS&E 22Q. The Flaw of Averages

(S,Sem) Stanford Introductory Seminar. Uncertain assumptions in business and public policy are often replaced with single best guesses or average numbers. This leads to a fallacy as fundamental as the belief that the earth is flat, which I call the Flaw of Averages. It states, in effect, that plans based on average assumptions are wrong on average. This class will discuss mitigations of the flaw of averages using simulation and other methods from probability management.

3 units, Aut (Savage, S)

### MS&E 41. Financial Literacy

Practical knowledge about personal finance and money management including budgeting, pay checks, credit cards, banking, insurance, taxes, and saving. Class especially appropriate for those soon to be self-supporting. Limited enrollment.

1 unit, Win (Morrison, M), Spr (Morrison, M)

### MS&E 52. Introduction to Decision Making

Experienced management consultants share lessons and war stories. Case studies, disguised examples from real engagements, and movie clips illustrate theories and concepts of decision analysis. Student teams critique decisions made in actual organizations. Topics include what makes a good decision, how decisions can be made better, framing and structuring techniques, modeling and analysis tools, biases and probability assessment, evaluation and appraisal methods, decision psychology, creativity and organizational leadership, and effective presentation styles. Not intended for MS&E majors.

3 units, Sum (Staff)

### MS&E 92Q. International Environmental Policy

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Science, economics, and politics of international environmental policy. Current negotiations on global climate change, including actors and potential solutions. Sources include briefing materials used in international negotiations and the U.S. Congress.

3 units, Win (Weyant, J)

### MS&E 93Q. Nuclear Weapons, Energy, Proliferation, and Terrorism

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. What are nuclear weapons; what do they do? How are they different from other weapons? What drives proliferation of nuclear weapons? Why do countries want them? Can they be eliminated? What about Iran and North Korea? What role does nuclear energy play? Can it help combat global climate change? What are the risks of nuclear terrorism? Recommended: a course in international relations, engineering, or physical science. GER:DB-EngrAppSci, DB-EngrAppSci

3 units, Spr (Hecker, S)

### MS&E 94Q. The Public Use and Misuse of Mathematics: How to Interpret Numbers as Used by Media and Politicians

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. How to unearth and interpret relevant math to illuminate underlying political and economic issues. How to interpret public budgets, whether jury pool selection is biased, estimate pollution risks, and when to believe poll results and statistical relationships; how to deal with rare but high-consequence eventualities such as terrorism, a nuclear meltdown, or a possible pandemic. How to determine how much to pay to reduce carbon emissions, when a medicine should be withdrawn, and what is a useful forecast.

3 units, Spr (May, M)

### MS&E 101. Undergraduate Directed Study

Subject of mutual interest to student and faculty member. Prerequisite: faculty sponsor.

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### MS&E 107. Interactive Management Science

(Same as MS&E 207) Analytical techniques such as linear and integer programming, Monte Carlo simulation, forecasting, decision analysis, and Markov chains in the environment of the spreadsheet. Probability management. Materials include spreadsheet add-ins for implementing these and other techniques. Emphasis is on building intuition through interactive modeling, and extending the applicability of this type of analysis through integration with existing business data structures. GER:DB-EngrAppSci

3 units, Aut (Savage, S)

### MS&E 108. Senior Project

Restricted to MS&E majors in their senior year. Students carry out a major project in groups of four, applying techniques and concepts learned in the major. Project work includes problem identification and definition, data collection and synthesis, modeling, development of feasible solutions, and presentation of results. Service Learning Course (certified by Haas Center).

5 units, Win (Brandeau, M; Carlson, R; Eesley, C; Katila, R; Shachter, R)

### MS&E 111. Introduction to Optimization

(Same as ENGR 62) Formulation and analysis of linear optimization problems. Solution using Excel solver. Polyhedral geometry and duality theory. Applications to contingent claims analysis, production scheduling, pattern recognition, two-player zero-sum games, and network flows. Prerequisite: MATH 51. GER:DB-EngrAppSci

4 units, Aut (Van Roy, B), Spr (Goel, A)

### MS&E 112. Mathematical Programming and Combinatorial Optimization

(Same as MS&E 212) Combinatorial and mathematical programming (integer and non-linear) techniques for optimization. Topics: linear program duality and LP solvers; integer programming; combinatorial optimization problems on networks including minimum spanning trees, shortest paths, and network flows; matching and assignment problems; dynamic programming; linear approximations to convex programs; NP-completeness. Hands-on exercises. Prerequisites: CS 106A or X; ENGR 62 or MATH 103. GER:DB-EngrAppSci

3 units, Win (Saber, A)

### MS&E 120. Probabilistic Analysis

Concepts and tools for the analysis of problems under uncertainty, focusing on model building and communication: structuring, processing, and presentation of probabilistic information. Examples from legal, social, medical, and physical problems. Spreadsheets illustrate and solve problems as a complement to analytical closed-form solutions. Topics: axioms of probability, probability trees, random variables, distributions, conditioning, expectation, change of variables, and limit theorems. Prerequisite: MATH 51. Recommended: knowledge of spreadsheets. GER:DB-EngrAppSci

5 units, Aut (Shachter, R)

### MS&E 121. Introduction to Stochastic Modeling

Stochastic processes and models in operations research. Discrete and continuous time parameter Markov chains. Queuing theory, inventory theory, simulation. Prerequisite: 120 or Statistics 116. GER:DB-EngrAppSci

4 units, Win (Chang, D)

### MS&E 130. Information Networks and Services

Architecture of the Internet and performance engineering of computer systems and networks. Switching, routing and shortest path algorithms. Congestion management and queueing networks. Peer-to-peer networking. Wireless and mobile networking. Information service engineering and management. Search engines and recommendation systems. Reputation systems and social networking technologies. Security and trust. Information markets. Select special topics and case studies. Prerequisites: 111, 120, and CS 106A. GER:DB-EngrAppSci

3 units, Spr (Bambos, N)

**MS&E 134. Organization Change and Information Systems**

(Same as MS&E 234) Leading organizational change and Information Systems. Case method discussions and lectures. Themes include: real-time enterprise; reengineering; organization transformation, cross-functional teams, IT development, and leading IT. Course includes a group project that is defined and approved during the first two weeks of class. Limited enrollment. Prerequisites: CS 106A, 180, or equivalents.

3 units, Win (Tabrizi, B)

**MS&E 140. Accounting for Managers and Entrepreneurs**

(Same as MS&E 240) Non-majors and minors who have taken or are taking elementary accounting should not enroll. Introduction to accounting concepts and the operating characteristics of accounting systems. The principles of financial and cost accounting, design of accounting systems, techniques of analysis, and cost control. Interpretation and use of accounting information for decision making. Designed for the user of accounting information and not as an introduction to a professional accounting career.

3-4 units, Aut (Stanton, F), Win (Stanton, F), Sum (Staff)

**MS&E 142. Introductory Financial Analysis**

Evaluation and management of money, complicated by temporary distributions and uncertainty. The time-value of money and its impact on economic decisions (both personal and corporate) with the introduction of interest rate (constant or varying over time); several approaches critically examined and made consistent as suitable metrics of comparison. The concept of investment diversification in the presence of uncertainty; portfolio selection and efficient frontier analysis leading to the formulation of the Capital Asset Pricing Model; practical implementation of the concepts, including comparison of loan (e.g., house and auto) terms, credit card financial terms, interest rate term structure and its relationship to rate-of-return analysis, and graphical presentation of uncertain investment alternatives; and current economic news of interest. Critical thinking, discussion, and interaction, using group and computer labs assignments. Prerequisites: differential calculus and probability.

3 units, Aut (Chiu, S)

**MS&E 146. Corporate Financial Management**

Key functions of finance in both large and small companies, and the core concepts and key analytic tools that provide their foundation. Making financing decisions, evaluating investments, and managing cashflow, profitability and risk. Designing performance metrics to effectively measure and align the activities of functional groups and individuals within the firm. Structuring relationships with key customers, partners and suppliers. Prerequisite: 142 or 245G or equivalent.

3 units, Win (Johnson, B)

**MS&E 152. Introduction to Decision Analysis**

(Same as MS&E 152W) How to make good decisions in a complex, dynamic, and uncertain world. People often make decisions that on close examination they regard as wrong. Decision analysis uses a structured conversation based on actional thought to obtain clarity of action in a wide variety of domains. Topics: distinctions, possibilities and probabilities, relevance, value of information and experimentation, relevance and decision diagrams, risk attitude. Students seeking to fulfill the Writing in the Major requirement should register for MS&E 152W. GER:DB-EngrAppSci

3-4 units, Spr (Shachter, R)

**MS&E 152W. Introduction to Decision Analysis**

(Same as MS&E 152) How to make good decisions in a complex, dynamic, and uncertain world. People often make decisions that on close examination they regard as wrong. Decision analysis uses a structured conversation based on actional thought to obtain clarity of action in a wide variety of domains. Topics: distinctions, possibilities and probabilities, relevance, value of information and experimentation, relevance and decision diagrams, risk attitude. Students seeking to fulfill the Writing in the Major requirement should register for MS&E 152W. GER:DB-EngrAppSci, WIM

3-4 units, Spr (Shachter, R)

**MS&E 175. Innovation, Creativity, and Change**

Problem solving in organizations; creativity and innovation skills; thinking tools; creative organizations, teams, individuals, and

communities. Limited enrollment. (Katila)

3-4 units, Win (Katila, R)

**MS&E 178. The Spirit of Entrepreneurship**

Is there more to entrepreneurship than inventing the better mouse trap? This course uses the speakers from the Entrepreneurial Thought Leader seminar (MS&E472) to drive research and discussion about what makes an entrepreneur successful. Topics include venture financing, business models, and interpersonal dynamics in the startup environment. Students meet before and after MS&E 472 to prepare for and debrief after the sessions. Enrollment limited to 50 students.

3 units, Aut (Roizen, H), Win (Roizen, H), Spr (Staff)

**MS&E 180. Organizations: Theory and Management**

For undergraduates only; preference to MS&E majors. Classical and contemporary organization theory; the behavior of individuals, groups, and organizations. Limited enrollment. Students must attend first session.

4 units, Aut (Eisenhardt, K), Spr (Staff)

**MS&E 181. Issues in Technology and Work for a Postindustrial Economy**

How changes in technology and organization are altering work and lives. Approaches to studying and designing work. How understanding work and work practices can assist engineers in designing better technologies and organizations. Topics include job design, distributed and virtual organizations, the blurring of boundaries between work and family life, computer supported cooperative work, trends in skill requirements and occupational structures, monitoring and surveillance in the workplace, downsizing and its effects on work systems, project work and project-based lifestyles, the growth of contingent employment, telecommuting, electronic commerce, and the changing nature of labor relations. Enrollment limited to 50 students. Preference to MS&E, STS, and CEE seniors, followed by MS&E, STS, and CEE juniors.

3 units, Spr (Barley, S)

**MS&E 185. Global Work**

Issues, challenges, and opportunities facing workers, teams, and organizations working across national boundaries. Topics include geographic distance, time zones, language and cultural differences, technologies to support distant collaboration, team dynamics, and corporate strategy. Limited enrollment.

4 units, Aut (Siino, R), Spr (Siino, R)

**MS&E 189. Social Networks - Theory, Methods, and Applications**

Introduces students to the theoretical, substantive, and methodological foundations of social networks. The social network paradigm seeks to explain how social relations facilitate and constrain an actor's opportunities, behaviors, and cognitions. Topics include: network concepts and principles; network data collection, measurement, and analysis; and applications in management, engineering, and related disciplines.

3 units, Aut (Lifschitz, A)

**MS&E 190. Methods and Models for Policy and Strategy Analysis**

Guest lectures by departmental practitioners. Emphasis is on links among theory, application, and observation. Environmental, national security, and health policy; marketing, new technology, and new business strategy analyses. Comparisons between domains and methods.

3 units, not given this year

**MS&E 193. Technology and National Security**

(Same as MS&E 193W, MS&E 293) The interaction of technology and national security policy from the perspective of history to implications for the new security imperative, homeland defense. Key technologies in nuclear and biological weapons, military platforms, and intelligence gathering. Policy issues from the point of view of U.S. and other nations. The impact of terrorist threat. Guest lecturers include key participants in the development of technology and/or policy. Students seeking to fulfill the WIM requirement should register for 193W.

3 units, Aut (Hecker, S; Perry, W)

**MS&E 193W. Technology and National Security**

(Same as MS&E 193, MS&E 293) The interaction of technology and national security policy from the perspective of history to

implications for the new security imperative, homeland defense. Key technologies in nuclear and biological weapons, military platforms, and intelligence gathering. Policy issues from the point of view of U.S. and other nations. The impact of terrorist threat. Guest lecturers include key participants in the development of technology and/or policy. Students seeking to fulfill the WIM requirement should register for 193W. WIM

3 units, Aut (Hecker, S; Perry, W)

#### **MS&E 197. Ethics and Public Policy**

(Same as PUBLPOL 103B, STS 110) Ethical issues in science- and technology-related public policy conflicts. Focus is on complex, value-laden policy disputes. Topics: the nature of ethics and morality; rationales for liberty, justice, and human rights; and the use and abuse of these concepts in policy disputes. Case studies from biomedicine, environmental affairs, technical professions, communications, and international relations. GER:DB-Hum, EC-EthicReas, WIM

5 units, Win (McGinn, R)

#### **MS&E 198. Applied Modeling of Energy and Environmental Markets**

Economic principles in models of energy and environmental markets. Spreadsheet examples for developing insights and communicating with decision makers. Market-clearing conditions, controlling emissions through fees, diffusion of new technologies, resource depletion, cartel behavior, and model evaluation. Prerequisites: ECON 50 and spreadsheets, or consent of instructor.

1 unit, not given this year

## **GRADUATE COURSES IN MANAGEMENT SCIENCE AND ENGINEERING**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

#### **MS&E 201. Dynamic Systems**

Goal is to think dynamically in decision making, and recognize and analyze dynamic phenomena in diverse situations. Concepts: formulation and analysis; state-space formulation; solutions of linear dynamic systems, equilibria, dynamic diagrams; eigenvalues and eigenvectors of linear systems, the concept of feedback; nonlinear dynamics, phase plane analysis, linearized analysis, Liapunov functions, catastrophe theory. Examples: grabber-holder dynamics, technology innovation dynamics, creation of new game dynamics in business competition, ecosystem dynamics, social dynamics, and stochastic exchange dynamics. Prerequisite: MATH 51 or equivalent.

3-4 units, Spr (Tse, E)

#### **MS&E 205. Product and Systems Development**

(Same as AA 253) Modern approaches to aerospace design development for life cycle value. Concepts of air and space systems development in a systems context. Stakeholder value issues and requirements through manufacturing and delivery. Processes and practices for functional analysis, concept and architecture development, trades, domain criteria, interfaces, and verification and validation. Reliability, risk, and safety. Value stream analysis, integrated product and process development, key characteristics, and hardware/software integration aimed at information systems. Tools involve quality function deployment, design structure matrices, and decision mechanisms.

3 units, Spr (Weiss, S)

#### **MS&E 206. Art of Mathematical Modeling**

Practicum. Students build mathematical models of real-life, ill-framed problems. Emphasis is on framing the issues, articulating modeling components logically (drawing from student's mathematical background), and analyzing the resulting model. Hands-on modeling. Project work in small groups. Prerequisites: basic analysis, calculus and algebra, and probability theory. Recommended: decision analysis, optimization and dynamic systems.

3-4 units, Spr (Kieffel, H)

#### **MS&E 207. Interactive Management Science**

(Same as MS&E 107) Analytical techniques such as linear and integer programming, Monte Carlo simulation, forecasting, decision analysis, and Markov chains in the environment of the spreadsheet. Probability management. Materials include

spreadsheet add-ins for implementing these and other techniques. Emphasis is on building intuition through interactive modeling, and extending the applicability of this type of analysis through integration with existing business data structures.

3 units, Aut (Savage, S)

#### **MS&E 208A. Practical Training**

MS&E students obtain employment in a relevant industrial or research activity to enhance professional experience, consistent with the degree program they are pursuing. Students submit a one-page statement showing relevance to degree program along with offer letter before the start of the quarter, and a 2-3 page final report documenting the work done and relevance to degree program at the conclusion of the quarter. Master's students are limited to one quarter of practical training. B.S. and Ph.D. students may take each of A, B, and C once.

1 unit, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

#### **MS&E 208B. Practical Training**

MS&E students obtain employment in a relevant industrial or research activity to enhance professional experience, consistent with the degree program they are pursuing. Students submit a one-page statement showing relevance to degree program along with offer letter before the start of the quarter, and a 2-3 page final report documenting the work done and relevance to degree program at the conclusion of the quarter. Master's students are limited to one quarter of practical training. B.S. and Ph.D. students may take each of A, B, and C once.

1 unit, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

#### **MS&E 208C. Practical Training**

MS&E students obtain employment in a relevant industrial or research activity to enhance professional experience, consistent with the degree program they are pursuing. Students submit a one-page statement showing relevance to degree program along with offer letter before the start of the quarter, and a 2-3 page final report documenting the work done and relevance to degree program at the conclusion of the quarter. Master's students are limited to one quarter of practical training. B.S. and Ph.D. students may take each of A, B, and C once.

1 unit, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

#### **MS&E 211. Linear and Nonlinear Optimization**

Optimization theory and modeling. The role of prices, duality, optimality conditions, and algorithms in finding and recognizing solutions. Perspectives: problem formulation, analytical theory, computational methods, and recent applications in engineering, finance, and economics. Theories: finite dimensional derivatives, convexity, optimality, duality, and sensitivity. Methods: simplex and interior-point, gradient, Newton, and barrier. Prerequisite: MATH 51.

3-4 units, Aut (Ye, Y)

#### **MS&E 212. Mathematical Programming and Combinatorial Optimization**

(Same as MS&E 112) Combinatorial and mathematical programming (integer and non-linear) techniques for optimization. Topics: linear program duality and LP solvers; integer programming; combinatorial optimization problems on networks including minimum spanning trees, shortest paths, and network flows; matching and assignment problems; dynamic programming; linear approximations to convex programs; NP-completeness. Hands-on exercises. Prerequisites: CS 106A or X; ENGR 62 or MATH 103.

3 units, Win (Saber, A)

#### **MS&E 220. Probabilistic Analysis**

Concepts and tools for the analysis of problems under uncertainty, focusing on model building and communication: the structuring, processing, and presentation of probabilistic information. Examples from legal, social, medical, and physical problems. Spreadsheets illustrate and solve problems as a complement to analytical closed-form solutions. Topics: axioms of probability, probability trees, random variables, distributions, conditioning, expectation, change of variables, and limit theorems. Prerequisite: MATH 51. Recommended: knowledge of spreadsheets.

3-4 units, Aut (Chiu, S)

#### **MS&E 221. Stochastic Modeling**

Focus is on time-dependent random phenomena. Topics: discrete and continuous time Markov chains, renewal processes, queuing

theory, and applications. Emphasis is on building a framework to formulate and analyze probabilistic systems. Prerequisite: 220 or consent of instructor.

3 units, Win (Johari, R)

### MS&E 223. Simulation

Discrete-event systems, generation of uniform and non-uniform random numbers, Monte Carlo methods, programming techniques for simulation, statistical analysis of simulation output, efficiency-improvement techniques, decision making using simulation, applications to systems in computer science, engineering, finance, and operations research. Prerequisites: working knowledge of a programming language such as C, C++, Java, or FORTRAN; probability; and statistical methods.

3 units, Spr (Haas, P)

### MS&E 233. Networked Markets

An introduction to economic analysis for modern online services and systems. Topics include: Examples of networked markets. Online advertising. Recommendation and reputation systems. Pricing digital media. Network effects and network externalities. Social learning and herd behavior. Markets and information. Prerequisites: Math 51 and probability at the level of MS&E 220 or equivalent. No prior economics background will be assumed; requisite concepts will be introduced as needed.

3 units, Spr (Johari, R)

### MS&E 234. Organization Change and Information Systems

(Same as MS&E 134) Leading organizational change and Information Systems. Case method discussions and lectures. Themes include: real-time enterprise; reengineering; organization transformation, cross-functional teams, IT development, and leading IT. Course includes a group project that is defined and approved during the first two weeks of class. Limited enrollment. Prerequisites: CS 106A, 180, or equivalents.

3 units, Win (Tabrizi, B)

### MS&E 236. Game Theory with Engineering Applications

Strategic interactions among multiple decision makers emphasizing applications to engineering systems. Topics: efficiency and fairness; collective decision making and cooperative games; static and dynamic noncooperative games; and complete and incomplete information models. Competition: Bertrand, Cournot, and Stackelberg models. Mechanism design: auctions, contracts. Examples from engineering problems. Prerequisites: MATH 51 and exposure to probability such as 120 or EE 178. Recommended: 211, concurrent enrollment in 241 or ECON 202.

3 units, Win (Erhun Oguz, F), alternate years, not given next year

### MS&E 236H. Game Theory with Engineering Applications

Advanced and mathematically more rigorous version of MS&E 236. Strategic interactions among multiple decision makers emphasizing applications to engineering systems. Topics: efficiency and fairness; collective decision making and cooperative games; static and dynamic noncooperative games; and complete and incomplete information models. Competition: efficient markets; Bertrand, Cournot, and Stackelberg models. Mechanism design: auctions, contracts. Examples from engineering problems. Prerequisites: mathematical maturity; MATH 51; probability at the level of 220, STATS 116, or equivalent. Recommended: 211, concurrent enrollment in 241 or ECON 202.

3 units, alternate years, not given this year

### MS&E 237. The Social Data Revolution: Data Mining and Electronic Business

Hands-on exploration of current and emergent data sources and their impact on individuals, business and society: recommendation engines, reputation systems, social network analysis, and engagement metrics. Guest speakers, homework assignments and group projects (e.g., Twitter and Facebook apps) combine data strategy, machine learning, modern and traditional marketing, behavioral economics, and incentive design. Cases include Amazon.com, BestBuy, MySpace, Lufthansa, and startups. Prerequisites: intellectual curiosity, entrepreneurial spirit, some programming experience (details at weigend.com/teaching), and willingness to implement in the real world.

3 units, not given this year

### MS&E 238. Leading Trends in Information Technology

Focuses on new trends and disruptive technologies in IT. Emphasis

on the way technologies create a competitive edge and generate business value. Broad range of views presented by guest speakers, including top level executives of technology companies, and IT executives (e.g. CIOs) of Fortune 1000 companies. Special emphasis in technologies such as Virtualization, Cloud Computing, Security, Mobility and Unified Communications.

3 units, Sum (Staff)

### MS&E 239. Computational Advertising

Computational, economic, and optimization issues in online advertising, in contexts including web search, social networks, web surfing, and online multimedia. Overview of scientific and engineering issues arising in building online advertising platforms for Internet advertising formats, as well as ad pricing, ad auctions, and ad optimization. Research frontiers of this young discipline. Limited enrollment. Prerequisites: elementary probability and linear algebra.

3 units, Aut (Broder, A; Josifovski, V)

### MS&E 240. Accounting for Managers and Entrepreneurs

(Same as MS&E 140) Non-majors and minors who have taken or are taking elementary accounting should not enroll. Introduction to accounting concepts and the operating characteristics of accounting systems. The principles of financial and cost accounting, design of accounting systems, techniques of analysis, and cost control. Interpretation and use of accounting information for decision making. Designed for the user of accounting information and not as an introduction to a professional accounting career.

3-4 units, Aut (Stanton, F), Win (Stanton, F), Sum (Staff)

### MS&E 241. Economic Analysis

Principal methods of economic analysis of the production activities of firms, including production technologies, cost and profit, and perfect and imperfect competition; individual choice, including preferences and demand; and the market-based system, including price formation, efficiency, and welfare. Practical applications of the methods presented. See 341 for continuation of 241. Recommended: 211, ECON 50.

3-4 units, Win (Sweeney, J)

### MS&E 242. Investment Science

Theory and application of modern quantitative investment analysis from an engineering perspective. How investment concepts are used to evaluate and manage opportunities, portfolios, and investment products including stocks, bonds, mortgages, and annuities. Topics: deterministic cash flows (term structure of interest rates, bond portfolio immunization, project optimization); mean-variance theory (Markowitz model, capital asset pricing); and arbitrage pricing theory. Group project. Prerequisites: 120, MATH 51, or equivalents. Recommended: 111, 140, knowledge of spreadsheets. Limited enrollment.

3 units, Aut (Infanger, G; Luenberger, D)

### MS&E 242H. Investment Science Honors

Concepts of modern quantitative finance and investments. Basic concepts under certainty including arbitrage, term structure of interest rates, and bond portfolio immunization. A situation of uncertainty in one period. Topics: arbitrage; theorems of asset pricing; pricing measures; derivative securities; applications and estimating of financial risk measures; mean-variance portfolio analysis; and equilibrium and the capital asset pricing model. Group projects involving financial market data. Enrollment limited. Prerequisites: basic probability, statistics, and economics such as MS&E 120, 121, MATH 51, or equivalents. No prior knowledge of finance required.

3 units, Aut (Giesecke, K)

### MS&E 242S. Investment Science

Emphasis is on a cash flow approach. Topics include deterministic cash flow analysis (time value of money, present value, internal rate of return, taxes, inflation), fixed income securities, duration and bond portfolio immunization, term structure of interest rates (spot rates, discount factors, forward rates), Fisher-Weill duration and immunization, capital budgeting, dynamic optimization problems, investments under uncertainty, mean-variance portfolio theory, capital asset pricing, and basic options theory. Goal is to create a link between engineering analysis and business decision making.

3 units, Sum (Staff)

**MS&E 243. Energy and Environmental Policy Analysis**

Concepts, methods, and applications. Energy/environmental policy issues such as automobile fuel economy regulation, global climate change, research and development policy, and environmental benefit assessment. Group project. Prerequisite: MS&E 241 or ECON 50, 51.

3 units, Spr (Sweeney, J)

**MS&E 245G. Finance for Non-MBAs**

(Same as ECON 135) For graduate students and advanced undergraduates. The foundations of finance; applications in corporate finance and investment management. Financial decisions made by corporate managers and investors with focus on process valuation. Topics include criteria for investment decisions, valuation of financial assets and liabilities, relationships between risk and return, market efficiency, and the valuation of derivative securities. Corporate financial instruments including debt, equity, and convertible securities. Equivalent to core MBA finance course, FINANCE 220. Prerequisites: ECON 51, or ENGR 60, or equivalent; ability to use spreadsheets, and basic probability and statistics concepts including random variables, expected value, variance, covariance, and simple estimation and regression.

3-5 units, Aut (Perez-Gonzalez, F), Win (Admati, A)

**MS&E 247G. International Financial Management**

With a daily volume of more than \$1.8tr the foreign exchange market is by far the largest financial market in the world. It is also one of the most important ones as it is impossible to avoid exchange rate risk in the global economy. We will examine various aspects of the foreign exchange market. First, we will examine the role of governments and central banks. We will then focus on the markets for spot exchange, currency forwards, options, swaps, international bonds, and international equities. For each of these markets, the valuation of instruments traded in these markets and, through cases, the application of these instruments to managing exposure to exchange rates, financing in international capital markets, and international capital budgeting. It is strongly recommended that students take Finance for Non-MBAs (FINANCE 221/MS&E 245G/ECON 135) as a pre- or co-requisite to this course. MS&E 242/242S/242H or MATH 238/STATS 250 are also acceptable.

4 units, not given this year

**MS&E 247S. International Investments**

International financial markets, their comparative behavior and interrelations. Focus is on assets traded in liquid markets: currencies, equities, bonds, swaps, and derivatives. Topics: institutional arrangements, taxation and regulation, international arbitrage and parity conditions, valuation of target firms for cross-border acquisitions, direct foreign investment, international diversification and portfolio management, derivative instruments and dynamic investment strategies, international performance analysis, international capital flows and financial crises, and topics of current relevance and importance.

3 units, Sum (Staff)

**MS&E 248. Economics of Natural Resources**

Intertemporal economic analysis of natural resource use, particularly energy, and including air, water, and other depletable mineral and biological resources. Emphasis is on an integrating theory for depletable and renewable resources. Stock-flow relationships; optimal choices over time; short- and long-run equilibrium conditions; depletion/extinction conditions; market failure mechanisms (common-property, public goods, discount rate distortions, rule-of-capture); policy options. Prerequisite: 241 or ECON 51.

3-4 units, Aut (Giraudet, L)

**MS&E 249. Economic Growth and Development**

What generates economic growth. Emphasis is on theory accompanied by intuition, illustrated with country cases. Topics: the equation of motion of an economy; optimal growth theory; calculus of variations and optimal control approaches; deriving the Euler and Pontryaguine equations from economic reasoning. Applications: former planned economies in Russia and E. Europe; the present global crisis: causes and consequences; a comparative study of India and China. The links between economic growth and civilization; the causes of the rise and decline of civilizations; lessons for the future. Intended for graduate students. Prerequisite: multivariable calculus.

3 units, Sum (Staff)

**MS&E 250A. Engineering Risk Analysis**

(Same as PUBLPOL 355) The techniques of analysis of engineering systems for risk management decisions involving trade-offs (technical, human, environmental aspects). Elements of decision analysis; probabilistic risk analysis (fault trees, event trees, systems dynamics); economic analysis of failure consequences (human safety and long-term economic discounting); and case studies such as space systems, nuclear power plants, and medical systems. Public and private sectors. Prerequisites: probability, decision analysis, stochastic processes, and convex optimization.

3 units, NEXTYEAR

**MS&E 250B. Project Course in Engineering Risk Analysis**

Students, individually or in groups, choose, define, formulate, and resolve a real risk management problem, preferably from a local firm or institution. Oral presentation and report required. Scope of the project is adapted to the number of students involved. Three phases: risk assessment, communication, and management. Emphasis is on the use of probability for the treatment of uncertainties and sensitivity to problem boundaries. Limited enrollment. Prerequisites: MS&E 250A and consent of instructor.

3 units, NEXTYEAR

**MS&E 251. Stochastic Decision Models**

Efficient formulation and computational solution of sequential decision problems under uncertainty. Markov decision chains and stochastic programming. Maximum expected present value and rate of return. Optimality of simple policies: myopic, linear, index, acceptance limit, and (s,S). Optimal stationary and periodic infinite-horizon policies. Applications to investment, options, overbooking, inventory, production, purchasing, selling, quality, repair, sequencing, queues, capacity, transportation. MATLAB is used. Prerequisites: probability, linear programming.

3 units, Spr (Van Roy, B)

**MS&E 252. Decision Analysis I: Foundations of Decision Analysis**

Coherent approach to decision making, using the metaphor of developing a structured conversation having desirable properties, and producing actionable thought that leads to clarity of action. Socratic instruction; computational problem sessions. Emphasis is on creation of distinctions, representation of uncertainty by probability, development of alternatives, specification of preference, and the role of these elements in creating a normative approach to decisions. Information gathering opportunities in terms of a value measure. Relevance and decision diagrams to represent inference and decision. Principles are applied to decisions in business, technology, law, and medicine. See 352 for continuation.

3-4 units, Aut (Howard, R)

**MS&E 254. The Ethical Analyst**

The ethical responsibility for consequences of professional analysts who use technical knowledge in support of any individual, organization, or government. The means to form ethical judgments; questioning the desirability of physical coercion and deception as a means to reach any end. Human action and relations in society in the light of previous thought, and research on the desired form of social interactions. Attitudes toward ethical dilemmas through an explicit personal code.

1-3 units, Spr (Staff)

**MS&E 255. Decision Systems I**

(Formerly MS&E 451.) Professional tools and techniques for designing decision systems that help when facing decisions such as buying a car, bidding on the Internet, hiring NFL players, making charitable donations, or choosing medical treatment. Demonstrations; small project. Topics: automatic decision diagram formulation, decision-class analysis, and dynamic sensitivity analysis. No programming required. Recommended: 252 or equivalent.

2-3 units, not given this year

**MS&E 256. Technology Assessment and Regulation of Medical Devices**

(Formerly 475.) Regulatory approval and reimbursement for new medical technologies as a key component of product commercialization. The regulatory and payer environment in the

U.S. and abroad, and common methods of health technology assessment. Framework to identify factors relevant to adoption of new medical devices, and the management of those factors in the design and development phases. Case studies; guest speakers from government (FDA) and industry.

1-3 units, Spr (Pietzsch, J)

#### **MS&E 260. Introduction to Operations Management**

Operations management focuses on the effective planning, scheduling, and control of manufacturing and service entities. This course introduces students to a broad range of key issues in operations management. Topics include determination of optimal facility location, production planning, optimal timing and sizing of capacity expansion, and inventory control. Prerequisites: basic probability and optimization.

3-4 units, Aut (Erhun Oguz, F), Sum (Staff)

#### **MS&E 261. Inventory Control and Production Systems**

Topics in the planning and control of manufacturing systems. The functions of inventory, determination of order quantities and safety stocks, alternative inventory replenishment systems, item forecasting, production-inventory systems, materials requirements planning (MRP), just-in-time systems, master and operations scheduling, supply chain management, and service operations. Limited enrollment. Prerequisite: 120, or STATS 116, or equivalent.

3 units, Win (Hausman, W)

#### **MS&E 262. Supply Chain Management**

Definition of a supply chain; coordination difficulties; pitfalls and opportunities in supply chain management; inventory/service tradeoffs; performance measurement and incentives. Global supply chain management; mass customization; supplier management. Design and redesign of products and processes for supply chain management; tools for analysis; industrial applications; current industry initiatives. Enrollment limited to 50. Prerequisite: 260 or 261.

3 units, Spr (Hausman, W)

#### **MS&E 264. Sustainable Product Development and Manufacturing**

Strategies and techniques for development of sustainable products and manufacturing processes. Topics: strategic decisions in new product development when environmental and resource externalities are accounted for; effect of regulatory requirements on ability of a firm to achieve its business objectives; contributions of sustainable products/processes to the firm's competitive advantage and operational efficiency and to enabling entrepreneurial opportunities; industrial ecology and life cycle analysis techniques in integrating traditional product development requirements with those of the environment and society. Maybe repeatable for credit once.

3-4 units, Aut (Rafinejad, D)

#### **MS&E 265. Supply Chain Logistics**

Student teams redesign the manufacturing and distribution system of a medium-sized manufacturer. Focus is on the transportation system, inventory policies for a regional warehouse, design of a national distribution system, improvements of work flow, and layout of the manufacturing plant. The redesign is at a detailed operational level consistent with a strategy of integrating the functions of manufacturing and distribution. Analytical and game software is used. Knowledge of inventory theory, linear/integer programming, economic analysis, and applied probability is required. Emphasis is on group learning. Limited enrollment. Prerequisites: senior or graduate standing, 111, 260, ECON 50, or consent of instructor.

4 units, alternate years, not given this year

#### **MS&E 266. Management of New Product Development**

Techniques of managing or leading the process of new product development that have been found effective. Emphasis is placed on how much control is desirable and how that control can be exercised in a setting where creativity has traditionally played a larger role than discipline. Topics: design for manufacturability, assessing the market, imposing discipline on the new product development process, selecting the appropriate portfolio of new product development projects, disruptive technology, product development at internet speed, uncertainty in product development, role of experimentation in new product development, creating an

effective development organization, and developing products to hit cost targets.

3 units, Win (Rafinejad, D)

#### **MS&E 268. Operations Strategy**

The development and implementation of the operations functional strategy. The integration of operations strategy with business and corporate strategies of a manufacturing-based firm. Topics: types and characteristics of manufacturing technologies, quality management, capacity planning and facilities choice, organization and control of operations, and operations' role in corporate strategy. Prerequisites: 260 or 261, or equivalent experience.

3 units, Spr (Staff)

#### **MS&E 270. Strategy in Technology-Based Companies**

For graduate students only. Introduction to the basic concepts of strategy, with emphasis on high technology firms. Topics: competitive positioning, resource-based perspectives, co-opetition and standards setting, and complexity/evolutionary perspectives. Limited enrollment.

3-4 units, Aut (Eisenhardt, K)

#### **MS&E 271. Global Entrepreneurial Marketing**

Skills needed to market new technology-based products to customers around the world. Case method discussions. Cases include startups and global high tech firms. Course themes: marketing toolkit, targeting markets and customers, product marketing and management, partners and distribution, sales and negotiation, and outbound marketing. Team-based take-home final exam. Limited enrollment.

3-4 units, Win (Kosnik, T; Novitsky, D; Ramfelt, L; Smith, L),  
Spr (Kosnik, T; Novitsky, D; Ramfelt, L; Smith, L)

#### **MS&E 273. Technology Venture Formation**

Open to graduate students interested in high-technology entrepreneurship. Examines key components of starting a venture-scale high-tech business: Opportunity Assessment, Market Sizing, Go to Market and Distribution Strategy, R&D and Ops Plans, Venture Capital, Legal considerations and Team building. Teaching team includes serial entrepreneurs and venture capitalists. Student teams write and present a business plan to top tier venture capitalists. In addition to class attendance, teams must interact with mentors and teaching team at least once per week for 60 minutes. Enrollment limited. Recommended: 270, 271, or equivalent.

3-4 units, Aut (Lyons, M; MacLean, A)

#### **MS&E 274. Dynamic Entrepreneurial Strategy**

Primarily for graduate students. How entrepreneurial strategy focuses on creating structural change or responding to change induced externally. Grabber-holder dynamics as an analytical framework for developing entrepreneurial strategy to increase success in creating and shaping the diffusion of new technology or product innovation dynamics. Topics: First mover versus follower advantage in an emerging market; latecomer advantage and strategy in a mature market; strategy to break through stagnation; and strategy to turn danger into opportunity. Modeling, case studies, and term project.

3 units, Win (Tse, E)

#### **MS&E 276. Entrepreneurial Management and Finance**

For graduate students only with a preference for engineering and science majors. Emphasis on managing high-growth ventures, especially those based on technology products and services. Students develop a set of skills and approaches to becoming effective entrepreneurial managers. Topics include turning opportunities into reality, raising capital and financial management, venture operations and organizational administration, handling growth and adversity. Limited enrollment. Prerequisites: 240 and 242, or equivalents.

3 units, Spr (Byers, T)

#### **MS&E 277. Creativity and Innovation**

Factors that promote and inhibit creativity of individuals, teams, and organizations. Creativity tools, assessment metrics, and exercises; workshops, field trips, and case studies. Each student completes an individual creativity portfolio and participates in a long-term team project. Enrollment limited to 32. See <http://creativity.stanford.edu>.

4 units, Spr (Seelig, T)

**MS&E 280. Organizational Behavior: Evidence in Action**

Organization theory; concepts and functions of management; behavior of the individual, work group, and organization. Emphasis is on cases and related discussion. Enrollment limited; priority to MS&E students.

3-4 units, Win (Sutton, R)

**MS&E 283. Scaling up Excellence in Organizations**

A problem for every manager is to make 'good' behaviors spread quickly and to shrink 'undesirable' behaviors quickly. This course provides you practical frameworks to accomplish these managerial goals. We will examine issues such as scaling Idea generation, scaling knowledge sharing, scaling the adoption of ideas across firms, scaling change in global firms. We will be using a newly written series of cases for this course and also draw on guest speakers.

4 units, Win (Rao, H; Sutton, R)

**MS&E 289. Designing for Sustainable Abundance**

Hands-on, team-based, multidisciplinary class, uses radically human-centered approach to tackle sustainability challenges in areas like food and transportation. Teams develop solutions that improve environmental and economic sustainability as well as physical and emotional well-being. Students benefit from close interaction with the teaching team, support from project sponsors, and the varied perspectives of numerous guest speakers. Application required. Limited enrollment. Design Institute class; see <http://dschool.stanford.edu>.

3-4 units, Win (Dunn, D; Waisberg, N)

**MS&E 292. Health Policy Modeling**

Primarily for master's students; also open to undergraduates and doctoral students. The application of mathematical, statistical, economic, and systems models to problems in health policy. Areas include: disease screening, prevention, and treatment; assessment of new technologies; bioterrorism response; and drug control policies.

3 units, Win (Brandeau, M)

**MS&E 293. Technology and National Security**

(Same as MS&E 193, MS&E 193W) The interaction of technology and national security policy from the perspective of history to implications for the new security imperative, homeland defense. Key technologies in nuclear and biological weapons, military platforms, and intelligence gathering. Policy issues from the point of view of U.S. and other nations. The impact of terrorist threat. Guest lecturers include key participants in the development of technology and/or policy. Students seeking to fulfill the WIM requirement should register for 193W.

3 units, Aut (Hecker, S; Perry, W)

**MS&E 294. Climate Policy Analysis**

Design and application of formal analytical methods in climate policy development. Issues include instrument design, technology development, resource management, multiparty negotiation, and dealing with complexity and uncertainty. Links among art, theory, and practice. Emphasis is on integrated use of modeling tools from diverse methodologies and requirements for policy making application. Recommended: background in economics, optimization, and decision analysis.

3 units, Win (Weyant, J)

**MS&E 295. Energy Policy Analysis**

Design and application of formal analytical methods for policy and technology assessments of energy efficiency and renewable energy options. Emphasis is on integrated use of modeling tools from diverse methodologies and requirements for policy and corporate strategy development. Recommended: background in economics, optimization, and decision analysis.

3 units, alternate years, not given this year

**MS&E 299. Voluntary Social Systems**

Ethical theory, feasibility, and desirability of a social order in which coercion by individuals and government is minimized and people pursue ends on a voluntary basis. Topics: efficacy and ethics; use rights for property; contracts and torts; spontaneous order and free markets; crime and punishment based on restitution; guardian-ward theory for dealing with incompetents; the effects of state action-hypothesis of reverse results; applications to help the needy, armed intervention, victimless crimes, and environmental protection; transition strategies to a voluntary society.

1-3 units, Win (Howard, R)

**MS&E 300. Ph.D. Qualifying Tutorial or Paper**

Restricted to Ph.D. students assigned tutorials as part of the MS&E Ph.D. qualifying process. Enrollment optional.

1-3 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**MS&E 301. Dissertation Research**

Prerequisite: doctoral candidacy.

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**MS&E 310. Linear Programming**

Formulation of standard linear programming models. Theory of polyhedral convex sets, linear inequalities, alternative theorems, and duality. Variants of the simplex method and the state of art interior-point algorithms. Sensitivity analyses, economic interpretations, and primal-dual methods. Relaxations of harder optimization problems and recent convex conic linear programs. Applications include game equilibrium facility location. Prerequisite: MATH 113 or consent of instructor.

3 units, Aut (Ye, Y)

**MS&E 311. Optimization**

Applications, theories, and algorithms for finite-dimensional linear and nonlinear optimization problems with continuous variables. Elements of convex analysis, first- and second-order optimality conditions, sensitivity and duality. Algorithms for unconstrained optimization, and linearly and nonlinearly constrained problems. Modern applications in communication, game theory, auction, and economics. Prerequisites: MATH 113, 115, or equivalent.

3 units, Win (Ye, Y)

**MS&E 312. Advanced Methods in Numerical Optimization**

(Same as CME 334) Topics include interior-point methods, relaxation methods for nonlinear discrete optimization, sequential quadratic programming methods, optimal control and decomposition methods. Topic chosen in first class; different topics for individuals or groups possible. Individual or team projects. May be repeated for credit.

3 units, Aut (Murray, W)

**MS&E 313. Vector Space Optimization**

Optimization theory from the unified framework of vector space theory: treating together problems of mathematical programming, calculus of variations, optimal control, estimation, and other optimization problems. Emphasis is on geometric interpretation. Duality theory. Topics: vector spaces including function spaces; Hilbert space and the projection theorem; dual spaces and the separating hyperplane theorem; linear operators and adjoints; optimization of functionals, including theory of necessary conditions in general spaces, and convex optimization theory; constrained optimization including Fenchel duality theory. Prerequisite: MATH 115.

3 units, alternate years, not given this year

**MS&E 314. Linear and Conic Optimization with Applications**

(Same as CME 336) Linear, semidefinite, conic, and convex nonlinear optimization problems as generalizations of classical linear programming. Algorithms include the interior-point, barrier function, and cutting plane methods. Related convex analysis, including the separating hyperplane theorem, Farkas lemma, dual cones, optimality conditions, and conic inequalities. Complexity and/or computation efficiency analysis. Applications to combinatorial optimization, sensor network localization, support vector machine, and graph realization. Prerequisite: MS&E 211 or equivalent.

3 units, alternate years, not given this year

**MS&E 315. Numerical Optimization**

(Same as CME 304) Solution of nonlinear equations; unconstrained optimization; linear programming; quadratic programming; global optimization; general linearly and nonlinearly constrained optimization. Theory and algorithms to solve these problems. Prerequisite: background in analysis and numerical linear algebra.

3 units, Win (Murray, W)

**MS&E 316. Discrete Mathematics and Algorithms**

(Same as CME 305) Topics: enumeration such as Cayley's theorem and Prufer codes, SDR, flows and cuts (deterministic and randomized algorithms), probabilistic methods and random graphs, asymptotics (NP-hardness and approximation algorithms). Topics



illustrated with EE, CS, and bioinformatics applications. Prerequisites: MATH 51 or 103 or equivalents.

3 units, Win (Saber, A)

### MS&E 317. Algorithms for Modern Data Models

(Same as CS 263) We traditionally think of algorithms as running on data available in a single location, typically main memory. In many modern applications including web analytics, search and data mining, computational biology, finance, and scientific computing, the data is often too large to reside in a single location, is arriving incrementally over time, is noisy/uncertain, or all of the above. Paradigms such as map-reduce, streaming, sketching, Distributed Hash Tables, Bulk Synchronous Processing, and random walks have proved useful for these applications. This course will provide an introduction to the design and analysis of algorithms for these modern data models. Prerequisite: Algorithms at the level of CS 261.

3 units, Aut (Goel, A)

### MS&E 318. Large-Scale Numerical Optimization

(Same as CME 338) The main algorithms and software for constrained optimization emphasizing the sparse-matrix methods needed for their implementation. Iterative methods for linear equations and least squares. The simplex method. Basic factorization and updates. Interior methods. The reduced-gradient method, augmented Lagrangian methods, and SQP methods. Prerequisites: Basic numerical linear algebra, including LU, QR, and SVD factorizations, and an interest in MATLAB, sparse-matrix methods, and gradient-based algorithms for constrained optimization. Recommended: MS&E 310, 311, 312, 314, or 315; CME 108, 200, 302, 304, 334, or 335.

3 units, Spr (Saunders, M)

### MS&E 319. Approximation Algorithms

Combinatorial and mathematical programming techniques to derive approximation algorithms for NP-hard optimization problems. Possible topics include: greedy algorithms for vertex/set cover; rounding LP relaxations of integer programs; primal-dual algorithms; semidefinite relaxations. May be repeated for credit. Prerequisites: 112 or CS 161.

3 units, alternate years, not given this year

### MS&E 321. Stochastic Systems

Topics in stochastic processes, emphasizing applications. Markov chains in discrete and continuous time; Markov processes in general state space; Lyapunov functions; regenerative process theory; renewal theory; martingales, Brownian motion, and diffusion processes. Application to queueing theory, storage theory, reliability, and finance. Prerequisites: 221 or STATS 217; MATH 113, 115. (Glynn)

3 units, Win (Glynn, P)

### MS&E 322. Stochastic Calculus and Control

Ito integral, existence and uniqueness of solutions of stochastic differential equations (SDEs), diffusion approximations, numerical solutions of SDEs, controlled diffusions and the Hamilton-Jacobi-Bellman equation, and statistical inference of SDEs. Applications to finance and queueing theory. Prerequisites: 221 or STATS 217; MATH 113, 115.

3 units, Win (Glynn, P)

### MS&E 323. Stochastic Simulation

Emphasis is on the theoretical foundations of simulation methodology. Generation of uniform and non-uniform random variables. Discrete-event simulation and generalized semi-Markov processes. Output analysis (autoregressive, regenerative, spectral, and stationary times series methods). Variance reduction techniques (antithetic variables, common random numbers, control variables, discrete-time, conversion, importance sampling). Stochastic optimization (likelihood ratio method, perturbation analysis, stochastic approximation). Simulation in a parallel environment. Prerequisite: MS&E 221 or equivalent.

3 units, not given this year

### MS&E 325. Topics in Stochastic Optimization

Algorithms for optimization problems with inputs from a known probability distribution or a known class of probability distributions. Topics: Markov decision processes; optimization with sparse priors; multi-armed bandit problems and the Gittins' index; regret bounds for multi-armed bandit problems; stochastic knapsack and the adaptivity gap; budgeted learning; adversarial

queueing theory; stochastic scheduling and routing; stochastic inventory problems; multi-stage and multi-objective stochastic optimization. Prerequisites: MS&E 221 or equivalent; and MS&E 212 or CS 261 or equivalent.

3 units, alternate years, not given this year

### MS&E 332. Security and Risk in Computer Networks

Risk management of large scale computing and networking systems with respect to security, data integrity, performance collapse, and service disruption. Qualitative and analytical basis for assessment, modeling, control, and mitigation of network risks. Stochastic risk models. Contact process. Random fields on networks. Virus and worm propagation dynamics and containment. Denial of service attacks. Intruder detection technologies. Distributed network attacks and countermeasures. Disaster recovery networks. Network protection services and resource placement. Autonomic self-defending networks. Economics of risk management. Emphasis is on analytics and quantitative methods.

3 units, not given this year

### MS&E 334. Computation of Equilibria

Topics: Sperner's lemma, fixed point theorems, and existence of Nash and Market equilibria. Alternate convex and linear complementarity program formulations. Combinatorial algorithms. Complexity classes related to fixed points theorems and reductions to equilibrium problems. Similar solutions in cooperative game theory and fair division.

3 units, not given this year

### MS&E 335. Queueing and Scheduling in Processing Networks

Advanced stochastic modeling and control of systems involving queueing and scheduling operations. Stability analysis of queueing systems. Key results on single queues and queueing networks. Controlled queueing systems. Dynamic routing and scheduling in processing networks. Applications to modeling, analysis and performance engineering of computing systems, communication networks, flexible manufacturing, and service systems. Prerequisite: 221 or equivalent.

3 units, Aut (Bambos, N)

### MS&E 336. Topics in Game Theory with Engineering Applications

Seminar. Recent research applying economic methods to engineering problems. Recent topics include: incentives in networked systems; mechanism design in engineered systems; and dynamics and learning in games. Prerequisites: mathematics at the level of MATH 115; game theory at the level of 246 or ECON 203; probability at the level of 220; optimization at the level of 211. May be repeated for credit.

3 units, Spr (Johari, R)

### MS&E 337. Information Networks

(Same as CME 337) Network structure of the Internet and the web. Modeling, scale-free graphs, small-world phenomenon. Algorithmic implications in searching and inter-domain routing; the effect of structure on performance. Game theoretic issues, routing games, and network creation games. Security issues, vulnerability, and robustness. Prerequisite: basic probability and graph theory.

3 units, Spr (Saber, A), alternate years, not given next year

### MS&E 338. Advanced Topics in Information Science and Technology

Advanced material in this area is sometimes taught for the first time as a topics course. Prerequisite: consent of instructor.

3 units, Win (Van Roy, B)

### MS&E 339. Approximate Dynamic Programming

Approximation algorithms for large-scale dynamic programming. Real-time dynamic programming and reinforcement learning algorithms. Generalizations of value iteration, policy iteration, and linear programming approaches. Recent research topics. Prerequisite: 251, 351, CS 221, CS 228, or CS 229.

3 units, not given this year

### MS&E 342. Advanced Investment Science

Topics: forwards and futures contracts, continuous and discrete time models of stock price behavior, geometric Brownian motion, Ito's lemma, basic options theory, Black-Scholes equation, advanced options techniques, models and applications of stochastic interest rate processes, and optimal portfolio growth. Computational issues and general theory. Teams work on



independent projects. Prerequisite: 242.

3 units, Win (Luenberger, D)

#### **MS&E 347. Credit Risk: Modeling and Management**

Credit risk modeling, valuation, and hedging emphasizing underlying economic, probabilistic, and statistical concepts. Point processes and their compensators. Structural, incomplete information and reduced form approaches. Single name products: corporate bonds, equity, equity options, credit and equity default swaps, forwards and swaptions. Multiname modeling: index and tranche swaps and options, collateralized debt obligations. Implementation, calibration and testing of models. Industry and market practice. Data and implementation driven group projects that focus on problems in the financial industry. Prerequisites: stochastic processes at the level of MSE 321, 322 or equivalent, and financial engineering at the level of MSE 342, MATH 180, MATH 240, FINANCE 622 or equivalent

3 units, Spr (Giesecke, K)

#### **MS&E 348. Optimization of Uncertainty and Applications in Finance**

How to make optimal decisions in the presence of uncertainty, solution techniques for large-scale systems resulting from decision problems under uncertainty, and applications in finance. Decision trees, utility, two-stage and multi-stage decision problems, approaches to stochastic programming, model formulation; large-scale systems, Benders and Dantzig-Wolfe decomposition, Monte Carlo sampling and variance reduction techniques, risk management, portfolio optimization, asset-liability management, mortgage finance. Projects involving the practical application of optimization under uncertainty to financial planning.

3 units, Win (Infanger, G)

#### **MS&E 349. Capital Deployment**

Methods for efficiently allocating capital among alternatives, constructing business plans, determining the value of risky projects, and creating alternatives that enhance value. Prerequisites: 242, 342.

3 units, not given this year

#### **MS&E 351. Dynamic Programming and Stochastic Control**

Markov population decision chains in discrete and continuous time. Risk posture. Present value and Cesaro overtaking optimality. Optimal stopping. Successive approximation, policy improvement, and linear programming methods. Team decisions and stochastic programs; quadratic costs and certainty equivalents. Maximum principle. Controlled diffusions. Examples from inventory, overbooking, options, investment, queues, reliability, quality, capacity, transportation. MATLAB. Prerequisites: MATH 113, 115; Markov chains; linear programming.

3 units, NEXTYEAR

#### **MS&E 352. Decision Analysis II: Professional Decision Analysis**

How to organize the decision conversation, the role of the decision analysis cycle and the model sequence, assessing the quality of decisions, framing decisions, the decision hierarchy, strategy tables for alternative development, creating spare and effective decision diagrams, biases in assessment, knowledge maps, uncertainty about probability. Sensitivity analysis, approximations, value of revelation, joint information, options, flexibility, bidding, assessing and using corporate risk attitude, risk sharing and scaling, and decisions involving health and safety. See 353 for continuation. Prerequisite: 252.

3-4 units, Win (Howard, R)

#### **MS&E 353. Decision Analysis III: Frontiers of Decision Analysis**

The concept of decision composite; probabilistic insurance and other challenges to the normative approach; the relationship of decision analysis to classical inference and data analysis procedures; the likelihood and exchangeability principles; inference, decision, and experimentation using conjugate distributions; developing a risk attitude based on general properties; alternative decision aiding practices such as analytic hierarchy and fuzzy approaches. Student presentations on current research. Goal is to prepare doctoral students for research. Prerequisite: 352.

3 units, Spr (Staff)

#### **MS&E 355. Influence Diagrams and Probabilistic Networks**

Network representations for reasoning under uncertainty: influence diagrams, belief networks, and Markov networks. Structuring and assessment of decision problems under uncertainty. Learning from evidence. Conditional independence and requisite information. Node reductions. Belief propagation and revision. Simulation. Linear-quadratic-Gaussian decision models and Kalman filters. Dynamic processes. Bayesian meta-analysis. Prerequisites: 220, 252, or equivalents, or consent of instructor.

3 units, Win (Shachter, R), alternate years, not given next year

#### **MS&E 362. Advanced Models in Production and Operations**

The design and operation of production-inventory systems. Topics include production scheduling, capacity planning, sequencing, assembly-line balancing, dynamic scheduling, and multigoal optimizations. Readings primarily from journal articles. Prerequisite: 260.

3 units, alternate years, not given this year

#### **MS&E 364. Multi-echelon Inventory Models**

Theoretical treatment of control problems arising in inventory management, production, and distribution systems. Inventory control for single and multi-location systems. Emphasis is on operating characteristics, performance measures, and optimal operating and control policies. Dynamic programming and applications in inventory control. Prerequisite: STATS 217 or equivalent, linear programming.

3 units, alternate years, not given this year

#### **MS&E 365. Advanced Models in Operations Management**

Primarily for doctoral students. Content varies. Topics based on recent literature and working papers. May be repeated for credit. Prerequisite: MS&E 246.

3 units, Spr (Erhun Oguz, F)

#### **MS&E 371. Innovation and Strategic Change**

Doctoral research seminar, limited to Ph.D. students. Current research on innovation strategy. Topics: scientific discovery, innovation search, organizational learning, evolutionary approaches, and incremental and radical change. Topics change yearly. Recommended: course in statistics or research methods.

2-3 units, Win (Katila, R)

#### **MS&E 372. Entrepreneurship Doctoral Research Seminar**

Classic and current research on entrepreneurship. Limited enrollment, restricted to PhD students. Prerequisites: SOC 363 or equivalent, and permission of instructor.

1-3 units, alternate years, not given this year

#### **MS&E 374. Dynamic Corporate Strategy**

Restricted to Ph.D. students. Research on the creation and shaping of disruptive industry dynamics and how companies can formulate and implement strategies to excel in such changing environments. Dynamic system model approach; case studies. Prerequisites: 201 or equivalent, 274.

3 units, alternate years, not given this year

#### **MS&E 375. Research on Entrepreneurship**

Restricted to Ph.D. students. Organization theory, economics, and strategy perspectives. Limited enrollment. Prerequisites: SOC 360 or equivalent, and consent of instructor.

3 units, Aut (Eisenhardt, K)

#### **MS&E 376. Strategy Doctoral Research Seminar**

Classic and current research on business and corporate strategy. Limited enrollment, restricted to PhD students. Prerequisites: SOC 363 or equivalent, and permission of instructor.

3 units, not given this year

#### **MS&E 380. Doctoral Research Seminar in Organizations**

Limited to Ph.D. students. Topics from current published literature and working papers. Content varies. Prerequisite: consent of instructor.

3 units, Aut (Sutton, R)

#### **MS&E 381. Doctoral Research Seminar in Work, Technology, and Organization**

Enrollment limited to Ph.D. students. Topics from current published literature and working papers. Content varies. Prerequisite: consent of instructor.

2-3 units, Win (Barley, S)

#### **MS&E 383. Doctoral Seminar on Ethnographic Research**

For graduate students; upper-level undergraduates with consent of

instructor. Ethnosemantic interviewing and participant observation. Techniques for taking, managing, and analyzing field notes and other qualitative data. 15 hours per week outside class collecting and analyzing own data. Methods texts and ethnographies offer examples of how to analyze and communicate ethnographic data. Prerequisite: consent of instructor. (Barley)

3 units, not given this year

#### **MS&E 384. Groups and Teams**

Research on groups and teams in organizations from the perspective of organizational behavior and social psychology. Topics include group effectiveness, norms, group composition, diversity, conflict, group dynamics, temporal issues in groups, geographically distributed teams, and intergroup relations.

3 units, not given this year

#### **MS&E 389. Seminar on Organizational Theory**

(Same as EDUC 375A, SOC 363A) The social science literature on organizations assessed through consideration of the major theoretical traditions and lines of research predominant in the field.

5 units, Aut (Powell, W)

#### **MS&E 390. Doctoral Research Seminar in Health Systems Modeling**

Restricted to PhD students, or by consent of instructor. Doctoral research seminar covering current topics in health policy, health systems modeling, and health innovation. May be repeated for credit.

1-3 units, Aut (Brandeau, M), Win (Brandeau, M), Spr (Brandeau, M)

#### **MS&E 408. Directed Reading and Research**

Directed study and research on a subject of mutual interest to student and faculty member. Prerequisite: faculty sponsor. (Staff)

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

#### **MS&E 444. Investment Practice**

Theory of real options, soft derivatives, and related ideas. Problems from financial engineering and risk management. Examples from industry. Small group projects formulate and design solutions to actual industry problems. Enrollment limited to 30.

3-4 units, Spr (Giesecke, K)

#### **MS&E 445. Projects in Wealth Management**

Recent theory and standard practice in portfolio design for institutions, individuals, and funds. Student projects and case studies derived from the financial industry.

3-4 units, Spr (Woehrmann, P)

#### **MS&E 446. Policy and Economics Research Roundtable (PERR)**

Research in progress or contemplated in policy and economics areas. Emphasis depends on research interests of participants, but is likely to include energy, environment, transportation, or technology policy and analysis. May be repeated for credit.

1 unit, Aut (Sweeney, J), Win (Sweeney, J), Spr (Sweeney, J)

#### **MS&E 450. Lessons in Decision Making**

Entrepreneurs, senior management consultants, and executives from Fortune 500 companies share real-world stories and insights from their experience in decision making.

1 unit, Spr (Staff)

#### **MS&E 452. Decision Analysis Projects: Helping Real Leaders Make Real Decisions**

A virtual consulting firm directed by professional decision analysts who offer advice and guidance as student teams help local organizations make a current business strategy or public policy decision. Projects for businesses, governments, or other institutions typically include start-up venture funding, R&D portfolio planning, new product or market entry, acquisition or partnering, cost reduction, program design, or regulatory policy decisions. Emphasis is on developing clarity of action and delivering insights to clients. Satisfies MS&E project course requirement. Prerequisite: 252. Recommended: 352.

3 units, Spr (Robinson, B)

#### **MS&E 453. Decision Analysis Applications: Business Strategy and Public Policy**

How decision analysis is used to make decisions in organizations. Who applies these methods to what decisions, and when, where, and why. Case studies: entrepreneurial ventures, consulting

projects, litigation, chip manufacturing, consumer electronics, Corvette design, blockbuster movies, R&D priorities, real estate portfolios, HIV/HCV drug trial design, cancer diagnostics, Mars contamination, oil E&P, economics and energy pricing, nuclear waste, climate change, marine resources, bioterrorism preparedness, nuclear weapons control, effective interactions, and ethics. Corequisite: MS&E 252 recommended.

2-3 units, Aut (Robinson, B)

#### **MS&E 454. Decision Analysis Seminar**

Current research and related topics presented by doctoral students and invited speakers. May be repeated for credit. Prerequisite: 252.

1 unit, Aut (Howard, R), Win (Howard, R), Spr (Shachter, R)

#### **MS&E 464. Global Project Coordination**

Students engage in projects that are global in nature, and related to the planning, design, and operations of supply chains, marketing, manufacturing, and product development. Project teams from Stanford and an overseas university work on common projects using telephones, faxes, email, Internet, video conferences, and face-to-face meetings. As part of the project, students travel to Hong Kong. Applications due in November. See <http://www.stanford.edu/class/msande464/>.

3-4 units, not given this year

#### **MS&E 472. Entrepreneurial Thought Leaders' Seminar**

Entrepreneurial leaders share lessons from real-world experiences across entrepreneurial settings. ETL speakers include entrepreneurs, leaders from global technology companies, venture capitalists, and best-selling authors. Half-hour talks followed by half hour of class interaction. Required web discussion. May be repeated for credit.

1 unit, Aut (Seelig, T; Kosnik, T), Win (Byers, T; Seelig, T; Kosnik, T), Spr (Byers, T; Seelig, T; Kosnik, T)

#### **MS&E 485A. Introduction to Crosscultural Design**

Preparation for 485B. Workshop and initial project work in teams.

1-2 units, not given this year

#### **MS&E 485B. Crosscultural Design**

The design of products and services for a global world. How to design products or services to be used across cultures; how to design for a culture other than one's own; and how the process of design is approached in different cultures. Prerequisite: 485A.

3-4 units, not given this year

#### **MS&E 491. Clean Energy Development**

'Clean energy' refers to low-depleting and low-polluting energy, such as solar, wind and biomass. Project course for advanced undergraduate and graduate students with an interest in clean energy and entrepreneurship, and with a commitment to strong analytic and communication skills. Student teams conceive, prepare and present a business plan for a real or realistic clean energy development - an individual project or an entire company - of their choice. Class sessions devoted primarily to information and guidance necessary for student team projects. Mix of presentations, discussions and guest lectures. Grades based on student team performance in developing and presenting a business concept and plan.

3 units, Spr (Borison, A; Hamm, G)

#### **MS&E 802. TGR Dissertation**

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

## MASTER OF LIBERAL ARTS (MLA) COURSES

### GRADUATE COURSES IN MASTER OF LIBERAL ARTS

Primarily for graduate students; undergraduates may enroll with consent of instructor.

#### **MLA 9. European Thought and Culture in the 19th Century**

Major European thinkers and writers and their intellectual significance from the Enlightenment to modernism. Works by Voltaire, Austen, Wordsworth, Marx, Nietzsche, and Freud.

4 units, not given this year

**MLA 100E. MLA Natural Science Elective**

1-2 units, Aut (Paulson, L), Win (Paulson, L), Spr (Paulson, L), Sum (Staff)

**MLA 101A. Foundations I**

Required of and limited to first-year MLA students. First of three quarter foundation course. Introduction to the main political, philosophical, literary, and artistic trends that inform the liberal arts vision of the world and that underlie the MLA curriculum.

4 units, Aut (Steidle, E)

**MLA 101B. Foundations II: the Middle Ages and Renaissance.**

Required of and limited to first-year MLA students. Second of three quarter foundation course. Introduction to the main political, philosophical, literary, and artistic trends that inform the liberal arts vision of the world and that underlie the MLA curriculum.

4 units, Win (Steidle, E)

**MLA 101C. Foundations III: the Enlightenment through Modernism**

Required of and limited to first-year MLA students. First of three quarter foundation course. Introduction to the main political, philosophical, literary, and artistic trends that inform the liberal arts vision of the world and that underlie the MLA curriculum.

4 units, Spr (Junkerman, C)

**MLA 102. An Introduction to Interdisciplinary Graduate Study**

Limited to and required of second-year MLA students. Historical, literary, artistic, medical, and theological issues are covered. Focus is on skills and information needed to pursue MLA graduate work at Stanford: writing a critical, argumentative graduate paper; conducting library research; expectations of seminar participation. Readings include Homer, Thucydides, Camus, Mann, Kushner, and sacred, scientific, and historical writings.

4 units, Aut (Paulson, L)

**MLA 262. The Economics of Life and Death**

4 units, not given this year

**MLA 268. Fin-de-Siecle Vienna**

The cultural and political life of fin-de-siècle Vienna with particular attention to revolutionary ideas that came to expression in its art, architecture, music, and political ideologies.

4 units, Spr (Harvey, V)

**MLA 269. The Meaning of Life: Moral and Spiritual Inquiry through Literature**

4 units, Aut (McLennan, W)

**MLA 274. From Slavery to Obama**

4 units, Aut (Jones, C)

**MLA 275. Shakespeare in Performance**

4 units, Sum (Staff)

**MLA 278. James Joyce's Ulysses**

4 units, Win (Chace, W)

**MLA 279. When Worlds Collide: The Trial of Galileo**

4 units, Win (Findlen, P)

**MLA 280. British and American Fiction in the 19th and early 20th Century**

4 units, Win (Gelpi, B; Gelpi, A)

**MLA 281. The Arts as History: Britain 1900-1956**

4 units, Spr (Stansky, P)

**MLA 282. Indigenous Peoples and Environmental Problems**

4 units, Spr (Durham, W; Hunt, C)

**MLA 283. Three 20th-century Minds: Eliot, Pound, and Yeats**

This course considers three revolutionary thinkers as they each came to terms with what they saw as the encroaching chaos of the early 20th century.

4 units, Sum (Staff)

**MLA 284. Problems in American Foreign Policy**

This seminar examines in depth the problems facing American diplomacy. These include the several crises in the Middle East and relations with the Muslim World; the recent world economic recession; nuclear proliferation; problems and prospects in the relationship(s) with America's allies; persistent difficulties with and the possible promise of relations with China and Russia.

4 units, Sum (Staff)

**MLA 300. Oxford Summer Programme**

2-4 units, Sum (Staff)

**MLA 398. MLA Thesis in Progress**

Group meetings provide peer critiques, motivations, and advice under the direction of the Associate Dean.

0 units, Aut (Paulson, L), Win (Paulson, L), Spr (Paulson, L), Sum (Staff)

**MLA 399. MLA Thesis Final Quarter**

Students write a 75-100 page thesis that evolves out of work they pursued during their MLA studies.

6 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

## MATERIALS SCIENCE AND ENGINEERING (MATSCI) COURSES

### UNDERGRADUATE COURSES IN MATERIALS SCIENCE AND ENGINEERING

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**MATSCI 10SC. Diamonds from Peanut Butter: Material Technologies and Human History**

Technological importance of materials in history is captured in names: the Stone Age, Bronze Age, Iron Age, and now the Information Age or the Silicon Age. How materials have played, and continue to play, pivotal roles in the development of new technologies.

2 units, not given this year

**MATSCI 11SC. Energy Technologies for a Sustainable Future**

Wondering what the buzz is about sustainability, renewable energy, and clean fuels? Meeting the world's growing energy needs in a sustainable fashion is one of the most pressing problems of our time. This class will introduce the scope of the energy problem and define some of the options for sustainable energy. We will look into the scientific basis of sustainable energy technologies, such as solar cells, which convert the energy of the sun directly into electricity, and fuel cells, which convert chemical energy directly into electricity. Other topics will include biofuels, i.e., fuel derived from plant matter, and clean fuels such as hydrogen. The course will emphasize the fundamental science behind the devices and highlight some of the cutting-edge technological issues that are currently being explored. Assigned reading will include books on global energy issues as well as technical reading on the science and engineering of sustainable energy technologies. We will visit several local

2 units, not given this year

**MATSCI 81N. Bioengineering Materials to Heal the Body**

Preference to freshmen. How scientists and engineers are designing new materials for surgeon to use in replacing body parts such as heart tissue or the spinal cord. How cells, in the body and transplanted stem cells, communicate with implanted materials. Real-world examples of materials developed for tissue engineering and regenerative medicine therapies. Students identify a clinically important disease or injury that requires a better material, research approaches to the problem, and debate possible engineering solutions. GER:DB-EngrAppSci

3 units, not given this year

**MATSCI 100. Undergraduate Independent Study**

Independent study in materials science under supervision of a faculty member.

1-3 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**MATSCI 150. Undergraduate Research**

Participation in a research project.

3-6 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**MATSCI 151. Microstructure and Mechanical Properties**

(Same as MATSCI 251) Primarily for students without a materials background. Mechanical properties and their dependence on microstructure in a range of engineering materials. Elementary

deformation and fracture concepts, strengthening and toughening strategies in metals and ceramics. Topics: dislocation theory, mechanisms of hardening and toughening, fracture, fatigue, and high-temperature creep. Prerequisite: ENGR 50 or equivalent. GER:DB-EngrAppSci

3-4 units, Aut (Dauskardt, R)

#### **MATSCI 152. Electronic Materials Engineering**

Materials science and engineering for electronic device applications. Kinetic molecular theory and thermally activated processes; band structure and electrical conductivity of metals and semiconductors; intrinsic and extrinsic semiconductors; diffusion; elementary p-n junction theory; operating principles of metal-oxide-semiconductor field effect transistors. Semiconductor processing including crystal growth, oxidation kinetics, ion implantation, thin film deposition, etching, and photolithography. Prerequisite: ENGR 50 or equivalent. GER:DB-EngrAppSci

4 units, Spr (Dionne, J)

#### **MATSCI 153. Nanostructure and Characterization**

The structure of materials at the nanoscale is in most cases the same crystalline form as the natural phase. Structures of materials such as semiconductors, ceramics, metals, and nanotubes; classification of these materials according to the principles of crystallography. Primary methods of structural characterization, X-ray diffraction, and electron microscopy; their applications to study such nanostructures. GER:DB-EngrAppSci

4 units, Win (Earhart, C)

#### **MATSCI 154. Solid State Thermodynamics**

The principles of thermodynamics and relationships between thermodynamic variables. Equilibrium in thermodynamic systems. Thermodynamics of multicomponent systems. GER:DB-EngrAppSci

4 units, Aut (Barnett, D)

#### **MATSCI 155. Nanomaterials Synthesis**

The science of synthesis of nanometer scale materials. Examples including solution phase synthesis of nanoparticles, the vapor-liquid-solid approach to growing nanowires, formation of mesoporous materials from block-copolymer solutions, and formation of photonic crystals. Relationship of the synthesis phenomena to the materials science driving forces and kinetic mechanisms. Materials science concepts including capillarity, Gibbs free energy, phase diagrams, and driving forces. GER:DB-EngrAppSci

4 units, Spr (Clemens, B)

#### **MATSCI 156. Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution**

(Same as MATSCI 256) Operating principles and applications of emerging technological solutions to the energy demands of the world. The scale of global energy usage and requirements for possible solutions. Basic physics and chemistry of solar cells, fuel cells, and batteries. Performance issues, including economics, from the ideal device to the installed system. The promise of materials research for providing next generation solutions. GER:DB-EngrAppSci

3-4 units, Aut (Clemens, B)

#### **MATSCI 157. Quantum Mechanics of Nanoscale Materials**

Introduction to quantum mechanics and its application to the properties of materials. The Schrödinger equation, uncertainty principle, bound states and periodic potentials, angular momentum, quantum statistics, and perturbation theory. Applications to electronic band structure in semiconductors, metals, and nanostructures; vibrational properties of solids; light/matter interaction and lasers; bonding; magnetic materials; nanotechnology. Prerequisites: working knowledge of calculus and high school physics. GER:DB-EngrAppSci

4 units, Win (Lindenberg, A)

#### **MATSCI 159Q. Japanese Companies and Japanese Society**

(S,Sem) (Same as ENGR 159Q) Stanford Introductory Seminar. Preference to sophomores. The structure of a Japanese company from the point of view of Japanese society. Visiting researchers from Japanese companies give presentations on their research enterprise. The Japanese research ethic. The home campus equivalent of a Kyoto SCTI course. GER:DB-SocSci

3 units, Spr (Sinclair, R)

#### **MATSCI 160. Nanomaterials Laboratory**

Preference to sophomores and juniors. Hands-on approach to synthesis and characterization of nanoscale materials. How to make, pattern, and analyze the latest nanotech materials, including nanoparticles, nanowires, and self-assembled monolayers. Techniques such as soft lithography, self-assembly, and surface functionalization. The VLS mechanism of nanowire growth, nanoparticle size control, self-assembly mechanisms, and surface energy considerations. Laboratory projects. Enrollment limited to 24. GER:DB-EngrAppSci

4 units, Spr (Melosh, N)

#### **MATSCI 161. Nanocharacterization Laboratory**

(Same as MATSCI 171) Nanocharacterization techniques, such as: optical and electron microscopy, x-ray photoelectron spectroscopy and atomic force microscopy, will be explained in class and used in lab to determine structure of materials and understand why they have certain properties. This WIM class includes instruction on writing, statistics, generating effective plots with curve fits, using databases to find information and giving oral scientific presentations. Prerequisite: ENGR 50 or equivalent. (75 min. lecture + 3 hr. lab most weeks.) GER:DB-EngrAppSci, WIM

3-4 units, Spr (McGehee, M)

#### **MATSCI 162. X-Ray Diffraction Laboratory**

(Same as MATSCI 172) Experimental x-ray diffraction techniques for microstructural analysis of materials, emphasizing powder and single-crystal techniques. Diffraction from epitaxial and polycrystalline thin films, multilayers, and amorphous materials using medium and high resolution configurations. Determination of phase purity, crystallinity, relaxation, stress, and texture in the materials. Advanced experimental x-ray diffraction techniques: reciprocal lattice mapping, reflectivity, and grazing incidence diffraction. Enrollment limited to 20. GER:DB-EngrAppSci

3-4 units, Win (Vailionis, A)

#### **MATSCI 163. Mechanical Behavior Laboratory**

(Same as MATSCI 173) Experimental techniques for the study of the mechanical behavior of engineering materials in bulk and thin film form, including tension testing, nanoindentation, and wafer curvature stress analysis. Metallic and polymeric systems. Prerequisite: ENGR 50. GER:DB-EngrAppSci

3-4 units, Aut (Earhart, C)

#### **MATSCI 164. Electronic and Photonic Materials and Devices Laboratory**

Lab course. Current electronic and photonic materials and devices. Device physics and micro-fabrication techniques. Students design, fabricate, and perform physical characterization on the devices they have fabricated. Established techniques and materials such as photolithography, metal evaporation, and Si technology; and novel ones such as soft lithography and organic semiconductors. Prerequisite: 152 or 199 or consent of instructor. GER:DB-EngrAppSci, WIM

4 units, Aut (Salleo, A)

#### **MATSCI 190. Organic and Biological Materials**

(Same as MATSCI 210) Unique physical and chemical properties of organic materials and their uses. The relationship between structure and physical properties, and techniques to determine chemical structure and molecular ordering. Examples include liquid crystals, dendrimers, carbon nanotubes, hydrogels, and biopolymers such as lipids, protein, and DNA. Prerequisite: Thermodynamics and ENGR 50 or equivalent. GER:DB-EngrAppSci

3-4 units, Spr (Heilshorn, S)

#### **MATSCI 192. Materials Chemistry**

(Same as MATSCI 202) Chemical principles of materials: atomic and molecular bonding; acid and base chemistry; redox and electrochemistry; colloidal and surface chemistry; materials synthesis; and nanoscale chemistry. GER:DB-EngrAppSci

3-4 units, Aut (Dionne, J)

#### **MATSCI 193. Atomic Arrangements in Solids**

(Same as MATSCI 203) Atomic arrangements in perfect and imperfect solids, especially important metals, ceramics, and semiconductors. Elements of formal crystallography, including development of point groups and space groups. GER:DB-EngrAppSci

3-4 units, Aut (Reed, E)

**MATSCI 194. Thermodynamics and Phase Equilibria**

(Same as MATSCI 204) The principles of heterogeneous equilibria and their application to phase diagrams. Thermodynamics of solutions; chemical reactions; non-stoichiometry in compounds; first order phase transitions and metastability; thermodynamics of surfaces, elastic solids, dielectrics, and magnetic solids. GER:DB-EngrAppSci

3-4 units, Win (Salleo, A)

**MATSCI 195. Waves and Diffraction in Solids**

(Same as MATSCI 205) The elementary principals of x-ray, vibrational, and electron waves in solids. Basic wave behavior including Fourier analysis, interference, diffraction, and polarization. Examples of wave systems, including electromagnetic waves from Maxwell's equations. Diffracted intensity in reciprocal space and experimental techniques such as electron and x-ray diffraction. Lattice vibrations in solids, including vibrational modes, dispersion relationship, density of states, and thermal properties. Free electron model. Basic quantum mechanics and statistical mechanics including Fermi-Dirac and Bose-Einstein statistics. Prerequisite: 193/203 or consent of instructor. GER:DB-EngrAppSci

3-4 units, Win (Clemens, B)

**MATSCI 196. Imperfections in Solids**

(Same as MATSCI 206) Atomic and molecular scale defects and their importance to the physical and mechanical properties of bulk and nanoscale materials. Point defects and dislocations in crystals. Imperfections in amorphous solids. Structure and properties of interfaces. Prerequisite: 193/203. GER:DB-EngrAppSci

3-4 units, Win (Staff)

**MATSCI 197. Rate Processes in Materials**

(Same as MATSCI 207) Diffusion and phase transformations in solids. Diffusion topics: Fick's laws, atomic theory of diffusion, and diffusion in alloys. Phase transformation topics: nucleation, growth, diffusional transformations, spinodal decomposition, and interface phenomena. Material builds on the mathematical, thermodynamic, and statistical mechanical foundations in the prerequisites. Prerequisites: 194/204. GER:DB-EngrAppSci

3-4 units, Spr (McIntyre, P)

**MATSCI 198. Mechanical Properties of Materials**

(Same as MATSCI 208) Introduction to the mechanical behavior of solids, emphasizing the relationships between microstructure and mechanical properties. Elastic, anelastic, and plastic properties of materials. The relations between stress, strain, strain rate, and temperature for plastically deformable solids. Application of dislocation theory to strengthening mechanisms in crystalline solids. The phenomena of creep, fracture, and fatigue and their controlling mechanisms. Prerequisites: 193/203. GER:DB-EngrAppSci

3-4 units, Spr (Dauskardt, R)

**MATSCI 199. Electronic and Optical Properties of Solids**

(Same as MATSCI 209) The concepts of electronic energy bands and transports applied to metals, semiconductors, and insulators. The behavior of electronic and optical devices including p-n junctions, MOS-capacitors, MOSFETs, optical waveguides, quantum-well lasers, light amplifiers, and metallo-dielectric light guides. Emphasis is on relationships between structure and physical properties. Elementary quantum and statistical mechanics concepts are used. Prerequisite: 195/205 or equivalent. GER:DB-EngrAppSci

3-4 units, Spr (Brongersma, M)

**GRADUATE COURSES IN MATERIALS SCIENCE AND ENGINEERING**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**MATSCI 171. Nanocharacterization Laboratory**

(Same as MATSCI 161) Nanocharacterization techniques, such as: optical and electron microscopy, x-ray photoelectron spectroscopy and atomic force microscopy, will be explained in class and used in lab to determine structure of materials and understand why they have certain properties. This WIM class includes instruction on writing, statistics, generating effective plots with curve fits, using databases to find information and giving oral scientific

presentations. Prerequisite: ENGR 50 or equivalent. (75 min. lecture + 3 hr. lab most weeks.)

3-4 units, Spr (McGehee, M)

**MATSCI 172. X-Ray Diffraction Laboratory**

(Same as MATSCI 162) Experimental x-ray diffraction techniques for microstructural analysis of materials, emphasizing powder and single-crystal techniques. Diffraction from epitaxial and polycrystalline thin films, multilayers, and amorphous materials using medium and high resolution configurations. Determination of phase purity, crystallinity, relaxation, stress, and texture in the materials. Advanced experimental x-ray diffraction techniques: reciprocal lattice mapping, reflectivity, and grazing incidence diffraction. Enrollment limited to 20.

3-4 units, Win (Vailionis, A)

**MATSCI 173. Mechanical Behavior Laboratory**

(Same as MATSCI 163) Experimental techniques for the study of the mechanical behavior of engineering materials in bulk and thin film form, including tension testing, nanoindentation, and wafer curvature stress analysis. Metallic and polymeric systems. Prerequisite: ENGR 50.

3-4 units, Aut (Earhart, C)

**MATSCI 200. Master's Research**

Participation in a research project.

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**MATSCI 202. Materials Chemistry**

(Same as MATSCI 192) Chemical principles of materials: atomic and molecular bonding; acid and base chemistry; redox and electrochemistry; colloidal and surface chemistry; materials synthesis; and nanoscale chemistry.

3-4 units, Aut (Dionne, J)

**MATSCI 203. Atomic Arrangements in Solids**

(Same as MATSCI 193) Atomic arrangements in perfect and imperfect solids, especially important metals, ceramics, and semiconductors. Elements of formal crystallography, including development of point groups and space groups.

3-4 units, Aut (Reed, E)

**MATSCI 204. Thermodynamics and Phase Equilibria**

(Same as MATSCI 194) The principles of heterogeneous equilibria and their application to phase diagrams. Thermodynamics of solutions; chemical reactions; non-stoichiometry in compounds; first order phase transitions and metastability; thermodynamics of surfaces, elastic solids, dielectrics, and magnetic solids.

3-4 units, Win (Salleo, A)

**MATSCI 205. Waves and Diffraction in Solids**

(Same as MATSCI 195) The elementary principals of x-ray, vibrational, and electron waves in solids. Basic wave behavior including Fourier analysis, interference, diffraction, and polarization. Examples of wave systems, including electromagnetic waves from Maxwell's equations. Diffracted intensity in reciprocal space and experimental techniques such as electron and x-ray diffraction. Lattice vibrations in solids, including vibrational modes, dispersion relationship, density of states, and thermal properties. Free electron model. Basic quantum mechanics and statistical mechanics including Fermi-Dirac and Bose-Einstein statistics. Prerequisite: 193/203 or consent of instructor.

3-4 units, Win (Clemens, B)

**MATSCI 206. Imperfections in Solids**

(Same as MATSCI 196) Atomic and molecular scale defects and their importance to the physical and mechanical properties of bulk and nanoscale materials. Point defects and dislocations in crystals. Imperfections in amorphous solids. Structure and properties of interfaces. Prerequisite: 193/203.

3-4 units, Win (Staff)

**MATSCI 207. Rate Processes in Materials**

(Same as MATSCI 197) Diffusion and phase transformations in solids. Diffusion topics: Fick's laws, atomic theory of diffusion, and diffusion in alloys. Phase transformation topics: nucleation, growth, diffusional transformations, spinodal decomposition, and interface phenomena. Material builds on the mathematical, thermodynamic, and statistical mechanical foundations in the prerequisites. Prerequisites: 194/204.

3-4 units, Spr (McIntyre, P)

**MATSCI 208. Mechanical Properties of Materials**

(Same as MATSCI 198) Introduction to the mechanical behavior of solids, emphasizing the relationships between microstructure and mechanical properties. Elastic, anelastic, and plastic properties of materials. The relations between stress, strain, strain rate, and temperature for plastically deformable solids. Application of dislocation theory to strengthening mechanisms in crystalline solids. The phenomena of creep, fracture, and fatigue and their controlling mechanisms. Prerequisites: 193/203.

3-4 units, Spr (Dauskardt, R)

**MATSCI 209. Electronic and Optical Properties of Solids**

(Same as MATSCI 199) The concepts of electronic energy bands and transports applied to metals, semiconductors, and insulators. The behavior of electronic and optical devices including p-n junctions, MOS-capacitors, MOSFETs, optical waveguides, quantum-well lasers, light amplifiers, and metallo-dielectric light guides. Emphasis is on relationships between structure and physical properties. Elementary quantum and statistical mechanics concepts are used. Prerequisite: 195/205 or equivalent.

3-4 units, Spr (Brongersma, M)

**MATSCI 210. Organic and Biological Materials**

(Same as MATSCI 190) Unique physical and chemical properties of organic materials and their uses. The relationship between structure and physical properties, and techniques to determine chemical structure and molecular ordering. Examples include liquid crystals, dendrimers, carbon nanotubes, hydrogels, and biopolymers such as lipids, protein, and DNA. Prerequisite: Thermodynamics and ENGR 50 or equivalent.

3-4 units, Spr (Heilshorn, S)

**MATSCI 230. Materials Science Colloquium**

May be repeated for credit.

1 unit, Aut (Salleo, A; Brongersma, M), Win (Dionne, J; Melosh, N), Spr (Lindenberg, A; Reed, E)

**MATSCI 251. Microstructure and Mechanical Properties**

(Same as MATSCI 151) Primarily for students without a materials background. Mechanical properties and their dependence on microstructure in a range of engineering materials. Elementary deformation and fracture concepts, strengthening and toughening strategies in metals and ceramics. Topics: dislocation theory, mechanisms of hardening and toughening, fracture, fatigue, and high-temperature creep. Prerequisite: ENGR 50 or equivalent.

3-4 units, Aut (Dauskardt, R)

**MATSCI 256. Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution**

(Same as MATSCI 156) Operating principles and applications of emerging technological solutions to the energy demands of the world. The scale of global energy usage and requirements for possible solutions. Basic physics and chemistry of solar cells, fuel cells, and batteries. Performance issues, including economics, from the ideal device to the installed system. The promise of materials research for providing next generation solutions.

3-4 units, Aut (Clemens, B)

**MATSCI 299. Practical Training**

Educational opportunities in high-technology research and development labs in industry. Qualified graduate students engage in internship work and integrate that work into their academic program. Following the internship, students complete a research report outlining their work activity, problems investigated, key results, and any follow-on projects they expect to perform. Student is responsible for arranging own employment. See department student services manager before enrolling.

3 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**MATSCI 300. Ph.D. Research**

Participation in a research project.

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**MATSCI 302. Solar Cells**

Theory of conventional p-n junction and excitonic solar cells. Design, fabrication, and characterization of crystalline silicon, amorphous silicon, CdTe, CIGS, and tandem and organic solar cells. Emerging solar cell concepts such as intermediate band gap and bioinspired solar cells. Emphasis is on the materials science aspects of solar cells research. Module design and economic hurdles that must be overcome for solar cell technology to generate a significant fraction of the world's electricity. Group project to

explore one solar cell approach in depth. SCPD offering.

3 units, Aut (McGehee, M)

**MATSCI 303. Principles, Materials and Devices of Batteries**

Thermodynamics and electrochemistry for batteries. Emphasis on lithium ion batteries, but also different types including lead acid, nickel metal hydride, metal air, sodium sulfur and redox flow. Battery electrode materials, electrolytes, separators, additives and electrode-electrolyte interface. Electrochemical techniques; advanced battery materials with nanotechnology; battery device structure. Prerequisites: undergraduate chemistry.

3 units, Aut (Cui, Y)

**MATSCI 311. Lasers in Materials Processing**

Principles of laser operation. Optically and electrically pumped lasers. Materials for solid-state lasers. Fundamentals of laser/materials interactions. Applications in thin film technology and microfabrication; laser annealing of defects and crystallization of amorphous films. Laser-induced shock waves. Extreme non-equilibrium laser processing; ultra-fast (femtosecond) lasers and their novel uses; micro- and nanofabrication of fluidic and photonic devices; intracellular nano-surgery.

3 units, not given this year

**MATSCI 312. New Methods in Thin Film Synthesis**

Materials base for engineering new classes of coatings and devices. Techniques to grow thin films at atomic scale and to fabricate multilayers/superlattices at nanoscale. Vacuum growth techniques including evaporation, molecular beam epitaxy (MBE), sputtering, ion beam assisted deposition, laser ablation, chemical vapor deposition (CVD), and electroplating. Future direction of material synthesis such as nanocluster deposition and nanoparticles self-assembly. Relationships between deposition parameters and film properties. Applications of thin film synthesis in microelectronics, nanotechnology, and biology. SCPD offering.

3 units, not given this year

**MATSCI 316. Nanoscale Science, Engineering, and Technology**

Sample application areas: renewable energy including nanoscaled photovoltaic cells, hydrogen storage, fuel cells, and nanoelectronics. Nanofabrication techniques including: self-assembly of amphiphilic molecules, block copolymers, organic-inorganic mesostructures, colloidal crystals, organic monolayers, proteins, DNA and abalone shells; biologically inspired growth of materials; photolithography, electron beam lithography, and scanning probe lithography; and synthesis of carbon nanotubes, nanowire, and nanocrystals. Other nanotechnology topics may be explored through a group project. SCPD offering.

3 units, Spr (Cui, Y)

**MATSCI 320. Nanocharacterization of Materials**

Current methods of directly examining the microstructure of materials. Topics: optical microscopy, scanning electron and focused ion beam microscopy, field ion microscopy, transmission electron microscopy, scanning probe microscopy, and microanalytical surface science methods. Emphasis is on the electron-optical techniques. Recommended: 193/203.

3 units, Win (Sinclair, R), alternate years, not given next year

**MATSCI 321. Transmission Electron Microscopy**

Image formation and interpretation. The contrast phenomena associated with perfect and imperfect crystals from a physical point of view and from a formal treatment of electron diffraction theory. The importance of electron diffraction to systematic analysis and recent imaging developments. Recommended: 193/203, 195/205, or equivalent.

3 units, alternate years, not given this year

**MATSCI 322. Transmission Electron Microscopy Laboratory**

Experimental application of electron microscopy to typical materials science studies. Topics include microscope operation and alignment, diffraction modes and analysis, bright-field/dark-field analysis of defects, high resolution imaging, and analytical techniques for compositional analysis (EDAX). Enrollment limited to 12. Prerequisites: 321, consent of instructor.

3 units, Spr (Marshall, A)

**MATSCI 323. Thin Film and Interface Microanalysis**

The science and technology of microanalytical techniques, including Auger electron spectroscopy (AES), Rutherford backscattering spectroscopy (RBS), secondary ion mass

spectroscopy (SIMS), ion scattering spectroscopy (ISS), and x-ray photoelectron spectroscopy (XPS or ESCA). Generic processes such as sputtering and high-vacuum generation. Prerequisite: some prior exposure to atomic and electronic structure of solids. SCPD offering.

3 units, not given this year

### **MATSCI 325. X-Ray Diffraction**

Diffraction theory and its relationship to structural determination in solids. Focus is on applications of x-rays; concepts can be applied to neutron and electron diffraction. Topics: Fourier analysis, kinematic theory, Patterson functions, diffraction from layered and amorphous materials, single crystal diffraction, dynamic theory, defect determination, surface diffraction, techniques for data analysis, and determination of particle size and strain. Prerequisites: 193/203, 195/205.

3 units, not given this year

### **MATSCI 326. X-Ray Science and Techniques**

X-ray interaction with matter; diffraction from ordered and disordered materials; x-ray absorption, photoemission, and coherent scattering; x-ray microscopy. Sources including synchrotrons, high harmonic generation, x-ray lasers. Time-resolved techniques and detector technology.

3 units, Aut (Lindenberg, A)

### **MATSCI 331. Atom-based computational methods for materials**

Introduction to atom-based computational methods for materials with emphasis on quantum methods. Topics include density functional theory, tight-binding and empirical approaches. Computation of optical, electronic, phonon properties. Bulk materials, interfaces, nanostructures. Molecular dynamics. Prerequisites - undergraduate quantum mechanics.

3 units, Win (Reed, E)

### **MATSCI 343. Organic Semiconductors for Electronics and Photonics**

The science of organic semiconductors and their use in electronic and photonic devices. Topics: methods for fabricating thin films and devices; relationship between chemical structure and molecular packing on properties such as band gap, charge carrier mobility and luminescence efficiency; doping; field-effect transistors; light-emitting diodes; lasers; biosensors; photodetectors and photovoltaic cells. SCPD offering.

3 units, Spr (Salleo, A)

### **MATSCI 346. Nanophotonics**

(Same as EE 336) Recent developments in micro- and nanophotonic materials and devices. Basic concepts of photonic crystals. Integrated photonic circuits. Photonic crystal fibers. Superprism effects. Optical properties of metallic nanostructures. Sub-wavelength phenomena and plasmonic excitations. Meta-materials. Prerequisite: electromagnetic theory at the level of 242.

3 units, Aut (Brongersma, M; Fan, S)

### **MATSCI 347. Introduction to Magnetism and Magnetic Nanostructures**

Atomic origins of magnetic moments, magnetic exchange and ferromagnetism, types of magnetic order, magnetic anisotropy, domains, domain walls, hysteresis loops, hard and soft magnetic materials, demagnetization factors, and applications of magnetic materials, especially magnetic nanostructures and nanotechnology. Tools include finite-element and micromagnetic modeling. Design topics include electromagnet and permanent magnet, electronic article surveillance, magnetic inductors, bio-magnetic sensors, and magnetic drug delivery. Design projects, team work, and computer-aided design. Prerequisites: PHYSICS 29 and 43, or college-level electricity and magnetism.

3 units, Spr (Wang, S; White, R)

### **MATSCI 351. Failure Analysis for Emerging Technologies**

Introduction to root cause failure analysis investigation of emerging technologies such as high tech electronic and medical devices. Real case studies illustration of design errors, manufacturing defects, misuse and environmental degradation that resulted in fracture, fatigue, cracking or corrosion. Understanding material degradation modes and mechanisms. Examples on analytical characterization techniques such as scanning electron microscopy (SEM), X-ray photoelectron spectroscopy (XPS), Fourier transform infrared spectroscopy (FTIR), time of flight

secondary ion mass spectroscopy (TOF-SIMS), mechanical testing, finite element analysis (FEA) and electrochemical testing.

3 units, not given this year

### **MATSCI 353. Mechanical Properties of Thin Films**

The mechanical properties of thin films on substrates. The mechanics of thin films and of the atomic processes which cause stresses to develop during thin film growth. Experimental techniques for studying stresses in and mechanical properties of thin films. Elastic, plastic, and diffusional deformation of thin films on substrates as a function of temperature and microstructure. Effects of deformation and fracture on the processing of thin film materials. Prerequisite: 198/208.

3 units, not given this year

### **MATSCI 358. Fracture and Fatigue of Materials and Thin Film Structures**

Linear-elastic and elastic-plastic fracture mechanics from a materials science perspective, emphasizing microstructure and the micromechanisms of fracture. Plane strain fracture toughness and resistance curve behavior. Mechanisms of failure associated with cohesion and adhesion in bulk materials, composites, and thin film structures. Fracture mechanics approaches to toughening and subcritical crack-growth processes, with examples and applications involving cyclic fatigue and environmentally assisted subcritical crack growth. Prerequisite: 151/251, 198/208, or equivalent. SCPD offering.

3 units, Win (Dauskardt, R)

### **MATSCI 359. Crystalline Anisotropy**

(Same as ME 336) Matrix and tensor analysis with applications to the effects of crystal symmetry on elastic deformation, thermal expansion, diffusion, piezoelectricity, magnetism, thermodynamics, and optical properties of solids, on the level of J. F. Nye's Physical Properties of Crystals. Homework sets use Mathematica.

3 units, not given this year

### **MATSCI 380. Nano-Biotechnology**

Literature based. Principles that make nanoscale materials unique, applications to biology, and how biological systems can create nanomaterials. Molecular sensing, drug delivery, bio-inspired synthesis, self-assembling systems, and nanomaterial based therapies. Interactions at the nanoscale. Applications and opportunities for new technology.

3 units, Win (Melosh, N)

### **MATSCI 381. Biomaterials in Regenerative Medicine**

(Same as BIOE 361) Materials design and engineering for regenerative medicine. How materials interact with cells through their micro- and nanostructure, mechanical properties, degradation characteristics, surface chemistry, and biochemistry. Examples include novel materials for drug and gene delivery, materials for stem cell proliferation and differentiation, and tissue engineering scaffolds. Prerequisites: undergraduate chemistry, and cell/molecular biology or biochemistry.

3 units, not given this year

### **MATSCI 382. Bio-chips, Imaging and Nanomedicine**

(Same as EE 225) The course covers state-of-the-art and emerging bio-sensors, bio-chips, imaging modalities, and nano-therapies which will be studied in the context of human physiology including the nervous system, circulatory system and immune system. Medical diagnostics will be divided into bio-chips (in-vitro diagnostics) and medical and molecular imaging (in-vivo imaging). In-depth discussion on cancer and cardiovascular diseases and the role of diagnostics and nano-therapies.

3 units, Win (Wang, S; de la Zerda, A; Akin, D)

### **MATSCI 399. Graduate Independent Study**

Under supervision of a faculty member.

1-10 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### **MATSCI 400. Participation in Materials Science Teaching**

May be repeated for credit.

1-3 units, Aut (Staff), Win (Staff), Spr (Staff)

### **MATSCI 801. TGR Project for MS Students**

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### **MATSCI 802. TGR Dissertation for Ph.D Students**

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)



# MATHEMATICAL AND COMPUTATIONAL SCIENCE (MCS) COURSES

## UNDERGRADUATE COURSES IN MATHEMATICAL AND COMPUTATIONAL SCIENCE

Primarily for undergraduates; graduate students may enroll with consent of adviser.

### MCS 100. Mathematics of Sports

(Same as STATS 50) The use of mathematics, statistics, and probability in the analysis of sports performance, sports records, and strategy. Topics include mathematical analysis of the physics of sports and the determinations of optimal strategies. New diagnostic statistics and strategies for each sport. Corequisite: STATS 116. GER:DB-Math

3 units, Aut (Cover, T)

## MATHEMATICS (MATH) COURSES

### UNDERGRADUATE COURSES IN MATHEMATICS

Primarily for undergraduates; graduate students may enroll with consent of adviser.

#### MATH 19. Calculus

Introduction to differential calculus of functions of one variable. Topics: review of elementary functions including exponentials and logarithms, limits, rates of change, the derivative, and applications. Math 19, 20, and 21 cover the same material as Math 41 and 42, but in three quarters rather than two. Prerequisites: precalculus, including trigonometry, advanced algebra, and analysis of elementary functions. GER:DB-Math

3 units, Aut (Bahuaud, E), Win (Rhoades, R), Sum (Staff)

#### MATH 20. Calculus

Continuation of 19. Applications of differential calculus; introduction to integral calculus of functions of one variable, including: the definite integral, methods of symbolic and numerical integration, applications of the definite integral. Prerequisites: 19 or equivalent. GER:DB-Math

3 units, Win (Bahuaud, E), Spr (Van Horn-Morris, J)

#### MATH 21. Calculus

Continuation of 20. Applications of integral calculus, introduction to differential equations, infinite series. Prerequisite: 20 or equivalent. GER:DB-Math

4 units, Spr (Bahuaud, E)

#### MATH 41. Calculus (accelerated)

Introduction to differential and integral calculus of functions of one variable. Topics: limits, rates of change, the derivative and applications, introduction to the definite integral and integration. Math 41 and 42 cover the same material as Math 19-20-21, but in two quarters rather than three. Prerequisites: trigonometry, advanced algebra, and analysis of elementary functions, including exponentials and logarithms. GER:DB-Math

5 units, Aut (Rodriguez, N)

#### MATH 41A. Calculus ACE

Students attend MATH 41 lectures with different recitation sessions, four hours instead of two, emphasizing engineering applications. Prerequisite: application; see <http://soe.stanford.edu/edp/programs/ace.html>. GER:DB-Math

6 units, Aut (Cantarero Lopez, J; Nance, T)

#### MATH 42. Calculus (Accelerated)

Continuation of 41. Methods of symbolic and numerical integration, applications of the definite integral, introduction to differential equations, infinite series. Prerequisite: 41 or equivalent. GER:DB-Math

5 units, Aut (Zvonkine, D), Win (Lucianovic, M)

#### MATH 42A. Calculus ACE

Students attend MATH 41 lectures with different recitation sessions, four hours instead of two, emphasizing engineering applications. Prerequisite: application; see

<http://soe.stanford.edu/edp/programs/ace.html>. GER:DB-Math  
6 units, Aut (Zvonkine, D; Jerison, D), Win (Lucianovic, M)

#### MATH 50V. Multivariable Differential Calculus

Differential calculus for functions of two or more variables. Topics: vectors and vector-valued functions in 2-space and 3-space, tangent and normal vectors, curvature, functions of two or more variables, partial derivatives and differentiability, directional derivatives and gradients, maxima and minima, and optimization using Lagrange multipliers. Prerequisites: two quarters of single variable calculus, or consent of instructor. GER:DB-Math

4 units, Sum (Staff)

#### MATH 51. Linear Algebra and Differential Calculus of Several Variables

Geometry and algebra of vectors, systems of linear equations, matrices and linear transformations, diagonalization and eigenvectors, vector valued functions and functions of several variables, parametric curves, partial derivatives and gradients, the derivative as a matrix, chain rule in several variables, constrained and unconstrained optimization. Prerequisite: 21, or 42, or a score of 4 on the BC Advanced Placement exam or 5 on the AB Advanced Placement exam, or consent of instructor. GER:DB-Math

5 units, Aut (Rubinstein, Y), Win (Staff), Spr (Lucianovic, M), Sum (Staff)

#### MATH 51A. Linear Algebra and Differential Calculus of Several Variables, ACE

Students attend MATH 51 lectures with different recitation sessions: four hours per week instead of two, emphasizing engineering applications. Prerequisite: application; see <http://soe.stanford.edu/edp/programs/ace.html>. GER:DB-Math

6 units, Aut (Mazzeo, R; Goodman, E), Win (Staff), Spr (Lucianovic, M)

#### MATH 51H. Honors Multivariable Mathematics

For prospective Mathematics majors in the honors program and students from other areas of science or engineering who have a strong mathematics background. Three quarter sequence covers the material of 51, 52, 53, and additional advanced calculus and ordinary and partial differential equations. Unified treatment of multivariable calculus, linear algebra, and differential equations with a different order of topics and emphasis from standard courses. Students should know one-variable calculus and have an interest in a theoretical approach to the subject. Prerequisite: score of 5 on BC Advanced Placement exam, or consent of instructor. GER:DB-Math

5 units, Aut (Simon, L; Malkiewich, C)

#### MATH 51M. Introduction to MATLAB for Multivariable Mathematics

Corequisite: MATH 51.

1 unit, Aut (Fouladgar, K)

#### MATH 52. Integral Calculus of Several Variables

Iterated integrals, line and surface integrals, vector analysis with applications to vector potentials and conservative vector fields, physical interpretations. Divergence theorem and the theorems of Green, Gauss, and Stokes. Prerequisite: 51 and 42 or equivalents. GER:DB-Math

5 units, Aut (Wieczorek, W), Win (Wieczorek, W), Spr (Wise, J)

#### MATH 52H. Honors Multivariable Mathematics

Continuation of 51H. Prerequisite: 51H. GER:DB-Math

5 units, Win (Eliashberg, Y; Petrow, I)

#### MATH 52V. Multivariable Integral Calculus

Integral calculus for functions of two or more variables. Topics: double and triple integrals, change of variables and the Jacobian, vector fields, line integrals, independence of path and the fundamental theorem of line integrals, Green's theorem, divergence theorem, Stokes's theorem. Prerequisites: one quarter of multivariable differential calculus (comparable to 50V or 51), or consent of instructor. GER:DB-Math

5 units, Sum (Staff)

#### MATH 53. Ordinary Differential Equations with Linear



**Algebra**

Ordinary differential equations and initial value problems, systems of linear differential equations with constant coefficients, applications of second-order equations to oscillations, matrix exponentials, Laplace transforms, stability of non-linear systems and phase plane analysis, numerical methods. Prerequisite: 51 and 42 or equivalents. GER:DB-Math

5 units, Aut (Ionel, E), Win (Brendle, S), Spr (Staff), Sum (Staff)

**MATH 53H. Honors Multivariable Mathematics**

Continuation of 52H. Prerequisite: 52H. GER:DB-Math

5 units, Spr (Eliashberg, Y; Hough, R)

**MATH 70SI. The Game of Go: Strategy, Theory, and History**

Strategy and mathematical theories of the game of Go, with guest appearance by a professional Go player.

1 unit, Spr (Bump, D)

**MATH 78SI. Speedcubing: History, Theory, and Practice**

History of the Rubik's cube; the current cubing community; basic mathematical theory; concepts to improve speed solving skill. Prior ability to solve cube not required.

1 unit, not given this year

**MATH 80Q. Capillary Surfaces: Explored and Unexplored Territory**

Preference to sophomores. Capillary surfaces: the interfaces between fluids that are adjacent to each other and do not mix. Recently discovered phenomena, predicted mathematically and subsequently confirmed by experiments, some done in space shuttles. Interested students may participate in ongoing investigations with affinity between mathematics and physics.

3 units, not given this year

**MATH 87Q. Mathematics of Knots, Braids, Links, and Tangles**

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Types of knots and how knots can be distinguished from one another by means of numerical or polynomial invariants. The geometry and algebra of braids, including their relationships to knots. Topology of surfaces. Brief summary of applications to biology, chemistry, and physics.

3 units, Win (Wieczorek, W)

**MATH 88Q. The Mathematics of the Rubik's Cube**

Preference to sophomores. Group theory through topics that can be illustrated with the Rubik's cube: subgroups, homomorphisms and quotient groups, the symmetric and alternating groups, conjugation, commutators, and Sylow subgroups.

3 units, not given this year

**MATH 100. Mathematics for Elementary School Teachers**

Mathematics and pedagogical strategies. Core mathematical content in grades K-6, classroom presentation, how to handle student errors, and mathematical issues that come up during instruction.

4 units, not given this year

**MATH 102. Mathematics and magic tricks**

Performance magic tricks based on combinatorics, number theory, and topology; open mathematical problems related to magic tricks; history of magic and methods of inventing new tricks (and new mathematics.) Students are expected to learn performable skills.

3 units, Spr (Diaconis, P)

**MATH 104. Applied Matrix Theory**

Linear algebra for applications in science and engineering: orthogonality, projections, the four fundamental subspaces of a matrix, spectral theory for symmetric matrices, the singular value decomposition, the QR decomposition, least-squares, the condition number of a matrix, algorithms for solving linear systems. Prerequisites: MATH 51 and MATH 52 or 53. GER:DB-Math

3 units, Aut (Mukamel, R), Win (Candes, E), Sum (Staff)

**MATH 106. Functions of a Complex Variable**

Complex numbers, analytic functions, Cauchy-Riemann equations, complex integration, Cauchy integral formula, residues, elementary conformal mappings. Prerequisite: 52. GER:DB-Math

3 units, Win (Luu, M), Sum (Staff)

**MATH 108. Introduction to Combinatorics and Its Applications**

Topics: graphs, trees (Cayley's Theorem, application to

phylogony), eigenvalues, basic enumeration (permutations, Stirling and Bell numbers), recurrences, generating functions, basic asymptotics. Prerequisites: 51 or 103 or equivalent. GER:DB-Math

3 units, Spr (Bump, D)

**MATH 109. Applied Group Theory**

Applications of the theory of groups. Topics: elements of group theory, groups of symmetries, matrix groups, group actions, and applications to combinatorics and computing. Applications: rotational symmetry groups, the study of the Platonic solids, crystallographic groups and their applications in chemistry and physics. WIM. GER:DB-Math, WIM

3 units, Win (Venkatesh, A)

**MATH 110. Applied Number Theory and Field Theory**

Number theory and its applications to modern cryptography. Topics: congruences, finite fields, primality testing and factorization, public key cryptography, error correcting codes, and elliptic curves, emphasizing algorithms. WIM. GER:DB-Math, WIM

3 units, Spr (McNamara, P)

**MATH 111. Computational Commutative Algebra**

Introduction to the theory of commutative rings, ideals, and modules. Systems of polynomial equations in several variables from the algorithmic viewpoint. Groebner bases, Buchberger's algorithm, elimination theory. Applications to algebraic geometry and to geometric problems. GER:DB-Math

3 units, not given this year

**MATH 113. Linear Algebra and Matrix Theory**

Algebraic properties of matrices and their interpretation in geometric terms. The relationship between the algebraic and geometric points of view and matters fundamental to the study and solution of linear equations. Topics: linear equations, vector spaces, linear dependence, bases and coordinate systems; linear transformations and matrices; similarity; eigenvectors and eigenvalues; diagonalization. GER:DB-Math

3 units, Win (Ionel, E), Spr (Li, J)

**MATH 113V. Linear Algebra**

Topics: matrices, linear equations, vector spaces, linear dependence, bases and coordinates, linear transformations, similarity, eigenvectors and eigenvalues, and diagonalization. Prerequisites: two quarters of single variable calculus, or consent of instructor. GER:DB-Math

3 units, Sum (Staff)

**MATH 115. Functions of a Real Variable**

The development of real analysis in Euclidean space: sequences and series, limits, continuous functions, derivatives, integrals. Basic point set topology. Honors math majors and students who intend to do graduate work in mathematics should take 171.

Prerequisite: 51. GER:DB-Math

3 units, Aut (Camilier, I), Spr (Abrantes Andrade, R), Sum (Staff)

**MATH 116. Complex Analysis**

Analytic functions, Cauchy integral formula, power series and Laurent series, calculus of residues and applications, conformal mapping, analytic continuation, introduction to Riemann surfaces, Fourier series and integrals. Prerequisites: 52, and 115 or 171. GER:DB-Math

3 units, Spr (Li, J)

**MATH 120. Modern Algebra**

Groups acting on sets, examples of finite groups, Sylow theorems, solvable and simple groups. Fields, rings, and ideals; polynomial rings over a field; PID and non-PID. Unique factorization domains. WIM. GER:DB-Math, WIM

3 units, Aut (Galatius, S), Spr (McNamara, P)

**MATH 121. Modern Algebra II**

Continuation of 120. Field of fractions, field theory and Galois theory. Modules over a PID, quotient modules, non-free modules. Canonical forms, generalized eigenspaces, quotients and duality for vector spaces. Prerequisite: Math 120. GER:DB-Math

3 units, Win (Luu, M)

**MATH 122. GROUP REPRESENTATIONS**

Group representations and group rings, tensor algebra, character theory. Bilinear and quadratic forms, semisimplicity. Induced representations. Classification of representations, applications.

Prerequisite: Math 120, and either Math 121 or permission of instructor.

3 units, Spr (Venkatesh, A)

### MATH 131P. Partial Differential Equations I

An introduction to PDE; particularly suitable for non-Math majors. Topics include physical examples of PDE's, method of characteristics, D'Alembert's formula, maximum principles, heat kernel, Duhamel's principle, separation of variables, Fourier series, Harmonic functions, Bessel functions, spherical harmonics. Students who have taken MATH 171 should consider taking MATH 173 rather than 131p. Prerequisite: 53. GER:DB-Math

3 units, Aut (Garapon, P), Win (Garapon, P)

### MATH 132. Partial Differential Equations II

Laplace's equation and properties of harmonic functions. Green's functions. Distributions and Fourier transforms. Eigenvalue problems and generalized Fourier series. Numerical solutions. Prerequisite: 131P. GER:DB-Math

3 units, Spr (Garapon, P)

### MATH 136. Stochastic Processes

(Same as STATS 219) Introduction to measure theory,  $L_p$  spaces and Hilbert spaces. Random variables, expectation, conditional expectation, conditional distribution. Uniform integrability, almost sure and  $L_p$  convergence. Stochastic processes: definition, stationarity, sample path continuity. Examples: random walk, Markov chains, Gaussian processes, Poisson processes, Martingales. Construction and basic properties of Brownian motion. Prerequisite: STATS 116 or MATH 151 or equivalent. Recommended: MATH 115 or equivalent. GER:DB-Math

3 units, Aut (Ding, J)

### MATH 137. Mathematical Methods of Classical Mechanics

Newtonian mechanics. Lagrangian formalism. E. Noether's theorem. Oscillations. Rigid bodies. Introduction to symplectic geometry. Hamiltonian formalism. Legendre transform. Variational principles. Geometric optics. Introduction to the theory of integrable systems. Prerequisites: 51, 52, 53, or 51H, 52H, 53H. GER:DB-Math

3 units, not given this year

### MATH 138. Celestial Mechanics

Mathematically rigorous introduction to the classical N-body problem: the motion of N particles evolving according to Newton's law. Topics include: the Kepler problem and its symmetries; other central force problems; conservation theorems; variational methods; Hamilton-Jacobi theory; the role of equilibrium points and stability; and symplectic methods. Prerequisites: 53, and 115 or 171. GER:DB-Math

3 units, not given this year

### MATH 143. Differential Geometry

Geometry of curves and surfaces in three-space and higher dimensional manifolds. Parallel transport, curvature, and geodesics. Surfaces with constant curvature. Minimal surfaces. GER:DB-Math

3 units, Win (Schoen, R)

### MATH 145. Algebraic Geometry

Hilbert's nullstellensatz, complex affine and projective curves, Bezout's theorem, the degree/genus formula, blow-up, Riemann-Roch theorem. Prerequisites: 120, and 121 or knowledge of fraction fields. Recommended: familiarity with surfaces equivalent to 143, 146, 147, or 148. GER:DB-Math

3 units, Win (Conrad, B)

### MATH 146. Analysis on Manifolds

Differentiable manifolds, tangent space, submanifolds, implicit function theorem, differential forms, vector and tensor fields. Frobenius' theorem, DeRham theory. Prerequisite: 52 or 52H. GER:DB-Math

3 units, alternate years, not given this year

### MATH 147. Differential Topology

Smooth manifolds, transversality, Sard's theorem, embeddings, degree of a map, Borsuk-Ulam theorem, Hopf degree theorem, Jordan curve theorem. Prerequisite: 115 or 171. GER:DB-Math

3 units, Spr (Mukamel, R), alternate years, not given next year

### MATH 148. Algebraic Topology

Fundamental group, covering spaces, Euler characteristic, homology, classification of surfaces, knots. Prerequisite: 109 or

120. GER:DB-Math

3 units, alternate years, not given this year

### MATH 151. Introduction to Probability Theory

Counting; axioms of probability; conditioning and independence; expectation and variance; discrete and continuous random variables and distributions; joint distributions and dependence; central limit theorem and laws of large numbers. Prerequisite: 52 or consent of instructor. GER:DB-Math

3 units, Win (Carlsson, G)

### MATH 152. Elementary Theory of Numbers

Euclid's algorithm, fundamental theorems on divisibility; prime numbers; congruence of numbers; theorems of Fermat, Euler, Wilson; congruences of first and higher degrees; quadratic residues; introduction to the theory of binary quadratic forms; quadratic reciprocity; partitions. GER:DB-Math

3 units, Aut (Rhoades, R)

### MATH 154. Algebraic Number Theory

Properties of number fields and Dedekind domains, quadratic and cyclotomic fields, applications to some classical Diophantine equations; introduction to elliptic curves. Prerequisites: 120 and 121, especially modules over principal ideal domains and Galois theory of finite fields. GER:DB-Math

3 units, alternate years, not given this year

### MATH 155. Analytic Number Theory

Topics in analytic number theory such as the distribution of prime numbers, the prime number theorem, twin primes and Goldbach's conjecture, the theory of quadratic forms, Dirichlet's class number formula, Dirichlet's theorem on primes in arithmetic progressions, and the fifteen theorem. Prerequisite: 152, or familiarity with the Euclidean algorithm, congruences, residue classes and reduced residue classes, primitive roots, and quadratic reciprocity. GER:DB-Math

3 units, Spr (Soundararajan, K), alternate years, not given next year

### MATH 159. Discrete Probabilistic Methods

Modern discrete probabilistic methods suitable for analyzing discrete structures of the type arising in number theory, graph theory, combinatorics, computer science, information theory and molecular sequence analysis. Prerequisite: STATS 116/MATH 151 or equivalent.

3 units, not given this year

### MATH 161. Set Theory

Informal and axiomatic set theory: sets, relations, functions, and set-theoretical operations. The Zermelo-Fraenkel axiom system and the special role of the axiom of choice and its various equivalents. Well-orderings and ordinal numbers; transfinite induction and transfinite recursion. Equinumerosity and cardinal numbers; Cantor's Alephs and cardinal arithmetic. Open problems in set theory. Prerequisite: students should be comfortable doing proofs. GER:DB-Math

3 units, Aut (Sommer, R)

### MATH 162. Philosophy of Mathematics

(Same as PHIL 162, PHIL 262) (Graduate students register for PHIL 262.) 20th-century approaches to the foundations and philosophy of mathematics. The background in mathematics, set theory, and logic. Schools and programs of logicism, predicativism, platonism, formalism, and constructivism. Readings from leading thinkers. Prerequisite: PHIL151 or consent of instructor. GER:DB-Math

4 units, Spr (Mumma, J)

### MATH 171. Fundamental Concepts of Analysis

Recommended for Mathematics majors and required of honors Mathematics majors. Similar to 115 but altered content and more theoretical orientation. Properties of Riemann integrals, continuous functions and convergence in metric spaces; compact metric spaces, basic point set topology. Prerequisites: 51 and 52, or 51H and 52H. WIM GER:DB-Math, WIM

3 units, Aut (Simon, L), Spr (Vasy, A)

### MATH 172. Lebesgue Integration and Fourier Analysis

Similar to 205A, but for undergraduate Math majors and graduate students in other disciplines. Topics include Lebesgue measure on Euclidean space, Lebesgue integration,  $L^p$  spaces, the Fourier transform, the Hardy-Littlewood maximal function and Lebesgue

differentiation. Prerequisite: 171 or consent of instructor. GER:DB-Math

3 units, Win (Bamler, R)

**MATH 173. Theory of Partial Differential Equations**

A rigorous introduction to PDE accessible to advanced undergraduates. Elliptic, parabolic, and hyperbolic equations in many space dimensions including basic properties of solutions such as maximum principles, causality, and conservation laws. Methods include the Fourier transform as well as more classical methods. The Lebesgue integral will be used throughout, but a summary of its properties will be provided to make the course accessible to students who have not had 172 or 205A. Prerequisite: 171 or equivalent.

3 units, Win (Mazzeo, R)

**MATH 174. Calculus of Variations**

An introductory course emphasizing the historical development of the theory, its connections to physics and mechanics, its independent mathematical interest, and its contacts with daily life experience. Applications to minimal surfaces and to capillary surface interfaces. Prerequisites: Math 171 or equivalent.

3 units, not given this year

**MATH 174A. Topics in Analysis and Differential Equations with Applications**

For students planning graduate work in mathematics or physics, and for honors math majors and other students at ease with rigorous proofs and qualitative discussion. Topics may include: geometric theory of ODEs with applications to dynamics; mathematical foundations of classical mechanics including variational principles, Lagrangian and Hamiltonian formalisms, theory of integrable systems; theorems of existence and uniqueness; Sturm-Liouville theory. Prerequisite: 53H or 171, or consent of instructor. GER:DB-Math

3 units, not given this year

**MATH 174B. Honors Analysis**

Continuation of 174A. Topics may include: introduction to PDEs including transport equations, Laplace, wave, and heat equations; techniques of solution including separation of variables and Green's functions; Fourier series and integrals; introduction to the theory of distributions; mathematical foundations of quantum mechanics. Prerequisite: 174A. GER:DB-Math

3 units, not given this year

**MATH 175. Elementary Functional Analysis**

Linear operators on Hilbert space. Spectral theory of compact operators; applications to integral equations. Elements of Banach space theory. Prerequisite: 115 or 171. GER:DB-Math

3 units, Spr (Bamler, R)

**MATH 180. Introduction to Financial Mathematics**

Financial derivatives: contracts and options. Hedging and risk management. Arbitrage, interest rate, and discounted value. Geometric random walk and Brownian motion as models of risky assets. Initial boundary value problems for the heat and related partial differential equations. Self-financing replicating portfolio. Black-Scholes pricing of European options. Dividends. Implied volatility. Optimal stopping and American options. Prerequisite: 53. Corequisites: 131, 151 or STATS 116. GER:DB-Math

3 units, Aut (Camilleri, I)

**MATH 193. Polya Problem Solving Seminar**

Topics in mathematics and problem solving strategies with an eye towards the Putnam Competition. Topics may include parity, the pigeonhole principle, number theory, recurrence, generating functions, and probability. Students present solutions to the class. Open to anyone with an interest in mathematics.

1 unit, Aut (Soundararajan, K)

**MATH 196. Undergraduate Colloquium**

Weekly lectures by different experts on topics in pure and applied mathematics that go beyond the standard curriculum. May be repeated for credit for up to 3 units. Does not count toward the math major or minor.

1 unit, Aut (Conrad, B), Win (Conrad, B), Spr (Conrad, B)

**MATH 197. Senior Honors Thesis**

(Staff)

1-6 units, Aut (Staff), Win (Staff), Spr (Staff)

**MATH 198. Category Theory and Functional Programming**

An introduction to category theory and its applications in computer science: in particular to Haskell, a programming language with many language elements inspired by category theory. Students should have some familiarity with linear algebra, discrete mathematics and functional programming. Recommended corequisite: CS 242.

1 unit, not given this year

**MATH 199. Independent Work**

Undergraduates pursue a reading program; topics limited to those not in regular department course offerings. Credit can fulfill the elective requirement for math majors. Approval of Undergraduate Affairs Committee is required to use credit for honors majors area requirement.

1-3 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**GRADUATE COURSES IN MATHEMATICS**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**MATH 205A. Real Analysis**

Basic measure theory and the theory of Lebesgue integration. Prerequisite: 171 or equivalent.

3 units, Aut (Ryzhik, L)

**MATH 205B. Real Analysis**

Point set topology, basic functional analysis, Fourier series, and Fourier transform. Prerequisites: 171 and 205A or equivalent.

3 units, Win (Mazzeo, R)

**MATH 210A. Modern Algebra**

Basic commutative ring and module theory, tensor algebra, homological constructions, linear and multilinear algebra, introduction to representation theory. Prerequisite: 121 or equivalent.

3 units, Aut (Brumfiel, G)

**MATH 210B. Modern Algebra**

Continuation of 210A. Topics in group theory, Galois theory, commutative algebra, introductions to algebraic number theory and algebraic geometry.

3 units, Win (Conrad, B)

**MATH 210C. Modern Algebra**

Continuation of 210B. Semisimple rings and modules, representation theory, Lie algebras, Lie groups and their representations.

3 units, Spr (Bump, D)

**MATH 215A. Complex Analysis, Geometry, and Topology**

Analytic functions, complex integration, Cauchy's theorem, residue theorem, argument principle, conformal mappings, Riemann mapping theorem, Picard's theorem, elliptic functions, analytic continuation and Riemann surfaces.

3 units, Aut (Soundararajan, K)

**MATH 215B. Complex Analysis, Geometry, and Topology**

Topics: fundamental group and covering spaces, homology, cohomology, products, basic homotopy theory, and applications. Prerequisites: 113, 120, and 171, or equivalent; 215A is not a prerequisite for 215B.

3 units, Win (Cantarero Lopez, J)

**MATH 215C. Complex Analysis, Geometry, and Topology**

Differentiable manifolds, transversality, degree of a mapping, vector fields, intersection theory, and Poincare duality. Differential forms and the DeRham theorem. Prerequisite: 215B or equivalent.

3 units, Spr (Mirzakhani, M)

**MATH 216A. Introduction to Algebraic Geometry**

Algebraic curves, algebraic varieties, sheaves, cohomology, Riemann-Roch theorem. Classification of algebraic surfaces, moduli spaces, deformation theory and obstruction theory, the notion of schemes. May be repeated for credit. Prerequisites: 210ABC or equivalent.

3 units, Aut (Vakil, R)

**MATH 216B. Introduction to Algebraic Geometry**

Continuation of 216A. May be repeated for credit.

3 units, Win (Vakil, R)

**MATH 216C. Introduction to Algebraic Geometry**

Continuation of 216B. May be repeated for credit.

3 units, Spr (Vakil, R)

### MATH 217A. Differential Geometry

Smooth manifolds and submanifolds, tensors and forms, Lie and exterior derivative, DeRham cohomology, distributions and the Frobenius theorem, vector bundles, connection theory, parallel transport and curvature, affine connections, geodesics and the exponential map, connections on the principal frame bundle. Prerequisite: 215C or equivalent.

3 units, Spr (Brendle, S)

### MATH 220. Partial Differential Equations of Applied Mathematics

(Same as CME 303) First-order partial differential equations; method of characteristics; weak solutions; elliptic, parabolic, and hyperbolic equations; Fourier transform; Fourier series; and eigenvalue problems. Prerequisite: foundation in multivariable calculus and ordinary differential equations.

3 units, Aut (Ryzhik, L)

### MATH 221. Mathematical Methods of Imaging

Mathematical methods of imaging: array imaging using Kirchhoff migration and beamforming, resolution theory for broad and narrow band array imaging in homogeneous media, topics in high-frequency, variable background imaging with velocity estimation, interferometric imaging methods, the role of noise and inhomogeneities, and variational problems that arise in optimizing the performance of imaging algorithms and the deblurring of images. Prerequisite: 220.

3 units, not given this year

### MATH 222. Computational Methods for Fronts, Interfaces, and Waves

High-order methods for multidimensional systems of conservation laws and Hamilton-Jacobi equations (central schemes, discontinuous Galerkin methods, relaxation methods). Level set methods and fast marching methods. Computation of multi-valued solutions. Multi-scale analysis, including wavelet-based methods. Boundary schemes (perfectly matched layers). Examples from (but not limited to) geometrical optics, transport equations, reaction-diffusion equations, imaging, and signal processing.

3 units, not given this year

### MATH 224. Topics in Mathematical Biology

Mathematical models for biological processes based on ordinary and partial differential equations. Topics: population and infectious diseases dynamics, biological oscillators, reaction diffusion models, biological waves, and pattern formation. Prerequisites: 53 and 131, or equivalents.

3 units, not given this year

### MATH 226. Numerical Solution of Partial Differential Equations

(Same as CME 306) Hyperbolic partial differential equations: stability, convergence and qualitative properties; nonlinear hyperbolic equations and systems; combined solution methods from elliptic, parabolic, and hyperbolic problems. Examples include: Burger's equation, Euler equations for compressible flow, Navier-Stokes equations for incompressible flow. Prerequisites: MATH 220A or CME 302.

3 units, Spr (Garapon, P)

### MATH 227. Partial Differential Equations and Diffusion Processes

Parabolic and elliptic partial differential equations and their relation to diffusion processes. First order equations and optimal control. Emphasis is on applications to mathematical finance. Prerequisites: MATH 131 and MATH 136/STATS 219, or equivalents.

3 units, Win (Ryzhik, L)

### MATH 228. Stochastic Methods in Engineering

(Same as CME 308) Review of basic probability; Monte Carlo simulation; state space models and time series; parameter estimation, prediction, and filtering; Markov chains and processes; stochastic control; and stochastic differential equations. Examples from various engineering disciplines. Prerequisites: exposure to probability; background in real variables and analysis.

3 units, Spr (Papanicolaou, G)

### MATH 230A. Theory of Probability

(Same as STATS 310A) Mathematical tools: sigma algebras,

measure theory, connections between coin tossing and Lebesgue measure, basic convergence theorems. Probability: independence, Borel-Cantelli lemmas, almost sure and  $L_p$  convergence, weak and strong laws of large numbers. Large deviations. Weak convergence; central limit theorems; Poisson convergence; Stein's method. Prerequisites: 116, MATH 171.

2-4 units, Aut (Diaconis, P)

### MATH 230B. Theory of Probability

(Same as STATS 310B) Conditional expectations, discrete time martingales, stopping times, uniform integrability, applications to 0-1 laws, Radon-Nikodym Theorem, ruin problems, etc. Other topics as time allows selected from (i) local limit theorems, (ii) renewal theory, (iii) discrete time Markov chains, (iv) random walk theory, (v) ergodic theory. Prerequisite: 310A or MATH 230A.

2-3 units, Win (Siegmund, D)

### MATH 230C. Theory of Probability

(Same as STATS 310C) Continuous time stochastic processes: martingales, Brownian motion, stationary independent increments, Markov jump processes and Gaussian processes. Invariance principle, random walks, LIL and functional CLT. Markov and strong Markov property. Infinitely divisible laws. Some ergodic theory. Prerequisite: 310B or MATH 230B.

2-4 units, Spr (Dembo, A)

### MATH 231A. An Introduction to Random Matrix Theory

(Same as STATS 351A) Patterns in the eigenvalue distribution of typical large matrices, which also show up in physics (energy distribution in scattering experiments), combinatorics (length of longest increasing subsequence), first passage percolation and number theory (zeros of the zeta function). Classical compact ensembles (random orthogonal matrices). The tools of determinantal point processes.

3 units, not given this year

### MATH 231B. The Spectrum of Large Random Matrices

Asymptotics of eigenvalues of large random matrices, focusing on Wigner matrices and the Gaussian unitary ensemble: the combinatorics of non-crossing partitions and word graphs, concentration inequalities, Cauchy-Stieltjes transform, Hermite polynomials, Fredholm determinants, Laplace asymptotic method, special functions (Airy, Painleve), and stochastic calculus. Prerequisites: STATS 310A or MATH 205A.

3 units, Spr (Dembo, A)

### MATH 231C. Free Probability

Background from operator theory, addition and multiplication theorems for operators, spectral properties of infinite-dimensional operators, the free additive and multiplicative convolutions of probability measures and their classical counterparts, asymptotic freeness of large random matrices, and free entropy and free dimension. Prerequisite: STATS 310B or equivalent.

3 units, not given this year

### MATH 232. Topics in Probability: Malliavin Calculus, Fractional Brownian Motion and Applications

Malliavin calculus: derivative and divergence operators, Skorohod integral. Fractional Brownian motion: relevance for financial mathematics, Ito and Tanaka formula, driving force for the heat equation. Ito formula for irregular Gaussian processes and other applications of Malliavin calculus. May be repeated for credit. Prerequisites: MATH 236, STATS 310C or equivalent.

3 units, not given this year

### MATH 233. Probabilistic Methods in Analysis

Proofs and constructions in analysis obtained from basic results in Probability Theory and a 'probabilistic way of thinking.' Topics: Rademacher functions, Gaussian processes, entropy.

3 units, not given this year

### MATH 234. Large Deviations

(Same as STATS 374) Combinatorial estimates and the method of types. Large deviation probabilities for partial sums and for empirical distributions, Cramer's and Sanov's theorems and their Markov extensions. Applications in statistics, information theory, and statistical mechanics. Prerequisite: MATH 230A or STATS 310.

3 units, not given this year

**MATH 236. Introduction to Stochastic Differential Equations**  
Brownian motion, stochastic integrals, and diffusions as solutions of stochastic differential equations. Functionals of diffusions and their connection with partial differential equations. Random walk approximation of diffusions. Prerequisite: 136 or equivalent and differential equations.

3 units, Win (Papanicolaou, G)

**MATH 237. Default and Systemic Risk**

Introduction to mathematical models of complex static and dynamic stochastic systems that undergo sudden regime change in response to small changes in parameters. Examples from materials science (phase transitions), power grid models, financial and banking systems. Special emphasis on mean field models and their large deviations, including computational issues of uncertainty quantification.

3 units, Spr (Papanicolaou, G)

**MATH 238. Mathematical Finance**

(Same as STATS 250) Stochastic models of financial markets. Forward and futures contracts. European options and equivalent martingale measures. Hedging strategies and management of risk. Term structure models and interest rate derivatives. Optimal stopping and American options. Corequisites: MATH 236 and 227 or equivalent.

3 units, Win (Papanicolaou, G)

**MATH 239. Computation and Simulation in Finance**

Monte Carlo, finite difference, tree, and transform methods for the numerical solution of partial differential equations in finance. Emphasis is on derivative security pricing. Prerequisite: 238 or equivalent.

3 units, Spr (Camilier, I)

**MATH 240. Topics in Financial Mathematics: Fixed Income Models**

Introduction to continuous time models for arbitrage-free pricing of interest rate derivatives. Bonds, yields, and the construction of yield curves. Caps, floors, swaps, swaptions, and bond options. Short rate models. Yield curve models. Forward measures. Forward and futures. LIBOR and swap market models. Prerequisite: MATH 238.

3 units, Spr (Camilier, I)

**MATH 243. Functions of Several Complex Variables**

3 units, not given this year

**MATH 244. Riemann Surfaces**

Compact Riemann surfaces and algebraic curves; cohomology of sheaves; Serre duality; Riemann-Roch theorem and application; Jacobians; Abel's theorem. May be repeated for credit.

3 units, not given this year

**MATH 245A. Topics in Algebraic Geometry: Moduli Theory**

Topics in the study of moduli spaces: Grothendieck's Quot scheme, Hilbert scheme, boundedness, semistable reduction, fine and coarse moduli space, geometric invariant theory, deformation theory, and universal families. Examples of moduli spaces including moduli of curves, moduli of vector bundles and moduli of maps. May be repeated for credit.

3 units, not given this year

**MATH 245B. Topics in Algebraic Geometry: Intersection Theory**

Topics such as intersection theory on surfaces, toric varieties, and homogeneous spaces; numerical criteria for positivity; Chow groups and rings. May be repeated for credit.

3 units, not given this year

**MATH 245C. Topics in Algebraic Geometry: Alterations**

3 units, not given this year

**MATH 247. Topics in Group Theory**

Topics include the Burnside basis theorem, classification of  $p$ -groups, regular and powerful groups, Sylow theorems, the Frattini argument, nilpotent groups, solvable groups, theorems of P. Hall, group cohomology, and the Schur-Zassenhaus theorem. The classical groups and introduction to the classification of finite simple groups and its applications. May be repeated for credit.

3 units, not given this year

**MATH 248. Ergodic Theory and Szemerédi's Theorem**

An introduction to ergodic theory leading to (and proving) Szemerédi's theorem and its multidimensional extension.

Prerequisite: 205a and some knowledge of Hilbert spaces.

3 units, Win (Katznelson, Y)

**MATH 248A. Algebraic Number Theory**

Structure theory and Galois theory of local and global fields, finiteness theorems for class numbers and units, adelic techniques. Prerequisites: MATH 210A,B.

3 units, not given this year

**MATH 249A. Topics in number theory**

3 units, Aut (Conrad, B)

**MATH 249B. Topics in Number Theory**

3 units, Win (Venkatesh, A)

**MATH 249C. Topics in Number Theory**

3 units, Spr (Soundararajan, K)

**MATH 250. Elliptic Curves in Cryptography**

(Same as CS 259C) Discusses the mathematics of elliptic curves and their applications in cryptography. Studies crypto-systems based on elliptic curves and discuss their security. Studies algorithmic aspects of elliptic curves related to crypto-system construction and security. Topics include: elliptic curves over finite fields, attacks on elliptic curve crypto-systems, point counting, pairing-based cryptography. Suggested background: Math 120 or 152, or CS255.

3 units, Aut (Freeman, D)

**MATH 252. Algebraic Groups**

Smooth affine groups over general fields, quotients, tori, solvable groups, reductive groups, root systems, Existence and Isomorphism theorem, structure theory. If time permits, classification theory over interesting fields. Prerequisites: 210A, 210B, and familiarity with algebraic varieties over general fields.

3 units, not given this year

**MATH 254. Geometric Methods in the Theory of Ordinary Differential Equations**

Topics may include: structural stability and perturbation theory of dynamical systems; hyperbolic theory; first order PDE; normal forms, bifurcation theory; Hamiltonian systems, their geometry and applications. May be repeated for credit.

3 units, not given this year

**MATH 256A. Partial Differential Equations**

The theory of linear and nonlinear partial differential equations, beginning with linear theory involving use of Fourier transform and Sobolev spaces. Topics: Schauder and L2 estimates for elliptic and parabolic equations; De Giorgi-Nash-Moser theory for elliptic equations; nonlinear equations such as the minimal surface equation, geometric flow problems, and nonlinear hyperbolic equations.

3 units, Spr (Vasy, A)

**MATH 256B. Partial Differential Equations**

Continuation of 256A.

3 units, Win (Vasy, A)

**MATH 257A. Symplectic Geometry and Topology**

Linear symplectic geometry and linear Hamiltonian systems. Symplectic manifolds and their Lagrangian submanifolds, local properties. Symplectic geometry and mechanics. Contact geometry and contact manifolds. Relations between symplectic and contact manifolds. Hamiltonian systems with symmetries. Momentum map and its properties. May be repeated for credit.

3 units, not given this year

**MATH 257B. Symplectic Geometry and Topology**

Continuation of 257A. May be repeated for credit.

3 units, not given this year

**MATH 258. Topics in Geometric Analysis**

May be repeated for credit.

3 units, Spr (White, B)

**MATH 259. mirror symmetry**

3 units, Aut (Subotic, A)

**MATH 261A. Functional Analysis**

Geometry of linear topological spaces. Linear operators and functionals. Spectral theory. Calculus for vector-valued functions. Operational calculus. Banach algebras. Special topics in functional analysis. May be repeated for credit.

3 units, not given this year

**MATH 263A. Lie Groups and Lie Algebras**

Definitions, examples, properties. Semi-simple Lie algebras, their structure and classification. Cartan decomposition: real Lie algebras. Representation theory: Cartan-Stiefel diagram, weights. Weyl character formula. Orthogonal and symplectic representations. May be repeated for credit. Prerequisite: 210 or equivalent.

*3 units, not given this year*

**MATH 263B. Lie Groups and Lie Algebras**

Continuation of 263A. May be repeated for credit.

*3 units, Win (Bump, D)*

**MATH 264. Infinite Dimensional Lie Algebra**

*3 units, not given this year*

**MATH 266. Computational Signal Processing and Wavelets**

Theoretical and computational aspects of signal processing. Topics: time-frequency transforms; wavelet bases and wavelet packets; linear and nonlinear multiresolution approximations; estimation and restoration of signals; signal compression. May be repeated for credit.

*3 units, not given this year*

**MATH 269. Topics in symplectic geometry**

May be repeated for credit.

*3 units, not given this year*

**MATH 270. Geometry and Topology of Complex Manifolds**

Complex manifolds, Kahler manifolds, curvature, Hodge theory, Lefschetz theorem, Kahler-Einstein equation, Hermitian-Einstein equations, deformation of complex structures. May be repeated for credit.

*3 units, not given this year*

**MATH 271. The H-Principle**

The language of jets. Thom transversality theorem. Holonomic approximation theorem. Applications: immersion theory and its generalizations. Differential relations and Gromov's h-principle for open manifolds. Applications to symplectic geometry. Microflexibility. Mappings with simple singularities and their applications. Method of convex integration. Nash-Kuiper  $C^1$ -isometric embedding theorem.

*3 units, Win (Eliashberg, Y)*

**MATH 272. Topics in Partial Differential Equations**

*3 units, not given this year*

**MATH 280. Evolution Equations in Differential Geometry**

*3 units, Aut (Brendle, S)*

**MATH 282A. Low Dimensional Topology**

The theory of surfaces and 3-manifolds. Curves on surfaces, the classification of diffeomorphisms of surfaces, and Teichmüller space. The mapping class group and the braid group. Knot theory, including knot invariants. Decomposition of 3-manifolds: triangulations, Heegaard splittings, Dehn surgery. Loop theorem, sphere theorem, incompressible surfaces. Geometric structures, particularly hyperbolic structures on surfaces and 3-manifolds.

*3 units, Aut (Kerckhoff, S)*

**MATH 282B. Homotopy Theory**

Homotopy groups, fibrations, spectral sequences, simplicial methods, Dold-Thom theorem, models for loop spaces, homotopy limits and colimits, stable homotopy theory.

*3 units, Win (Carlsson, G)*

**MATH 282C. Fiber Bundles and Cobordism**

Possible topics: principal bundles, vector bundles, classifying spaces. Connections on bundles, curvature. Topology of gauge groups and gauge equivalence classes of connections. Characteristic classes and K-theory, including Bott periodicity, algebraic K-theory, and indices of elliptic operators. Spectral sequences of Atiyah-Hirzebruch, Serre, and Adams. Cobordism theory, Pontryagin-Thom theorem, calculation of unoriented and complex cobordism. May be repeated for credit.

*3 units, Spr (Abrantes Andrade, R)*

**MATH 283. Topics in Algebraic and Geometric Topology**

May be repeated for credit.

*3 units, Aut (Cohen, R), Win (Cantarero Lopez, J), Spr (Carlsson, G)*

**MATH 283A. Topics in Topology**

*3 units, not given this year*

**MATH 284. Topics in Geometric Topology: Heegaard splittings and three-manifolds**

Incompressible surfaces, irreducible manifolds, prime decomposition, Morse theory, Heegaard diagrams, Heegaard splittings, the Thurston norm, sutured manifold theory, Heegaard Floer homology, sutured Floer homology.

*3 units, not given this year*

**MATH 284A. Geometry and Topology in Dimension 3**

The Poincaré conjecture and the uniformization of 3-manifolds. May be repeated for credit.

*3 units, not given this year*

**MATH 284B. Geometry and Topology in Dimension 3**

The Poincaré conjecture and the uniformization of 3-manifolds. May be repeated for credit.

*3 units, not given this year*

**MATH 286. Topics in Differential Geometry**

May be repeated for credit.

*3 units, Win (Schoen, R)*

**MATH 290B. Model Theory B**

(Same as PHIL 350B) Decidable theories. Model-theoretic background. Arithmetic of addition, real closed and algebraically closed fields, weak second order arithmetic, theories of terms, theories of arrays, temporal logic. Combining decision procedures. May be repeated for credit. Prerequisite: 151, 152 or equivalents.

*1-3 units, not given this year*

**MATH 292A. Set Theory**

(Same as PHIL 352A) The basics of axiomatic set theory; the systems of Zermelo-Fraenkel and Bernays-Gödel. Topics: cardinal and ordinal numbers, the cumulative hierarchy and the role of the axiom of choice. Models of set theory, including the constructible sets and models constructed by the method of forcing. Consistency and independence results for the axiom of choice, the continuum hypothesis, and other unsettled mathematical and set-theoretical problems. Prerequisites: PHIL 151 and MATH 161, or equivalents.

*3 units, not given this year*

**MATH 293A. Proof Theory**

(Same as PHIL 353A) Gentzen's natural deduction and sequential calculi for first-order propositional and predicate logics. Normalization and cut-elimination procedures. Relationships with computational lambda calculi and automated deduction. Prerequisites: 151, 152, and 161, or equivalents.

*3 units, Aut (Mints, G)*

**MATH 295. Computation and Algorithms in Mathematics**

Use of computer and algorithmic techniques in various areas of mathematics. Computational experiments. Topics may include polynomial manipulation, Groebner bases, computational geometry, and randomness. May be repeated for credit.

*3 units, not given this year*

**MATH 301. Advanced Topics in Convex Optimization**

Modern developments in convex optimization: semidefinite programming; novel and efficient first-order algorithms for smooth and nonsmooth convex optimization. Emphasis on numerical methods suitable for large scale problems arising in science and engineering. Prerequisites: convex optimization (EE 364), linear algebra (Math 104), numerical linear algebra (CME 302); background in probability, statistics, real analysis and numerical optimization.

*3 units, not given this year*

**MATH 355. Graduate Teaching Seminar**

Required of and limited to first-year Mathematics graduate students.

*1 unit, Spr (Simon, L; Lucianovic, M)*

**MATH 360. Advanced Reading and Research**

(Staff)

*1-9 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**MATH 361. Research Seminar Participation**

Participation in a faculty-led seminar which has no specific course number. (Staff)

*1-3 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**MATH 381. Seminar in Analysis**

*1-3 units, by arrangement*

**MATH 384. Seminar in Geometry***1 unit, by arrangement***MATH 385. Seminar in Topology***1-3 units, by arrangement***MATH 388. Seminar in Probability and Stochastic Processes***1-3 units, by arrangement***MATH 389. Seminar in Mathematical Biology***1-3 units, by arrangement***MATH 391. Research Seminar in Logic and the Foundations of Mathematics**

(Same as PHIL 391) Contemporary work. May be repeated a total of three times for credit.

*1-3 units, Aut (Mints, G; Feferman, S), Win (Mints, G; Feferman, S), Spr (Mints, G; Feferman, S)***MATH 394. classics in analysis**

Original papers in analysis.

*3 units, Win (Vasy, A)***MATH 395. Classics in Geometry and Topology**

Original papers in geometry and in algebraic and geometric topology. May be repeated for credit.

*3 units, Spr (Mirzakhani, M)***MATH 396. Graduate Progress**

Results and current research of graduate and postdoctoral students. May be repeated for credit.

*1 unit, not given this year***MATH 802. TGR Dissertation***0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

## MECHANICAL ENGINEERING (ME) COURSES

### UNDERGRADUATE COURSES IN MECHANICAL ENGINEERING

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**ME 10N. Form and Function of Animal Skeletons**

(Same as BIOE 10N) Preference to freshmen. The biomechanics and mechanobiology of the musculoskeletal system in human beings and other vertebrates on the level of the whole organism, organ systems, tissues, and cell biology. Field trips to labs. GER:DB-EngrAppSci

*3 units, not given this year***ME 11SC. The Art and Science of Measuring Fluid Flows**

The roles of fluid flows in natural systems such as swimming protozoa and planet-forming nebulae, and technologies such as biomolecular assay devices and jet engines. The analytical background for fluid sciences. Phenomena such as shock waves and vortex formation that create flow patterns while challenging engineers. Visualization and measurement techniques to obtain full-field flow pattern information. The physics behind these technologies. Field trips; lab work. (Eaton)

*2 units, not given this year***ME 12N. The Jet Engine**

Preference to freshmen. How a jet engine works; the technologies and analytical techniques required to understand them. Dynamics, thermodynamics, turbomachinery, combustion, advanced materials, cooling technologies, and control systems. Visits to research laboratories, examination of a partially disassembled engine, and probable operation of a small jet engine. Prerequisites: high school physics. GER:DB-EngrAppSci

*3 units, not given this year***ME 12SC. Hands-on Jet Engines**

How jet engines transformed the world through intercontinental travel causing internationalization in daily life. Competition driving improvements in fuel economy, engine lifetime, noise, and emissions.

*2 units, not given this year***ME 14N. How Stuff Is Made**

(F,Sem) Stanford Introductory Seminar. The design and engineering of products and processes, such as machining, fabric, food, and electrical goods. Tradeoffs in choice of materials, features, and process selection. Final project: students research and redesign the engineering and manufacturing aspects of a product and its processes with an eye toward sustainability. Includes several field trips to manufacturing facilities. GER:DB-EngrAppSci

*3 units, Aut (Pruitt, B)***ME 15. Growing creativity: Education Reform in New York City**

Preparation for Alternative Spring Break program. Current issues in education with a focus on the New York City area. Emphasis will be placed on design thinking and the creative process. Enrollment limited to Growing Creativity ASB 2011 participants.

*1 unit, not given this year***ME 16N. The Science of Flames**

Preference to freshmen. The roles that chemistry and fluid dynamics play in governing the behaviors of flames. Emphasis is on factors that affect flame microstructure, external appearance, and on the fundamental physical and chemical processes that cause flames and fires to propagate. Topics: history, thermodynamics, and pollutant formation in flames. Trips to labs where flames are studied. Prerequisites: high school physics. GER:DB-EngrAppSci

*3 units, not given this year***ME 17N. Robotics Imitating Nature**

Preference to freshmen. The dream of constructing robots that duplicate the functional abilities of humans and/or other animals has been promulgated primarily by science fiction writers. But biological systems provide models for the designers of robots. Building electromechanical devices that perform locomotory and sensing functions similar to those of an animal as a way of learning about how biological systems function. Walking and running machines, and the problem of giving a robot the capability to respond to its environment.

*3 units, not given this year***ME 18Q. Teamology: Creative Teams and Individual Development**

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Roles on a problem solving team that best suit individual creative characteristics. Two teams are formed for teaching experientially how to develop less conscious abilities from teammates creative in those roles. Reinforcement teams have members with similar personalities; problem solving teams are composed of people with maximally different personalities.

*3 units, Aut (Wilde, D)***ME 19. Pre-field Course for Alternative Spring Break: Design for Social Change**

Focus is on applying design, technology and innovation to catalyze social change. Topics include identifying social needs, learning different brainstorming methods, developing an applicable service model or product, prototyping, implementation, and reiteration. Reading and service components, followed by week-long Alternative Spring Break trip. See <http://d4sc.blogspot.com>. Enrollment limited to 12. May be repeated for credit.

*1 unit, not given this year***ME 21N. Renaissance Machine Design**

Preference to freshmen. Technological innovations of the 1400s that accompanied the proliferation of monumental art and architecture by Brunelleschi, da Vinci, and others who designed machines and invented novel construction, fresco, and bronze-casting techniques. The social and political climate, from the perspective of a machine designer, that made possible and demanded engineering expertise from prominent artists. Hands-on projects to provide a physical understanding of Renaissance-era engineering challenges and introduce the pleasure of creative engineering design. Technical background not required. GER:DB-EngrAppSci

*3 units, not given this year***ME 24N. Designing the Car of the Future**

Preference to freshmen. Automotive design drawing from all areas of mechanical engineering. The state of the art in automotive design and the engineering principles to understand vehicle



performance. Future technologies for vehicles. Topics include vehicle emissions and fuel consumption, possibilities of hydrogen, drive-by-wire systems, active safety and collision avoidance, and human-machine interface issues. GER:DB-EngrAppSci

3 units, not given this year

**ME 25N. Global Warming and Climate Change: Fact or Fiction**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Scientific arguments concerning debates between the view that anthropogenic activities are not causing global warming versus the view that these activities are responsible for a global warming that results in significant climate change. Consequences of increased demand for energy. Prerequisites: high school physics, chemistry, and biology.

3 units, Win (Bowman, C)

**ME 26N. Think Like a Designer**

(F,Sem) Stanford Introductory Seminar. Introduces students to techniques designers use to create highly innovative solutions across domains. The project-based class will emphasize approaches to problem identification and problem solving. Topics include need-finding, structured brainstorming, synthesis, rapid prototyping, and visual communication; field trips to a local design firm, a robotics lab, and a machining lab. A secondary goal of the seminar is to introduce students to the pleasures of creative design and hands-on development of tangible solutions.

3 units, Aut (Banerjee, S)

**ME 27SI. Needfinding for Underserved Populations**

The heart of any design process resides in empathy with users and their needs. Working in the realm of public service may engage a population to which the designer might not have been exposed. How different needfinding techniques can help designers to understand users from underserved populations and inspire them to create products and services that serve user needs.

2 units, not given this year

**ME 28SI. Professional Design Practices**

Lab. Professional skills are developed through web-based portfolio and resume building. Additionally, visits to local design consulting firms and in house design groups will help solidify students understanding of the designer in the professional workplace.

1 unit, not given this year

**ME 29SI. Cars: A Crash Course**

Focus is on the basic mechanics and significance of cars. Topics include a basic, real-world understanding of automobile workings, histories, industries, cultural impact, and related media. Field trips to Tesla Motors and Go-Kart Racer will be organized, and there will be guest appearances by local automotive historians and enthusiasts. Students will get hands on experience with maintaining real cars, see high performance engines run, and have the opportunity to learn how to drive a manual transmission.

1 unit, not given this year

**ME 70. Introductory Fluids Engineering**

Elements of fluid mechanics as applied to engineering problems. Equations of motion for incompressible ideal flow. Hydrostatics. Control volume laws for mass, momentum, and energy. Bernoulli equation. Dimensional analysis and similarity. Flow in ducts. Boundary layer flows. Lift and drag. Lab experiment demonstrations. Prerequisites: ENGR 14 and 30. GER:DB-EngrAppSci

4 units, Win (Cappelli, M), Spr (Tang, S)

**ME 80. Mechanics of Materials**

Mechanics of materials and deformation of structural members. Topics include stress and deformation analysis under axial loading, torsion and bending, column buckling and pressure vessels. Introduction to stress transformation and multiaxial loading. Prerequisite: ENGR 14. GER:DB-EngrAppSci

4 units, Aut (Cai, W), Spr (Mitiguy, P)

**ME 101. Visual Thinking**

Lecture/lab. Visual thinking and language skills are developed and exercised in the context of solving design problems. Exercises for the mind's eye. Rapid visualization and prototyping with emphasis on fluent and flexible idea production. The relationship between visual thinking and the creative process. Enrollment limited to 60. GER:DB-EngrAppSci

4 units, Aut (Kessin, J; Luomanen, C; Feng, A), Win (Gleason, P; Silver, J), Spr (Northway, D; Pauwels, D)

**ME 103D. Engineering Drawing and Design**

Designed to accompany 203. The fundamentals of engineering drawing including orthographic projection, dimensioning, sectioning, exploded and auxiliary views, and assembly drawings. Homework drawings are of parts fabricated by the student in the lab. Assignments in 203 supported by material in 103D and sequenced on the assumption that the student is enrolled in both courses simultaneously.

1 unit, Aut (Milroy, J; Dreissigacker, M), Win (Milroy, J; Dreissigacker, M), Spr (Milroy, J; Dreissigacker, M)

**ME 104. The Designer's Voice**

Course helps students develop a point of view about their design career that will enable them to articulate their design vision, inspire a design studio, or infect a business with a culture of design-thinking. Focus on the integration of work and worldview, professional values, design language, and the development of the designer's voice. Includes seminar-style discussions, role-playing, short writing assignments, guest speakers, and individual mentoring and coaching. Participants will be required to keep a journal.

1 unit, Aut (Evans, D; Burnett, W)

**ME 104B. Designing Your Life**

The course employs a design thinking approach to help students develop a point of view about their career. The course focuses on an introduction to design thinking, the integration of work and worldview, and practices that support vocation formation. The course will include seminar-style discussions, role-playing, short writing assignments, guest speakers, and individual mentoring and coaching. Enrollment limited to: Jrs. and Srs., all majors. Admission confirmed by email to Axxess registered students prior to first class session. See [www.designingyourlife.org](http://www.designingyourlife.org)

2 units, Aut (Burnett, W; Evans, D), Win (Burnett, W; Evans, D), Spr (Evans, D; Burnett, W)

**ME 110. Design Sketching**

Freehand sketching, rendering, and design development. Students develop a design sketching portfolio for review by program faculty. May be repeated for credit.

1 unit, Aut (Li, W; Scott, W), Win (Li, W; Scott, W), Spr (Li, W; Scott, W)

**ME 112. Mechanical Systems Design**

Lecture/lab. Characteristics of machine elements including gears, bearings, and shafts. Design for fatigue life. Electric motor fundamentals. Transmission design for maximizing output power or efficiency. Mechanism types, linkage analysis and kinematic synthesis. Team-based design projects emphasizing the balance of physical with virtual prototyping based on engineering analysis. Lab for dissection of mechanical systems and project design reviews. Prerequisites: 80, 101. Recommended: 203, ENGR 15. GER:DB-EngrAppSci

4 units, Win (Gerdes, C)

**ME 113. Mechanical Engineering Design**

Capstone course. Mechanical engineering design is experienced by students as they work on team projects obtained from industry or other organizations. Prerequisites: 80,101,112, 203. Enrollment priority to ME majors. GER:DB-EngrAppSci

4 units, Spr (Nelson, D)

**ME 115A. Introduction to Human Values in Design**

Lecture/lab. Introduces the central philosophy of the product design program, emphasizing the relation between technical and human values, the innovation process, and design methodology. Lab exercises include development of simple product concepts visualized in rapidly executed three-dimensional mockups. Prerequisite: 101.

3 units, Aut (Kelley, D; Fields, B)

**ME 115B. Product Design Methods**

Problem-finding, problem-solving, intermediate creativity methods and effective techniques for researching and presenting product concepts. Individual- and team-based design projects emphasizing advanced visual thinking and prototyping skills. Prerequisite: ME115A GER:DB-EngrAppSci

3 units, Win (Edson, J)



**ME 115C. Design and Business Factors**

Design and Business Factors: Introduces business concepts critical to determining the success of new products and services. Students will learn to estimate the cost of R&D for new product development. Using financial analysis, ROI, and tollgates to reduce development risk will be explored using case studies and simulations. Students will develop a bill of materials and a profit and loss statement for a sample product concept, prototype a design consultancy, and create a business proposal for a proposed new product company.

3 units, Spr (Burnett, W; Siddiqui, O)

**ME 116. Advanced Product Design: Formgiving**

Small- and medium-scale design projects are carried to a high degree of aesthetic refinement. Emphasis is on form development, design process, and model making. Prerequisites: ME 115B, ARTSTUDI 160. GER:DB-EngrAppSci

4 units, Aut (Burnett, W; Staff, I)

**ME 120. History and Philosophy of Design**

Major schools of 19th- and 20th-century design (Arts and Crafts movement, Bauhaus, Industrial Design, and postmodernism) are analyzed in terms of their continuing cultural relevance. The relation of design to art, technology, and politics; readings from principal theorists, practitioners, and critics; recent controversies in industrial and graphic design, architecture, and urbanism. Enrollment limited to 65.

3 units, Spr (Katz, B)

**ME 131A. Heat Transfer**

The principles of heat transfer by conduction, convection, and radiation with examples from the engineering of practical devices and systems. Topics include transient and steady conduction, conduction by extended surfaces, boundary layer theory for forced and natural convection, boiling, heat exchangers, and graybody radiative exchange. Prerequisites: 70, ENGR 30. Recommended: intermediate calculus, ordinary differential equations. GER:DB-EngrAppSci

3-4 units, Aut (Asheghi, M)

**ME 131B. Fluid Mechanics: Compressible Flow and Turbomachinery**

Engineering applications involving compressible flow: aircraft and rocket propulsion, power generation; application of mass, momentum, energy and entropy balance to compressible flows; variable area isentropic flow, normal shock waves, adiabatic flow with friction, flow with heat addition. Operation of flow systems: the propulsion system. Turbomachinery: pumps, compressors, turbines. Angular momentum analysis of turbomachine performance, centrifugal and axial flow machines, effect of blade geometry, dimensionless performance of turbomachines; hydraulic turbines; steam turbines; wind turbines. Compressible flow turbomachinery: the aircraft engine. Prerequisites: 70, ENGR 30. GER:DB-EngrAppSci

4 units, Win (Eaton, J)

**ME 140. Advanced Thermal Systems**

Capstone course. Thermal analysis and engineering emphasizing integrating heat transfer, fluid mechanics, and thermodynamics into a unified approach to treating complex systems. Mixtures, humidity, chemical and phase equilibrium, and availability. Labs apply principles through hands-on experience with a turbojet engine, PEM fuel cell, and hybrid solid/oxygen rocket motor. Use of MATLAB as a computational tool. Prerequisites: ENGR 30, ME 70, and 131A,B. GER:DB-EngrAppSci

5 units, Spr (Mitchell, R)

**ME 161. Dynamic Systems, Vibrations and Control**

(Same as ME 261) (Graduate students only enroll in 261.) Modeling, analysis, and measurement of mechanical and electromechanical systems. Numerical and closed form solutions of ordinary differential equations governing the behavior of single and multiple degree of freedom systems. Stability, resonance, amplification and attenuation, and control system design. Prerequisites: Calculus (differentiation and integration), ordinary differential equations, and basic linear algebra (determinants and solving linear equations). Should be familiar with dynamics ( $F=m*a$ ) and simple electronics ( $V=i*R$ ). GER:DB-EngrAppSci

3-4 units, Aut (Mitiguy, P)

**ME 185. Electric Vehicle Design**

This project based class focuses on the design and prototyping of electric vehicles. Students learn the fundamentals of vehicle design in class and apply the knowledge as they form teams and work on projects involving concept, specifications, structure, systems, integration, assembly, testing, etc. The class meets once a week to learn about the fundamentals, exchange their experiences, and coordinate between projects. The teams of 3-5 will work on their projects independently.

3 units, Spr (Gerdes, C; Beiker, S)

**ME 190. Ethical Issues in Mechanical Engineering**

Moral rights and responsibilities of engineers in relation to society, employers, colleagues, and clients; cost-benefit-risk analysis, safety, and informed consent; whistle blowing; engineers as expert witnesses, consultants, and managers; ethical issues in engineering design, manufacturing, and operations, and engineering work in foreign countries; and ethical implications of the social and environmental contexts of contemporary engineering. Case studies and field research. Enrollment limited to 25 Mechanical Engineering majors.

4 units, not given this year

**ME 191. Engineering Problems and Experimental Investigation**

Directed study and research for undergraduates on a subject of mutual interest to student and staff member. Student must find faculty sponsor and have approval of adviser.

1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**ME 191H. Honors Research**

Student must find faculty honors adviser and apply for admission to the honors program. (Staff)

1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**ME 196. Design and Manufacturing Forum**

(Same as ME 396) Invited speakers address issues of interest to design and manufacturing engineering and business students. Sponsored by the Product Realization Network at Stanford.

1 unit, Spr (Reis, R)

**ME 214. Good Products, Bad Products**

(Same as ME 314) The characteristics of industrial products that cause them to be successes or failures: the straightforward (performance, economy, reliability), the complicated (human and cultural fit, compatibility with the environment, craftsmanship, positive emotional response of the user), the esoteric (elegance, sophistication, symbolism). Engineers and business people must better understand these factors to produce more successful products. Projects, papers, guest speakers, field trips. GER:DB-EngrAppSci

4 units, Win (Beach, D)

**GRADUATE COURSES IN MECHANICAL ENGINEERING**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**ME 201. Dim Sum of Mechanical Engineering**

Introduction to research in mechanical engineering for M.S. students and upper-division undergraduates. Weekly presentations by current ME Ph.D. and second-year fellowship students to show research opportunities across the department. Strategies for getting involved in a research project. (Sheppard)

1 unit, Aut (Gardella, I)

**ME 203. Design and Manufacturing**

Integrated experience involving need finding, product definition, conceptual design, detail design, prototype manufacture, public presentation of outcomes, archiving and interpreting the product realization process and its results. Presents an overview of manufacturing processes crucial to the practice of design. Corequisite: 103D or CAD experience. Corequisite for WIM for Mechanical Engineering and Product Design undergraduate majors: ENGR102M. Recommended: 101.

4 units, Aut (Beach, D), Win (Beach, D), Spr (Milroy, J)

**ME 203X. Prototyping and Process Capture**

Concepts and methods for low resolution prototyping as an integral activity in engineering design process. Class meetings include presentations by faculty and design oriented exercises by students.

Assignments will be Blog Posts. ME203X is designed to work in phase with ME203 and offers greater depth in prototyping strategy, technique, and resultant insights. Concurrent enrollment in ME203 is required. Enrollment is optional and capped at 6 students.

*1 unit, not given this year*

#### **ME 204. Bicycle Design and Frame-Building**

Lecture/lab. The engineering and artistic execution of designing and building a bicycle frame. Fundamentals of bicycle dynamics, handling, and sizing. Manufacturing processes. Films, guest lecturers, field trips. Each student designs and fabricates a custom bicycle frame. Limited enrollment. Prerequisite: 203 or equivalent.

*3 units, Spr (Staff)*

#### **ME 206A. Entrepreneurial Design for Extreme Affordability**

Project course jointly offered by School of Engineering and Graduate School of Business. Students apply engineering and business skills to design product prototypes, distribution systems, and business plans for entrepreneurial ventures in developing countries for a specified challenge faced by the world's poor. Topics include user empathy, appropriate technology design, rapid prototype engineering and testing, social technology entrepreneurship, business modeling, and project management. Weekly design reviews; final course presentation. Industry and adviser interaction. Limited enrollment via application; see <http://www.stanford.edu/class/me206>.

*4 units, Win (Patell, J; Beach, D)*

#### **ME 206B. Entrepreneurial Design for Extreme Affordability**

Part two of two-quarter project course jointly offered by School of Engineering and Graduate School of Business. Second quarter emphasizes prototyping and implementation of specific projects identified in first quarter. Students work in cross-disciplinary project teams. Industry and adviser interaction, weekly design reviews; final course presentation. Prerequisite: 206A. (Jointly offered as GSB OIT333B) Design Institute class; see <http://dschool.stanford.edu>.

*4 units, Spr (Patell, J; Beach, D)*

#### **ME 208. Patent Law and Strategy for Innovators and Entrepreneurs**

How to build a patent portfolio and avoid patent infringement. How to conduct a patent search. How to file a provisional patent application.

*2-3 units, Aut (Schox, J)*

#### **ME 210. Introduction to Mechatronics**

Technologies involved in mechatronics (intelligent electromechanical systems), and techniques to apply this technology to mecatronic system design. Topics include: electronics (A/D, D/A converters, op-amps, filters, power devices); software program design, event-driven programming; hardware and DC stepper motors, solenoids, and robust sensing. Large, open-ended team project. Limited enrollment. Prerequisites: ENGR 40, CS 106, or equivalents.

*4 units, Win (Ohline, R; Kenny, T)*

#### **ME 212. Calibrating the Instrument**

For first-year graduate students in the Joint Program in Design. Means for calibrating the designer's mind/body instrument through tools including improvisation, brainstorming, creative imaging, educational kinesiology, and Brain Gym. Current design issues; guest speakers; shared stories; and goal setting.

*1 unit, Aut (Edmark, J)*

#### **ME 216A. Advanced Product Design: Needfinding**

Human needs that lead to the conceptualization of future products, environments, systems, and services. Field work in public and private settings; appraisal of personal values; readings on social ethnographic issues; and needfinding for a corporate client. Emphasis is on developing the flexible thinking skills that enable the designer to navigate the future. Prerequisites for undergraduates: 116 and 203, or consent of the instructor.

*3-4 units, Win (Patnaik, D; O'Meara, I)*

#### **ME 216B. Advanced Product Design: Implementation**

Summary project using knowledge, methodology, and skills obtained in Product Design major. Students implement an original design concept and present it to a professional jury. Prerequisite: 216A.

*3-4 units, Spr (Burnett, W)*

#### **ME 218A. Smart Product Design Fundamentals**

Lecture/lab. Team design project series on programmable electromechanical systems design. Topics: transistors as switches, digital and analog circuits, operational amplifiers, comparators, software design, programming in C. Lab fee. Limited enrollment.

*4-5 units, Aut (Carryer, J)*

#### **ME 218B. Smart Product Design Applications**

Lecture/lab. Second in team design project series on programmable electromechanical systems design. Topics: user I/O, timer systems, interrupts, signal conditioning, software design for embedded systems, sensors, actuators, noise, and power supplies. Lab fee. Limited enrollment. Prerequisite: 218A or passing the smart product design fundamentals proficiency examination.

*4-5 units, Win (Carryer, J)*

#### **ME 218C. Smart Product Design Practice**

Lecture/lab. Advanced level in series on programmable electromechanical systems design. Topics: inter-processor communication, system design with multiple microprocessors, architecture and assembly language programming for the PIC microcontroller, controlling the embedded software tool chain, A/D and D/A techniques, electronic manufacturing technology. Team project. Lab fee. Limited enrollment. Prerequisite: 218B.

*4-5 units, Spr (Carryer, J)*

#### **ME 218D. Smart Product Design: Projects**

Lecture/lab. Industrially sponsored project is the culmination of the Smart Product Design sequence. Student teams take on an industrial project requiring application and extension of knowledge gained in the prior three quarters, including prototyping of a final solution with hardware, software, and professional documentation and presentation. Lectures extend the students' knowledge of electronic and software design, and electronic manufacturing techniques. Topics: chip level design of microprocessor systems, real time operating systems, alternate microprocessor architectures, and PCB layout and fabrication. Prerequisite: 218C.

*3-4 units, Aut (Carryer, J)*

#### **ME 219. The Magic of Materials and Manufacturing**

Lecture/lab. Methods for market-quantity manufacturing of parts and products from a product designer's point of view. Materials including metals, plastics, ceramics, fibers, and foams, and processes that manipulate, exploit, transform, and modify these materials. Visual descriptions of processes, product examples, relevant material details, cost information, and manufacturability rules-of-thumb. Imagining and creating new products. Manufacturing site visits; laboratory projects. Enrollment limited to 20.

*3 units, Aut (Beach, D; Johnson, K), Spr (Beach, D; Johnson, K)*

#### **ME 220. Introduction to Sensors**

Sensors are widely used in scientific research and as an integral part of commercial products and automated systems. The basic principles for sensing displacement, force, pressure, acceleration, temperature, optical radiation, nuclear radiation, and other physical parameters. Performance, cost, and operating requirements of available sensors. Elementary electronic circuits which are typically used with sensors. Lecture demonstration of a representative sensor from each category elucidates operating principles and typical performance. Lab experiments with off-the-shelf devices.

*3-4 units, Spr (Kenny, T)*

#### **ME 221. Green Design Strategies and Metrics**

Foundation in sustainable product design principles, reinforced by conceptual design projects. Discuss what aspects of sustainability matter most for different products. Application of dozens of strategies to improve product sustainability. Frameworks, measurements, and decision-making tools to navigate the complexities of designing greener products. Life-cycle analysis, materials, energy use, biomimicry, product-service systems, persuasive design, design for end-of-life, and systems thinking.

*2 units, not given this year*

#### **ME 222. Design for Sustainability**

Lecture/lab. Role of design in building a sustainable world. How to include sustainability in the design process considering environmental, cultural, and social impacts. Focus is on a proactive design approach, and the tools and techniques needed to translate theory into artifact.

2-3 units, not given this year

### ME 227. Vehicle Dynamics and Control

The application of dynamics, kinematics, and control theory to the analysis and design of ground vehicle behavior. Simplified models of ride, handling, and braking, their role in developing intuition, and limitations in engineering design. Suspension design fundamentals. Performance and safety enhancement through automatic control systems. In-car laboratory assignments for model validation and kinesthetic understanding of dynamics. Limited enrollment. Prerequisites: ENGR 105, consent of instructor.

3 units, Spr (Gerdes, C)

### ME 229. Design Evangelism

Students work with Ambidextrous staff and magazine professionals to edit and produce Ambidextrous, Stanford University's Journal of Design. Topics include design processes and innovation, storytelling, writing and editing for an audience, magazine production and project leadership. Hands-on projects, in-class exercises, and guest lectures.

1-2 units, not given this year

### ME 233. Making it Big: Crossing the Entrepreneur's Gap

Students take novel designs into entrepreneurial production and prepare for market production. Education, resources, and community to help cross the gap, found ideas and make them real in volume. Topics include entrepreneurial production methods and initiation, vendor selection and engagement, cost, design transfer, quality and testing, and manufacturing planning and execution. Leadership roles in entrepreneurial and large production-oriented companies. Case studies, project reviews, final presentation, industry interaction.

3 units, Aut (Theeuwes, M)

### ME 238. Patent Prosecution

Stages of the patent application process: identifying, capturing, and evaluating inventions; performing a patentability investigation, analyzing the documents, and the scope of the patent protection; composing claims that broadly cover the invention; creating a specification that supports the claims; filing a patent application with the U.S. Patent and Trademark Office; and analyzing an office action and preparing an appropriate response. Current rules and case law. Strategic decisions within each stage, such as: how does a patent application advance the patent portfolio; and in what countries should a patent application be filed? Same as Law 231.

2 units, Spr (Staff)

### ME 239. Mechanics of the Cell

Kinematical description of basic structural elements used to model parts of the cell: rods, ropes, membranes, and shells. Formulation of constitutive equations: nonlinear elasticity and entropic contributions. Elasticity of polymeric networks. Applications to model basic filaments of the cytoskeleton: actin, microtubules, intermediate filaments, and complete networks. Applications to biological membranes.

3 units, not given this year

### ME 243. Designing Emotion-Reactive Car Interfaces

How to design in car interfaces that take into account the emotional state of the driver in the moment of driving? Participants will be prototyping and testing interfaces for an industry partner. The challenge is to take real time physiological data to infer the emotional state of a driver and to lever these to improve the driving experience. We will cover topics on design methodology, psychology of emotions, and human machine interaction. The class meets at VAIL, the Stanford automotive innovation facility, for prototyping, discussions and presentations. Participants will have access to tools, prototyping materials, physiological sensors, and a car. Students from all ENGR majors but also beyond are encouraged to join, bring your drivers license.

3 units, Aut (Steinert, R; Jung, M)

### ME 250. Internal Combustion Engines

Internal combustion engines including conventional and turbocharged spark ignition, and diesel engines. Lectures: basic engine cycles, engine components, methods of analysis of engine performance, pollutant emissions, and methods of engine testing. Lab involves hands-on experience with engines and test hardware. Limited enrollment. Prerequisites: 140.

3 units, Aut (Edwards, C)

### ME 257. Turbine and Internal Combustion Engines

(Same as ME 357) Principles of design analysis for aircraft gas turbines and automotive piston engines. Analysis for aircraft engines performed for Airbus A380 type aircraft. Design parameters determined considering aircraft aerodynamics, gas turbine thermodynamics, compressible flow physics, and material limitations. Additional topics include characteristics of main engine components, off-design analysis, and component matching. Performance of automotive piston engines including novel engine concepts in terms of engine thermodynamics, intake and exhaust flows, and in-cylinder flow.

3 units, not given this year

### ME 260. Fuel Cell Science and Technology

Emphasis on proton exchange membrane (PEM) and solid oxide fuel cells (SOFC), and principles of electrochemical energy conversion. Topics in materials science, thermodynamics, and fluid mechanics. Prerequisites: MATH 43, PHYSICS 55, and ENGR 30 or ME 140, or equivalents.

3 units, Spr (Cha, S)

### ME 261. Dynamic Systems, Vibrations and Control

(Same as ME 161) (Graduate students only enroll in 261.) Modeling, analysis, and measurement of mechanical and electromechanical systems. Numerical and closed form solutions of ordinary differential equations governing the behavior of single and multiple degree of freedom systems. Stability, resonance, amplification and attenuation, and control system design. Prerequisites: Calculus (differentiation and integration), ordinary differential equations, and basic linear algebra (determinants and solving linear equations). Should be familiar with dynamics ( $F=m*a$ ) and simple electronics ( $V=i*R$ ).

3-4 units, Aut (Mitiguy, P)

### ME 265. Technology Licencing and Commercialization

How to profit from technology; processes and strategies to commercialize functional or artistic inventions and creations (not limited to mechanical engineering). Business and legal aspects of determining what can be owned and licensed, how to determine commercial value, and what agreements are necessary. Contract and intellectual property law; focus is on provisions of license agreements and their negotiation.

3 units, Spr (Hustein, J)

### ME 266. Introduction to Physiology and Biomechanics of Hearing

Hearing is fundamental to our ability to communicate, yet in the US alone over 30 million people suffer some form of hearing impairment. As engineers and scientists, it is important for us to understand the underlying principles of the auditory system if we are to devise better ways of helping those with hearing loss. The goal of this course is to introduce undergraduate and graduate students to the anatomy, physiology, and biomechanics of hearing. Principles from acoustics, mechanics, and hydrodynamics will be used to build a foundational understanding of one of the most complex, interdisciplinary, and fascinating areas of biology. Topics include the evolution of hearing, computational modeling approaches, fluid-structure interactions, ion-channel transduction, psychoacoustics, diagnostic tools, and micrometer to millimeter scale imaging methods. We will also study current technologies for mitigating hearing loss via passive and active prostheses, as well as future regenerative therap

3 units, Spr (Puria, S)

### ME 277. Advanced Product Design: Needfinding - Advanced Product Design- Needfinding

Human needs that lead to the conceptualization of future products, environments, systems, and services. Field work in public and private settings; appraisal of personal values; readings on social ethnographic issues; and needfinding for a corporate client. Emphasis is on developing the flexible thinking skills that enable the designer to navigate the future. Prerequisites: 203 and 313, or consent of instructor.

3-4 units, Win (Barry, M; Fletcher, A)

### ME 280. Skeletal Development and Evolution

(Same as BIOE 280, BIOE 280) The mechanobiology of skeletal growth, adaptation, regeneration, and aging is considered from developmental and evolutionary perspectives. Emphasis is on the interactions between mechanical and chemical factors in the

regulation of connective tissue biology. Prerequisites: BIO 42, and ME 80 or BIOE 42.

3 units, not given this year

**ME 281. Biomechanics of Movement**

(Same as BIOE 281) Experimental techniques to study human and animal movement including motion capture systems, EMG, force plates, medical imaging, and animation. The mechanical properties of muscle and tendon, and quantitative analysis of musculoskeletal geometry. Projects and demonstrations emphasize applications of mechanics in sports, orthopedics, and rehabilitation.

3 units, Win (Delp, S)

**ME 283. Introduction to Biomechanics**

Introduction to the application of mechanical engineering analysis to understand human physiology and disease. Topics include basics of musculoskeletal force analysis, cell mechanics, blood flow, and mechanical behaviors of tissues. Undergraduates should have taken ME70 and ME80 or equivalents.

3 units, Aut (Levenston, M)

**ME 284B. Cardiovascular Bioengineering**

(Same as BIOE 284B) Continuation of ME/BIOE 284A. Integrative cardiovascular physiology, blood fluid mechanics, and transport in the microcirculation. Sensing, feedback, and control of the circulation. Overview of congenital and adult cardiovascular disease, diagnostic methods, and treatment strategies. Engineering principles to evaluate the performance of cardiovascular devices and the efficacy of treatment strategies.

3 units, not given this year

**ME 287. Mechanics of Biological Tissues**

Introduction to the mechanical behaviors of biological tissues in health and disease. Overview of experimental approaches to evaluating tissue properties and mathematical constitutive models. Elastic behaviors of hard tissues, nonlinear elastic and viscoelastic models for soft tissues.

3 units, Spr (Levenston, M)

**ME 294. Medical Device Design**

In collaboration with the School of Medicine. Introduction to medical device design for undergraduate and graduate engineering students. Design and prototyping. Labs; medical device environments may include hands-on device testing; and field trips to operating rooms and local device companies. Limited enrollment. Prerequisite: 203.

1 unit, Aut (Milroy, J; Srivastava, S)

**ME 294L. Medical Device Design Lab**

In collaboration with the School of Medicine. This is the lab portion of ME294, which must be taken concurrently. Introduction to medical device design for undergraduate and graduate engineering students. Design, prototyping and labs. Medical device environments may include hands-on device testing; and field trips to operating rooms and local device companies. Prerequisite: 203.

3 units, Aut (Srivastava, S; Milroy, J)

**ME 297. Forecasting for Innovators: Technology, Tools & Social Change**

Technologies from the steam engine to the microprocessor have been mixed gifts, at once benefitting humankind and creating many of the problems facing humanity today. This class will explore how innovators can use forecasting methods to identify new challenges, develop responsive innovations and anticipate unintended consequences. Students will produce a long-range forecast project, applying a variety of methodologies including research, expert interviews and graphical exploration.

3 units, Win (Saffo, P; Benjamin, C)

**ME 298. Silversmithing and Design**

Skills involved in working with precious metals at a small scale. Investment casting and fabrication techniques such as reticulation, granulations, filigree, and mokume gane.

3-4 units, Win (Shaughnessy, S; Knox Sather, A)

**ME 299A. Practical Training**

For master's students. Educational opportunities in high technology research and development labs in industry. Students engage in internship work and integrate that work into their academic program. Following internship work, students complete a research report outlining work activity, problems investigated, key results, and follow-up projects they expect to perform. Meets the

requirements for curricular practical training for students on F-1 visas. Student is responsible for arranging own internship/employment and faculty sponsorship. Register under faculty sponsor's section number. All paperwork must be completed by student and faculty sponsor, as the Student Services Office does not sponsor CPT. Students are allowed only one quarter of CPT per degree program.

1 unit, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**ME 299B. Practical Training**

For Ph.D. students. Educational opportunities in high technology research and development labs in industry. Students engage in internship work and integrate that work into their academic program. Following internship work, students complete a research report outlining work activity, problems investigated, key results, and follow-up projects they expect to perform. Meets the requirements for curricular practical training for students on F-1 visas. Student is responsible for arranging own internship/employment and faculty sponsorship. Register under faculty sponsor's section number. All paperwork must be completed by student and faculty sponsor, as the student services office does not sponsor CPT. Students are allowed only one quarter of CPT per degree program.

1 unit, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**ME 300A. Linear Algebra with Application to Engineering Computations**

(Same as CME 200) Computer based solution of systems of algebraic equations obtained from engineering problems and eigen-system analysis, Gaussian elimination, effect of round-off error, operation counts, banded matrices arising from discretization of differential equations, ill-conditioned matrices, matrix theory, least square solution of unsolvable systems, solution of non-linear algebraic equations, eigenvalues and eigenvectors, similar matrices, unitary and Hermitian matrices, positive definiteness, Cayley-Hamilton theory and function of a matrix and iterative methods. Prerequisite: familiarity with computer programming, and MATH103, 130, or equivalent.

3 units, Aut (Gerritsen, M)

**ME 300B. Partial Differential Equations in Engineering**

(Same as CME 204) Geometric interpretation of partial differential equation (PDE) characteristics; solution of first order PDEs and classification of second-order PDEs; self-similarity; separation of variables as applied to parabolic, hyperbolic, and elliptic PDEs; special functions; eigenfunction expansions; the method of characteristics. If time permits, Fourier integrals and transforms, Laplace transforms. Prerequisite: CME 200/ME 300A, equivalent, or consent of instructor.

3 units, Win (Lele, S)

**ME 300C. Introduction to Numerical Methods for Engineering**

(Same as AA 214A, CME 206) Numerical methods from a user's point of view. Lagrange interpolation, splines. Integration: trapezoid, Romberg, Gauss, adaptive quadrature; numerical solution of ordinary differential equations: explicit and implicit methods, multistep methods, Runge-Kutta and predictor-corrector methods, boundary value problems, eigenvalue problems; systems of differential equations, stiffness. Emphasis is on analysis of numerical methods for accuracy, stability, and convergence. Introduction to numerical solutions of partial differential equations; Von Neumann stability analysis; alternating direction implicit methods and nonlinear equations. Prerequisites: CME 200/ME 300A, CME 204/ME 300B.

3 units, Spr (Iaccarino, G)

**ME 301. Design and Launch your Product or Service**

Apply principles of design thinking to the real-life challenge of imagining, prototyping, testing and iterating, building, marketing, and selling your product or service. Work will be in teams (you apply as an intact team) or alone. You must submit a proposal and team for approval. Proposal can be a physical good or service of any kind. Projects are treated as real start-ups, so the work will be intense. Proposal submitted by Feb 15, 2010 acceptance by March 1. Design Institute class; see <http://dschool.stanford.edu>.

4 units, Spr (Klebahn, P; Dearing, M)

**ME 302. The Future of the Automobile**

Guest speakers from academia and industry present their research results, share their visions, explain challenges, and offer solutions

regarding individual transportation. Students are requested to draft brief write-ups on selected topics that will be discussed in class to develop an understanding of the interactions of technology, business, and society with a specific automotive focus. No specific technical background is required as it is encouraged that everyone brings in specific expertise regarding the automobile as a student, researcher, and/or consumer.

*1 unit, Win (Beiker, S; Gerdes, C), Spr (Beiker, S; Gerdes, C)*

### ME 304. The Designer's Voice

Course helps students develop a point of view about their design career that will enable them to articulate their design vision, inspire a design studio, or infect a business with a culture of design-thinking. Focus on the integration of work and worldview, professional values, design language, and the development of the designer's voice. Includes seminar-style discussions, role-playing, short writing assignments, guest speakers, and individual mentoring and coaching. Participants will be required to keep a journal.

*1 unit, Win (Evans, D; Burnett, W)*

### ME 308. Spatial Motion

The geometry of motion in Euclidean space. Fundamentals of theory of screws with applications to robotic mechanisms, constraint analysis, and vehicle dynamics. Methods for representing the positions of spatial systems of rigid bodies with their inter-relationships; the formulation of Newton-Euler kinetics applied to serial chain systems such as industrial robotics.

*3 units, alternate years, not given this year*

### ME 309. Finite Element Analysis in Mechanical Design

Basic concepts of finite elements, with applications to problems confronted by mechanical designers. Linear static, modal, and thermal formulations; nonlinear and dynamic formulations. Students implement simple element formulations. Application of a commercial finite element code in analyzing design problems. Issues: solution methods, modeling techniques, features of various commercial codes, basic problem definition. Individual projects focus on the interplay of analysis and testing in product design/development. Prerequisite: MATH 103, or equivalent. Recommended: 80, or equivalent in structural and/or solid mechanics; some exposure to principles of heat transfer.

*3 units, Spr (Sheppard, S)*

### ME 310A. Project-Based Engineering Design, Innovation, and Development

Three quarter sequence; for engineering graduate students intending to lead projects related to sustainability, automotive, biomedical devices, communication, and user interaction. Student teams collaborate with academic partners in Europe, Asia, and Latin America on product innovation challenges presented by global corporations to design requirements and construct functional prototypes for consumer testing and technical evaluation. Design loft format such as found in Silicon Valley consultancies. Typically requires international travel. Prerequisites: undergraduate engineering design project; consent of instructor.

*4 units, Aut (Cutkosky, M)*

### ME 310B. Project-Based Engineering Design, Innovation, and Development

Three quarter sequence; for engineering graduate students intending to lead projects related to sustainability, automotive, biomedical devices, communication, and user interaction. Student teams collaborate with academic partners in Europe, Asia, and Latin America on product innovation challenges presented by global corporations to design requirements and construct functional prototypes for consumer testing and technical evaluation. Design loft format such as found in Silicon Valley consultancies. Typically requires international travel. Prerequisites: undergraduate engineering design project; consent of instructor.

*4 units, Win (Cutkosky, M)*

### ME 310C. Project-Based Engineering Design, Innovation, and Development

Three quarter sequence; for engineering graduate students intending to lead projects related to sustainability, automotive, biomedical devices, communication, and user interaction. Student teams collaborate with academic partners in Europe, Asia, and Latin America on product innovation challenges presented by global corporations to design requirements and construct

functional prototypes for consumer testing and technical evaluation. Design loft format such as found in Silicon Valley consultancies. Typically requires international travel. Prerequisites: undergraduate engineering design project; consent of instructor.

*4 units, Spr (Cutkosky, M)*

### ME 310X. New Product Management

Restricted to graduate students. Focus is on the role of the product manager in industry. Topics include product management skills, leadership and team management, getting a product management job, corporate and project finance for engineers, sales and marketing for engineers and business strategy. Seminar with in-class exercises and guest speakers from industry. Limited to 50. Prerequisite: ME310a and ME310b.

*1 unit, Aut (Schar, M), Win (Leifer, L), Spr (Leifer, L)*

### ME 311. Design Strategy & Leadership

The class covers the topics of the business of design, design as strategy and design research. In addition, students will learn to lead brainstorming, needfinding, and design strategy workshops with peers and industry leaders. Prerequisite: ME313, ME312

*3 units, Spr (Burnett, W)*

### ME 312. Advanced Product Design: Formgiving

Lecture/lab. Small- and medium-scale design projects carried to a high degree of aesthetic refinement. Emphasis is on form development, design process, and model making. Prerequisites: 203, 313. Corequisite: ARTSTUDI 160.

*3 units, Win (Burnett, W)*

### ME 313. Human Values and Innovation in Design

Introduction to the philosophy, spirit, and tradition of the product design program. Hands-on design projects used as vehicles for design thinking, visualization, and methodology. The relationships among technical, human, aesthetic, and business concerns. Drawing, prototyping, and design skills. Focus is on tenets of design philosophy: point of view, user-centered design, design methodology, and iterative design.

*3 units, Aut (Banerjee, S; Newman, M)*

### ME 314. Good Products, Bad Products

(Same as ME 214) The characteristics of industrial products that cause them to be successes or failures: the straightforward (performance, economy, reliability), the complicated (human and cultural fit, compatibility with the environment, craftsmanship, positive emotional response of the user), the esoteric (elegance, sophistication, symbolism). Engineers and business people must better understand these factors to produce more successful products. Projects, papers, guest speakers, field trips.

*4 units, Win (Beach, D)*

### ME 315. The Designer in Society

For graduate students. Career objectives and psychological orientation compared with existing social values and conditions. Emphasis is on assisting individuals in assessing their roles in society. Readings on political, social, and humanistic thought are related to technology and design. Experiential, in-class exercises, and term project. Enrollment limited to 24.

*3 units, Aut (Roth, B; Klebahn, P)*

### ME 316A. Product Design Master's Project

For graduate Product Design or Design (Art) majors only. Student teams, under the supervision of the design faculty, spend the quarter researching master's project topics. Students are expected to demonstrate mastery of design thinking methods including: needfinding, brainstorming, field interviews and synthesis during this investigation. Masters projects are selected that involve the synthesis of aesthetics and technological concerns in the service of human need. Prerequisites: ME216B, ME313, ME 311, ARTSTUDIO 360.

*2-6 units, Aut (Burnett, W; Kelley, D; Klebahn, P)*

### ME 316B. Product Design Master's Project

Design Garage is a Winter/Spring class (a two quarter commitment is required). The class is a deep dive in design thinking that uses student-lead projects to teach design process and methods. The projects come from investigations conducted during the Fall quarter where the preliminary need finding, customer research, and product or service ideas have been developed to provide the seed projects for the student design teams. Students will learn the methodologies of design thinking by bringing a product, service, or experience to market. Students apply to Design Garage in the Fall,

and teams are formed after interviews and applications are reviewed. Prerequisite: graduate student standing.

*2-6 units, Win (Burnett, W; Kelley, D; Klebahn, P)*

### **ME 316C. Product Design Master's Project**

This is the second half of the two quarter Design Garage sequence. Students will complete projects begun in ME316B the prior quarter. Prerequisite: ME316C and graduate student standing. Design Institute class; see <http://dschool.stanford.edu>.

*2-6 units, Spr (Burnett, W; Kelley, D)*

### **ME 317A. Design Methods: Product Definition**

Systematic methodologies to define, develop, and produce world-class products. Student team projects to identify opportunities for improvement and develop a comprehensive product definition. Topics include value engineering, quality function deployment, design for assembly and producibility, design for variety and supply chain, design for life-cycle quality, and concurrent engineering. Students must take 317B to complete the project and obtain a letter grade. On-campus enrollment limited to 20; SCPD class size limited to 50, and each site must have at least 3 students to form a project team.

*4 units, Win (Beiter, K)*

### **ME 317B. Design Methods: Quality By Design**

Building on 317A, focus is on the implementation of competitive product design. Student groups apply structured methods to optimize the design of an improved product, and plan for its manufacture, testing, and service. The project deliverable is a comprehensive product and process specification. Topics: concept generation and selection (Pugh's Method), FMEA applied to the manufacturing process, design for robustness, Taguchi Method, SPC and six sigma process, tolerance analysis, flexible manufacturing, product testing, rapid prototyping. Enrollment limited to 40, not including SCPD students. Minimum enrollment of two per SCPD viewing site; single student site by prior consent of instructor. On-campus class limited to 20. For SCPD students, limit is 50 and each site must have a minimum of three students to form a project team and define a project on their own. Prerequisite: 317A.

*4 units, Spr (Beiter, K)*

### **ME 318. Computer-Aided Product Creation**

Design course focusing on an integrated suite of computer tools: rapid prototyping, solid modeling, computer-aided machining, and computer numerical control manufacturing. Students choose, design, and manufacture individual products, emphasizing individual design process and computer design tools. Field trips demonstrate Stanford Product Realization Lab's relationship to the outside world. Structured lab experiences build a basic CAD/CAM/CNC proficiency. Limited enrollment. Prerequisite: consent of instructor.

*4 units, Aut (Milroy, J), Win (Milroy, J), Spr (Milroy, J)*

### **ME 320. Introduction to Robotics**

(Same as CS 223A) Robotics foundations in modeling, design, planning, and control. Class covers relevant results from geometry, kinematics, statics, dynamics, motion planning, and control, providing the basic methodologies and tools in robotics research and applications. Concepts and models are illustrated through physical robot platforms, interactive robot simulations, and video segments relevant to historical research developments or to emerging application areas in the field. Recommended: matrix algebra.

*3 units, Win (Khatib, O)*

### **ME 321. Optofluidics: Interplay of Light and Fluids at the Micro and Nanoscale**

Many optical systems in biology have sophisticated designs with functions that conventional optics cannot achieve: no synthetic materials, for example, can provide the camouflage capability exhibited by some animals. This course overviews recent efforts--some inspired by examples in biology--in using fluids, soft materials and nanostructures to create new functions in optics. Topics include electrowetting lenses, electronic inks, colloidal photonic crystals, bioinspired optical nanostructures, nanophotonic biosensors, lens-less optofluidic microscopes. The use of optics to control fluids is also discussed: optoelectronic tweezers, particle trapping and transport, microrheology, optofluidic sorters, fabrication and self-assembly of novel micro and nanostructures.

*3 units, Aut (Tang, S)*

### **ME 322. Kinematic Synthesis of Mechanisms**

The rational design of linkages. Techniques to determine linkage proportions to fulfill design requirements using analytical, graphical, and computer based methods.

*3 units, not given this year*

### **ME 323. Modeling and Identification of Mechanical Systems for Control**

Lecture/Lab. The art and science behind developing mathematical models for control system design. Theoretical and practical system modeling and parameter identification. Frequency domain identification, parametric modeling, and black-box identification. Analytical work and laboratory experience with identification, controller implementation, and the implications of unmodeled dynamics and non-linearities. Prerequisites: linear algebra and system simulation with MATLAB/SIMULINK; ENGR 105.

*3 units, not given this year*

### **ME 324. Precision Engineering**

Advances in engineering are often enabled by more accurate control of manufacturing and measuring tolerances. Concepts and technology enable precision such that the ratio of overall dimensions to uncertainty of measurement is large relative to normal engineering practice. Typical application areas: non-spherical optics, computer information storage devices, and manufacturing metrology systems. Application experience through design and manufacture of a precision engineering project, emphasizing the principles of precision engineering. Structured labs; field trips. Prerequisite: consent of instructors.

*4 units, Spr (Beach, D; DeBra, D)*

### **ME 325. Introduction to High Performance Computing**

An introduction to the use of advanced computing resources with real-world examples of large-scale, multidisciplinary, simulation-based science as related to academic and applied research.

*1 unit, Sum (Staff)*

### **ME 326. Telerobotics and Human-Robot Interactions**

Focus is on dynamics and controls. Evaluation and implementation of required control systems. Topics include master-slave systems, kinematic and dynamic similarity; control architecture, force feedback, haptics, sensory substitutions; stability, passivity, sensor resolution, servo rates; time delays, prediction, wave variables. Hardware-based projects encouraged, which may complement ongoing research or inspire new developments. Limited enrollment. Prerequisites: ENGR 205, 320 or CS 223A, or consent of instructor. (Niemeyer)

*3 units, not given this year*

### **ME 330. Advanced Kinematics**

Kinematics from mathematical viewpoints. Introduction to algebraic geometry of point, line, and plane elements. Emphasis is on basic theories which have potential application to mechanical linkages, computational geometry, and robotics.

*3 units, Aut (Roth, B)*

### **ME 331A. Advanced Dynamics & Computation**

Newton, Euler, momentum, and road-map methods and computational tools for 3-D force and motion analysis of multibody systems. Power, work, and energy. Numerical solutions (e.g., MATLAB, etc.) of nonlinear algebraic and differential equations governing the static and dynamic behavior of multiple degree of freedom systems.

*3 units, Win (Mitiguy, P)*

### **ME 331B. Advanced Dynamics & Simulation**

Advanced methods and computational tools for the efficient formulation of equations of motion for multibody systems. D'Alembert principle. Power, work, and energy. Kane's method. Lagrange's method. Computed torque control. Systems with constraints. Quaternions Numerical solutions of nonlinear algebraic and differential equations governing the behavior of multiple degree of freedom systems.

*3 units, Spr (Mitiguy, P)*

### **ME 333. Mechanics**

Goal is a common basis for advanced mechanics courses. Formulation of the governing equations from a Lagrangian perspective. Examples include systems of particles and linear elastic solids. Waves in discrete and continuous media. Linear

elasticity formulation in the static and dynamic cases, and elementary measures of stress and strain. Tensor and variational calculus.

3 units, Aut (Lew, A)

### ME 335A. Finite Element Analysis

Fundamental concepts and techniques of primal finite element methods. Method of weighted residuals, Galerkin's method and variational equations. Linear elliptic boundary value problems in one, two and three space dimensions; applications in structural, solid and fluid mechanics and heat transfer. Properties of standard element families and numerically integrated elements. Implementation of the finite element method using Matlab, assembly of equations, and element routines. Lagrange multiplier and penalty methods for treatment of constraints. The mathematical theory of finite elements.

3 units, Win (Pinsky, P)

### ME 335B. Finite Element Analysis

Finite element methods for linear dynamic analysis. Eigenvalue, parabolic, and hyperbolic problems. Mathematical properties of semi-discrete (t-continuous) Galerkin approximations. Modal decomposition and direct spectral truncation techniques. Stability, consistency, convergence, and accuracy of ordinary differential equation solvers. Asymptotic stability, over-shoot, and conservation laws for discrete algorithms. Mass reduction. Applications in heat conduction, structural vibrations, and elastic wave propagation. Computer implementation of finite element methods in linear dynamics. Implicit, explicit, and implicit-explicit algorithms and code architectures.

3 units, Spr (Pinsky, P)

### ME 335C. Finite Element Analysis

Variational formulation of nonlinear elliptic, parabolic and hyperbolic problems. Newton's method for solving nonlinear algebraic systems; load-stepping, convergence, divergence and bifurcation. Enhancement of Newton's method including line-search, quasi-Newton and arc-length methods. Finite element approximation and consistent linearization; definition of the tangent operator and residual vector. Data structures for nonlinear finite element analysis. Examples drawn from nonlinear (rigid) heat conduction, nonlinear elasticity and contact mechanics.

3 units, not given this year

### ME 336. Crystalline Anisotropy

(Same as MATSCI 359) Matrix and tensor analysis with applications to the effects of crystal symmetry on elastic deformation, thermal expansion, diffusion, piezoelectricity, magnetism, thermodynamics, and optical properties of solids, on the level of J. F. Nye's Physical Properties of Crystals. Homework sets use Mathematica.

3 units, not given this year

### ME 337. Mechanics of Growth

Introduction to continuum theory and numerical solutions or biomechanical problems. Kinematics of finite growth. Balance equations in open system thermodynamics. Constitutive equations for biological tissues. Enhanced finite element models in biomechanics. Analytical solutions for simple model problems. Numerical solutions for more advanced problems such as: bone remodeling; wound healing; muscle regeneration; tumor growth; atherosclerosis; in-stent restenosis; and tissue engineering.

3 units, not given this year

### ME 338A. Continuum Mechanics

Nonlinear continuum mechanics for solids and fluids. Kinematics of finite deformations. Measures of strain and stress. Finite rotations. Linearized kinematics and infinitesimal measures of deformations. Rates. Conservation laws for mass, momenta, and energy. Boundary value problem in continuum mechanics. Prerequisites: 333 and 300, or equivalent background with consent of instructor.

3 units, Win (Lew, A)

### ME 338B. Continuum Mechanics

Constitutive theory; equilibrium constitutive relations; material frame indifference and material symmetry; finite elasticity; formulation of the boundary value problem; linearization and well-posedness; symmetries and configurational forces; numerical considerations.

3 units, alternate years, not given this year

### ME 339. Introduction to parallel computing using MPI, openMP, and CUDA

(Same as CME 213) This class will give hands on experience with programming multicore processors, graphics processing units (GPU), and parallel computers. Focus will be on the message passing interface (MPI, parallel clusters) and the compute unified device architecture (CUDA, GPU). Topics will include: network topologies, modeling communication times, collective communication operations, parallel efficiency, MPI, dense linear algebra using MPI. Symmetric multiprocessing (SMP), pthreads, openMP. CUDA, combining MPI and CUDA, dense linear algebra using CUDA, sort, reduce and scan using CUDA. Pre-requisites include: C programming language and numerical algorithms (solution of differential equations, linear algebra, Fourier transforms).

3 units, Spr (Darve, E)

### ME 340A. Theory and Applications of Elasticity

Elasticity theory and application to material structures at microscale. Theories: stress, strain, and energy; equilibrium and compatibility conditions; boundary value problem. Solution methods: stress function, Green's function, Fourier transformation. Numerical exercises using Matlab. Applications to defects in solids, thin films, and biomembranes.

3 units, not given this year

### ME 340B. Elasticity in Microscopic Structures

This course provides analytic tools, notably the Green's function method, to solve elasticity problems (stress, strain, energy) of microscopic structures under deformation. Students shall be able to apply the theory of elasticity to study the interaction of defects in solids, such as inclusions, inhomogeneities, cracks, dislocations and interfaces.

3 units, alternate years, not given this year

### ME 342A. MEMS Laboratory

Practice and theory of MEMS device design and fabrication, orientation to fabrication facilities, and introduction to techniques for design and evaluation of MEMS devices in the context of designed projects. Emphasis on MEMS design (need finding, brainstorming, evaluation, and design methodology), characterization, and fabrication, including photolithography, etching, oxidation, diffusion, and ion implantation. Limited enrollment. Prerequisite: engineering or science background and consent of instructor.

3-4 units, not given this year

### ME 342D. MEMS Laboratory Assignments

Prerequisite: consent of instructor.

1-3 units, Sum (Staff)

### ME 343. An Introduction to Waves in Elastic Solids

One-dimensional motion of an elastic continuum, the linearized theory of elasticity and elastodynamic theory, elastic waves in an unbounded medium, plane harmonic waves in elastic half-spaces including reflection and refraction, slowness, energy velocity and anisotropic effects. Text is first five chapters of Achenbach's Wave Propagation in Elastic Solids. (Barnett)

3 units, Win (Barnett, D)

### ME 345. Fatigue Design and Analysis

The mechanism and occurrences of fatigue in service. Methods for predicting fatigue life and for protecting against premature fatigue failure. Use of elastic stress and inelastic strain analyses to predict crack initiation life. Use of linear elastic fracture mechanics to predict crack propagation life. Effects of stress concentrations, manufacturing processes, load sequence, irregular loading, multi-axial loading. Subject is treated from the viewpoints of the engineer seeking up-to-date methods of life prediction and the researcher interested in improving understanding of fatigue behavior. Prerequisite: undergraduate mechanics of materials.

3 units, Win (Nelson, D)

### ME 346A. Introduction to Statistical Mechanics

The main purpose of this course is to provide students with enough statistical mechanics background to the Molecular Simulations classes (ME 346B,C), including the fundamental concepts such as ensemble, entropy, and free energy, etc. The main theme of this course is how the laws at the macroscale (thermodynamics) can be obtained by analyzing the spontaneous fluctuations at the microscale (dynamics of molecules). Topics include



thermodynamics, probability theory, information entropy, statistical ensembles, phase transition and phase equilibrium. Recommended: PHYSICS 110 or equivalent.

3 units, Win (Cai, W)

#### ME 346B. Introduction to Molecular Simulations

Algorithms of molecular simulations and underlying theories. Molecular dynamics, time integrators, modeling thermodynamic ensembles (NPT, NVT), free energy, constraints. Monte Carlo simulations, parallel tempering. Stochastic equations, Langevin and Brownian dynamics. Applications in solids, liquids, and biomolecules (proteins). Programming in Matlab.

3 units, Spr (Cai, W)

#### ME 346C. Advanced Techniques for Molecular Simulations

Advanced methods for computer simulation of proteins. Symplectic time integrators, multiple-time stepping, energy conservation. Long-range force calculation, particle mesh Ewald, fast multipole method, multigrid. Free energy methods, umbrella sampling, acceptance ratio, thermodynamic integration, non equilibrium methods, adaptive biasing force. Prerequisites: ME 346A,B or equivalent, Matlab, and C++.

3 units, alternate years, not given this year

#### ME 347. Mathematical Theory of Dislocations

The mathematical theory of straight and curvilinear dislocations in linear elastic solids. Stress fields, energies, and Peach-Koehler forces associated with these line imperfections. Anisotropic effects, Green's function methods, and the geometrical techniques of Brown and Indenborn-Orlov for computing dislocation fields and for studying dislocation interactions. Continuously distributed dislocations and cracks and inclusions.

3 units, not given this year

#### ME 348. Experimental Stress Analysis

Theory and applications of photoelasticity, strain gages, and holographic interferometry. Comparison of test results with theoretical predictions of stress and strain. Discussion of other methods of stress and strain determination (optical fiber strain sensors, acoustoelasticity, thermoelasticity, brittle coating, Moire interferometry, residual stress determination). Six labs plus mini-project. Limited enrollment. Lab fee.

3 units, Spr (Nelson, D)

#### ME 349. Variational Methods in Elasticity and Plate Theory

An introduction to variational calculus methods and their applications to the theories of elasticity and plates.

3 units, not given this year

#### ME 351A. Fluid Mechanics

Exact and approximate analysis of fluid flow covering kinematics, global and differential equations of mass, momentum, and energy conservation. Forces and stresses in fluids. Euler's equations and the Bernoulli theorem applied to inviscid flows. Vorticity dynamics. Topics in irrotational flow: stream function and velocity potential for exact and approximate solutions; superposition of solutions; complex potential function; circulation and lift. Some boundary layer concepts.

3 units, Aut (Su, L)

#### ME 351B. Fluid Mechanics

Laminar viscous fluid flow. Governing equations, boundary conditions, and constitutive laws. Exact solutions for parallel flows. Creeping flow limit, lubrication theory, and boundary layer theory including free-shear layers and approximate methods of solution; boundary layer separation. Introduction to stability theory and transition to turbulence, and turbulent boundary layers. Prerequisite: 351A.

3 units, Win (Eaton, J)

#### ME 352A. Radiative Heat Transfer

The fundamentals of thermal radiation heat transfer; blackbody radiation laws; radiative properties of non-black surfaces; analysis of radiative exchange between surfaces and in enclosures; combined radiation, conduction, and convection; radiative transfer in absorbing, emitting, and scattering media. Advanced material for students with interests in heat transfer, as applied in high-temperature energy conversion systems. Take 352B,C for depth in heat transfer. Prerequisites: graduate standing and undergraduate course in heat transfer. Recommended: computer skills.

3 units, not given this year

#### ME 352B. Fundamentals of Heat Conduction

Physical description of heat conduction in solids, liquids, and gases. The heat diffusion equation and its solution using analytical and numerical techniques. Data and microscopic models for the thermal conductivity of solids, liquids, and gases, and for the thermal resistance at solid-solid and solid-liquid boundaries. Introduction to the kinetic theory of heat transport, focusing on applications for composite materials, semiconductor devices, micromachined sensors and actuators, and rarefied gases. Prerequisite: consent of instructor.

3 units, Win (Goodson, K)

#### ME 352C. Convective Heat Transfer

Prediction of heat and mass transfer rates based on analytical and numerical solutions of the governing partial differential equations. Heat transfer in fully developed pipe and channel flow, pipe entrance flow, laminar boundary layers, and turbulent boundary layers. Superposition methods for handling non-uniform wall boundary conditions. Approximate models for turbulent flows. Comparison of exact and approximate analyses to modern experimental results. General introduction to heat transfer in complex flows. Prerequisite: 351B or equivalent.

3 units, Spr (Eaton, J)

#### ME 354. Experimental Methods in Fluid Mechanics

Experimental methods associated with the interfacing of laboratory instruments, experimental control, sampling strategies, data analysis, and introductory image processing. Instrumentation including point-wise anemometers and particle image tracking systems. Lab. Prerequisites: previous experience with computer programming and consent of instructor. Limited enrollment.

4 units, Aut (Santiago, J)

#### ME 355. Compressible Flow

Topics include quasi-one-dimensional isentropic flow in variable area ducts, normal shock waves, oblique shock and expansion waves, flow in ducts with friction and heat transfer, unsteady one-dimensional flow, and steady two-dimensional supersonic flow.

3 units, not given this year

#### ME 357. Turbine and Internal Combustion Engines

(Same as ME 257) Principles of design analysis for aircraft gas turbines and automotive piston engines. Analysis for aircraft engines performed for Airbus A380 type aircraft. Design parameters determined considering aircraft aerodynamics, gas turbine thermodynamics, compressible flow physics, and material limitations. Additional topics include characteristics of main engine components, off-design analysis, and component matching. Performance of automotive piston engines including novel engine concepts in terms of engine thermodynamics, intake and exhaust flows, and in-cylinder flow.

3 units, not given this year

#### ME 358. Heat Transfer in Microdevices

Application-driven introduction to the thermal design of electronic circuits, sensors, and actuators that have dimensions comparable to or smaller than one micrometer. The impact of thin-layer boundaries on thermal conduction and radiation. Convection in microchannels and microscopic heat pipes. Thermal property measurements for microdevices. Emphasis is on Si and GaAs semiconductor devices and layers of unusual, technically-promising materials such as chemical-vapor-deposited (CVD) diamond. Final project based on student research interests. Prerequisite: consent of instructor.

3 units, Spr (Asheghi, M)

#### ME 359A. Advanced Design and Engineering of Space Systems I

The application of advanced theory and concepts to the development of spacecraft and missile subsystems; taught by experts in their fields. Practical aspects of design and integration. Mission analysis, systems design and verification, radiation and space environments, orbital mechanics, space propulsion, electrical power and avionics subsystems, payload communications, and attitude control. Subsystem-oriented design problems focused around a mission to be completed in groups. Tours of Lockheed Martin facilities. Limited enrollment. Prerequisites: undergraduate degree in related engineering field or consent of instructor.

4 units, not given this year

#### ME 359B. Advanced Design and Engineering of Space Systems



**II**

Continuation of 359A. Topics include aerospace materials, mechanical environments, structural analysis and design, finite element analysis, mechanisms, thermal control, probability and statistics. Tours of Lockheed Martin facilities. Limited enrollment. Prerequisites: undergraduate degree in related field, or consent of instructor.

*4 units, not given this year*

**ME 361. Turbulence**

The nature of turbulent flows, statistical and spectral description of turbulence, coherent structures, spatial and temporal scales of turbulent flows. Averaging, two-point correlations and governing equations. Reynolds averaged equations and stresses. Free shear flows, turbulent jet, turbulent kinetic energy and kinetic energy dissipation, and kinetic energy budget. Kolmogorov's hypothesis and energy spectrum. Wall bounded flows, viscous scales, and law of the wall. Turbulence closure modeling for Reynolds averaged Navier Stokes equations. Direct and large eddy simulation of turbulent flows. Subgrid scale modeling.

*3 units, Spr (Moin, P)*

**ME 362A. Physical Gas Dynamics**

Concepts and techniques for description of high-temperature and chemically reacting gases from a molecular point of view. Introductory kinetic theory, chemical thermodynamics, and statistical mechanics as applied to properties of gases and gas mixtures. Transport and thermodynamic properties, law of mass action, and equilibrium chemical composition. Maxwellian and Boltzmann distributions of velocity and molecular energy. Examples and applications from areas of current interest such as combustion and materials processing.

*3 units, Aut (Bowman, C)*

**ME 362B. Nonequilibrium Processes in High-Temperature Gases**

Chemical kinetics and energy transfer in high-temperature gases. Collision theory, transition state theory, and unimolecular reaction theory. Prerequisite: 362A or consent of instructor.

*3 units, Win (Hanson, R)*

**ME 363. Partially Ionized Plasmas and Gas Discharges**

Introduction to partially ionized gases and the nature of gas discharges. Topics: the fundamentals of plasma physics emphasizing collisional and radiative processes, electron and ion transport, ohmic dissipation, oscillations and waves, interaction of electromagnetic waves with plasmas. Applications: plasma diagnostics, plasma propulsion and materials processing. Prerequisite: 362A or consent of instructor.

*3 units, Spr (Cappelli, M)*

**ME 364. Optical Diagnostics and Spectroscopy**

The spectroscopy of gases and laser-based diagnostic techniques for measurements of species concentrations, temperature, density, and other flow field properties. Topics: electronic, vibrational, and rotational transitions; spectral lineshapes and broadening mechanisms; absorption, fluorescence, Rayleigh and Raman scattering methods; collisional quenching. Prerequisite: 362A or equivalent.

*3 units, Win (Hanson, R)*

**ME 365. The Structure of Design Research**

Restricted to second-year Joint Program in Design graduate students; prerequisite for ME 316A,B,C. How to shape individual research plans, identify tools for design research, and develop a vocabulary for research through design. Students present proposals for master's theses. Case studies.

*1-3 units, not given this year*

**ME 366. Creative Gym: A Design Thinking Skills Studio**

Build your creative confidence and sharpen your design thinking skills. Train your intuition and expand the design context from which you operate every day. This experimental studio will introduce the d.school to fast-paced experimental exercises that lay the mental and physical foundation for a potent bias toward action, and a deeper knowledge of the personal skills that expert design thinkers utilize in all phases of their process. Exercises will be offered by a number of the d.school's most creatively confident design thinkers. Apply at the first day of class.

*1 unit, Win (Burgess-Auburn, C; Hawthorne, G)*

**ME 367. Optical Diagnostics and Spectroscopy Laboratory**

Principles, procedures, and instrumentation associated with optical measurements in gases and plasmas. Absorption, fluorescence and emission, and light-scattering methods. Measurements of temperature, species concentration, and molecular properties. Lab. Enrollment limited to 16. Prerequisite: 362A or 364.

*4 units, Spr (Hanson, R)*

**ME 368A. Biodesign Innovation: Needs Finding and Concept Creation**

(Same as BIOE 374A, MED 272A) (Same as OIT 384) Two quarter sequence. Inventing new medical devices and instrumentation, including: methods of validating medical needs; techniques for analyzing intellectual property; basics of regulatory (FDA) and reimbursement planning; brainstorming and early prototyping. Guest lecturers and practical demonstrations.

*4 units, Win (Yock, P; Zenios, S; Milroy, J; Brinton, T)*

**ME 368B. Biodesign Innovation: Concept Development and Implementation**

(Same as BIOE 374B, MED 272B) (Same as OIT 385) Two quarter sequence. How to take a medical device invention forward from early concept to technology translation and development. Topics include prototyping; patent strategies; advanced planning for reimbursement and FDA approval; choosing translation route (licensing versus start-up); ethical issues including conflict of interest; fundraising approaches and cash requirements; essentials of writing a business or research plan; strategies for assembling a development team. Prerequisite: MED 272A, ME368A, OIT 384 or BIOE 374A.

*4 units, Spr (Yock, P; Zenios, S; Milroy, J; Brinton, T)*

**ME 370A. Energy Systems I: Thermodynamics**

Thermodynamic analysis of energy systems emphasizing systematic methodology for and application of basic principles to generate quantitative understanding. Availability, mixtures, reacting systems, phase equilibrium, chemical availability, and modern computational methods for analysis. Prerequisites: undergraduate engineering thermodynamics and computer skills such as Matlab.

*3 units, Aut (Mitchell, R)*

**ME 370B. Energy Systems II: Modeling and Advanced Concepts**

Development of quantitative device models for complex energy systems, including fuel cells, reformers, combustion engines, and electrolyzers, using thermodynamic and transport analysis. Student groups work on energy systems to develop conceptual understanding, and high-level, quantitative and refined models. Advanced topics in thermodynamics and special topics associated with devices under study. Prerequisite: 370A.

*4 units, Win (Edwards, C)*

**ME 370C. Energy Systems III: Projects**

Refinement and calibration of energy system models generated in ME 370B carrying the models to maturity and completion. Integration of device models into a larger model of energy systems. Prerequisites: 370A,B, consent of instructor.

*3-5 units, Spr (Edwards, C)*

**ME 371. Combustion Fundamentals**

Heat of reaction, adiabatic flame temperature, and chemical composition of products of combustion; kinetics of combustion and pollutant formation reactions; conservation equations for multi-component reacting flows; propagation of laminar premixed flames and detonations. Prerequisite: 362A or 370A, or consent of instructor.

*3 units, Win (Zheng, X)*

**ME 372. Combustion Applications**

The role of chemical and physical processes in combustion; ignition, flammability, and quenching of combustible gas mixtures; premixed turbulent flames; laminar and turbulent diffusion flames; combustion of fuel droplets and sprays. Prerequisite: 371.

*3 units, Spr (Bowman, C)*

**ME 377. Design Thinking Bootcamp: Experiences in Innovation and Design**

Bootcamp is a fast-paced immersive experience in design thinking. You'll progress through four full cycles of the process, working with a diverse team to solve real world challenges. Field work and

deep collaboration with teammates are required of all students. Tenets of design thinking including being human-centered, prototype-driven, and mindful of process. Topics include design processes, innovation methodologies, need finding, human factors, visualization, rapid prototyping, team dynamics, storytelling, and project leadership. Limited enrollment. APPLICATION REQUIRED by 9/21/11. See <http://bit.ly/dbootcamp>.

3-4 units, Aut (Kembel, G; Staff, 1)

**ME 378. Tell, Make, Engage: Action Stories for Entrepreneurship**

Guest discussion leaders with entrepreneurship experience give the course an evolving framework of evaluative methods, formed and reformed by collaborative development within the class. Stories attached to an idea or a discovery, are considered through practice exercises, artifacts, design challenges, short papers, and presentations.

1-3 units, Win (Karanian, B), Spr (Karanian, B)

**ME 380. Collaborating with the Future: Launching Large Scale Sustainable Transformations**

(Same as ENVRES 380) This project-based d.school class combines Design Thinking Processes, Behavioral Sciences, and elements of Diffusion Theory. Tools and theories introduced in class will be used to structure large-scale transformations that simultaneously create value on environmental, societal, and economic fronts. We encourage students to use this class as a launching pad for real initiatives. Primarily meant for Graduate Students. (Especially qualified/motivated Seniors will be considered). Admission to the class is through an application process which ends on March 3. Please find instructions and applications at

<https://dschool.stanford.edu/groups/targettransformations/>.

3-4 units, Spr (Banerjee, S; Staff, 1)

**ME 381. Orthopaedic Bioengineering**

(Same as BIOE 381) Engineering approaches applied to the musculoskeletal system in the context of surgical and medical care. Fundamental anatomy and physiology. Material and structural characteristics of hard and soft connective tissues and organ systems, and the role of mechanics in normal development and pathogenesis. Engineering methods used in the evaluation and planning of orthopaedic procedures, surgery, and devices.

3 units, Spr (Levenston, M)

**ME 382A. Biomedical Engineering in Research and Development**

Project based class studying real world biomedical problems ranging from translational biomedical research to medical device design. Topics include preventative strategies and biomedical challenges of an aging population. Identifying underlying scientific principles (computational and/or experimental) for solving biomedical problems is a key element. Students will form project teams and develop interdisciplinary communication skills; form testable hypotheses with biological, anatomical and physiological considerations; test standards for medical devices and learn about regulatory issues and intellectual property.

4 units, Win (Andriacchi, T)

**ME 382B. Medical Device Design**

Continuation of industry sponsored projects from 382A. With the assistance of faculty and expert consultants, students finalize product designs or complete detailed design evaluations of new medical products. Bioethics issues and strategies for funding new medical ventures.

4 units, Spr (Andriacchi, T)

**ME 385. Tissue Engineering Lab**

Hands-on experience in the fabrication of living engineered tissues. Techniques include sterile technique, culture of mammalian cells, creation of cell-seeded scaffolds, and the effects of mechanical loading on the metabolism of living engineered tissues. Theory, background, and practical demonstration for each technique. Lab.

1-2 units, not given this year

**ME 386. Neuromuscular Biomechanics**

(Same as BIOE 386) The interplay between mechanics and neural control of movement. State of the art assessment through a review of classic and recent journal articles. Emphasis is on the application of dynamics and control to the design of assistive

technology for persons with movement disorders.

3 units, not given this year

**ME 387. Soft Tissue Mechanics**

Structure/function relationships and mechanical properties of soft tissues, including nonlinear elasticity, viscoelasticity, and poroelasticity.

3 units, not given this year

**ME 388. Transport Modeling for Biological Systems**

Introduction to electric fields, fluid flows, transport phenomena and their application to biological systems. Maxwell's equations, electrostatics, electro-chemical-mechanical driving forces in physiological systems. Ionic diffusion in electrolytes and membrane transport. Fluid and solid continua theory for porous, hydrated biological tissues. Applications include ionic and molecular transport in tissues and cells, electrophoresis, electromechanical and physicochemical interactions in cells and the extracellular matrix of connective tissue.

3 units, not given this year

**ME 389. Biomechanical Research Symposium**

Guest speakers present contemporary research on experimental and theoretical aspects of biomechanical engineering and bioengineering. May be repeated for credit.

1 unit, Aut (Levenston, M), Spr (Levenston, M)

**ME 390. Thermosciences Research Project Seminar**

Review of work in a particular research program and presentations of other related work.

1 unit, not given this year

**ME 390A. High Temperature Gasdynamics Laboratory Research Project Seminar**

Review of work in a particular research program and presentations of other related work.

1 unit, Aut (Mitchell, R), Win (Staff), Spr (Cappelli, M)

**ME 391. Engineering Problems**

Directed study for graduate engineering students on subjects of mutual interest to student and staff member. May be used to prepare for experimental research during a later quarter under 392. Faculty sponsor required.

1-10 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**ME 392. Experimental Investigation of Engineering Problems**

Graduate engineering students undertake experimental investigation under guidance of staff member. Previous work under 391 may be required to provide background for experimental program. Faculty sponsor required.

1-10 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**ME 393. Topics in Biologically Inspired or Human Interactive Robotics**

Application of observations from human and animal physiology to robotic systems. Force control of motion including manipulation, haptics, and locomotion. Weekly literature review forum led by student. May be repeated for credit. (Cutkosky, Waldron, Niemeyer)

1 unit, not given this year

**ME 395. Seminar in Solid Mechanics**

Required of Ph.D. candidates in solid mechanics. Guest speakers present research topics related to mechanics theory, computational methods, and applications in science and engineering. May be repeated for credit. See <http://mc.stanford.edu>.

1 unit, Aut (Pinsky, P), Win (Pinsky, P), Spr (Pinsky, P)

**ME 396. Design and Manufacturing Forum**

(Same as ME 196) Invited speakers address issues of interest to design and manufacturing engineering and business students. Sponsored by the Product Realization Network at Stanford.

1 unit, Spr (Reis, R)

**ME 397. Design Theory and Methodology Seminar**

What do designers do when they do design? How can their performance be improved? Topics change each quarter. May be repeated for credit.

1-3 units, Aut (Steinert, R), Win (Steinert, R), Spr (Steinert, R)

**ME 399. Fuel Cell Seminar**

Interdisciplinary research in engineering, chemistry, and physics. Talks on fundamentals of fuel cells by speakers from Stanford, other academic and research institutions, and industry. The

potential to provide high efficiency and zero emissions energy conversion for transportation and electrical power generation.

*1 unit, not given this year*

**ME 400. Thesis (Engineer Degree)**

Investigation of some engineering problems. Required of Engineer degree candidates

*2-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**ME 405. Asymptotic Methods and Applications**

Asymptotic versus convergent expansions, approximation of integrals, method of matched asymptotics, WKB method and turning points, method of multiple scales. Applications: viscous and potential flow, wave propagation, combustion, and electrostatics. Prerequisites: ME 300B, graduate-level fluid mechanics.

*3 units, not given this year*

**ME 406. Turbulence Physics and Modeling Using Numerical Simulation Data**

Prerequisite: consent of instructor.

*2 units, Sum (Staff)*

**ME 408. Spectral Methods in Computational Physics**

Data analysis, spectra and correlations, sampling theorem, nonperiodic data, and windowing; spectral methods for numerical solution of partial differential equations; accuracy and computational cost; fast Fourier transform, Galerkin, collocation, and Tau methods; spectral and pseudospectral methods based on Fourier series and eigenfunctions of singular Sturm-Liouville problems; Chebyshev, Legendre, and Laguerre representations; convergence of eigenfunction expansions; discontinuities and Gibbs phenomenon; aliasing errors and control; efficient implementation of spectral methods; spectral methods for complicated domains; time differencing and numerical stability.

*3 units, not given this year*

**ME 410A. Foresight and Innovation**

Learn what makes technical innovations succeed long-term. This course provides an intensive and hands-on overview to multiple foresight methods and anticipatory design techniques that teach you how to find and plan for future opportunities. Students build a portfolio of innovation ideas and prototypes. Prerequisite: consent of instructor.

*3-5 units, Aut (Cockayne, W)*

**ME 410B. Foresight and Innovation**

The art, science, and practice of design innovation. Tools such as critical foresight and anticipatory research that assist organizations in improving the quality and speed of research and design innovation programs. The path from idea to market. How to communicate a developing idea through scenarios, business pitches, and product prototypes.

*1-5 units, Win (Cockayne, W)*

**ME 410C. Foresight and Innovation**

The art, science, and practice of design innovation. Tools such as critical foresight and anticipatory research that assist organizations in improving the quality and speed of research and design innovation programs. The path from idea to market. How to communicate a developing idea through scenarios, business pitches, and product prototypes.

*1-5 units, Spr (Cockayne, W)*

**ME 411. Advanced Topics in Computational Solid Mechanics**

Discussion of the use of computational simulation methods for analyzing and optimizing production processes and for developing new products, based on real industrial applications in the metal forming industry. Brief review of linear and nonlinear continuum mechanics and the use of finite element methods to model solid mechanics problems, constitutive relations for metals, coupled thermo-elasto-plastic (viscoplastic) problems, modeling metal production processes: bulk metal forming processes using rigid/viscoplastic material models, application examples: hot rolling of plates and the Mannesmann piercing processes and modeling the service behavior of steel pipes. Prerequisites: ME 338A, ME 335A,B,C, or consent of instructor.

*3 units, not given this year*

**ME 412. Engineering Functional Analysis and Finite Elements**

(Same as CME 356) Concepts in functional analysis to understand models and methods used in simulation and design. Topology,

measure, and integration theory to introduce Sobolev spaces. Convergence analysis of finite elements for the generalized Poisson problem. Extensions to convection-diffusion-reaction equations and elasticity. Upwinding. Mixed methods and LBB conditions. Analysis of nonlinear and evolution problems. Prerequisites: 335A,B, CME 200, CME 204, or consent of instructor. Recommended: 333, MATH 171.

*3 units, not given this year*

**ME 413. Quantum Confinement Structures: Physics and Fabrication**

Quantum mechanics principles and the thermodynamics of confinement structures. Focus is on potential applications such as solar cells and catalysis. Student presentations. Lab demonstrations. Prerequisite: background in quantum mechanics and statistical thermodynamics.

*3 units, not given this year*

**ME 414. Solid State Physics Issues for Mechanical Engineering Experiments**

A basic understanding of concepts and issues in the area of Solid State Physics which underlie standard mechanical properties. This course will review some basic Quantum Mechanics and Statistical Thermodynamics, and then cover the first 50% of a standard overview of Solid State Physics. The goal is to provide some fundamental understanding of the principles involved in these mechanical phenomena, and the background necessary to participate in interdisciplinary research

*3 units, Sum (Staff)*

**ME 417. Total Product Integration Engineering**

For students aspiring to be product development executives and leaders in research and education. Advanced methods and tools beyond the material covered in 217: quality design across global supply chain, robust product architecture for market variety and technology advances, product development risk management. Small teams or individuals conduct a practical project that produces a case study or enhancement to produce development methods and tools. Enrollment limited to 12. Prerequisites: 317A,B.

*4 units, Aut (Beiter, K)*

**ME 420. Applied Electrochemistry at Micro- and Nanoscale**

The class is an introduction to applied electrochemistry with focus on micro- and nanoscale applications. Basic concepts of physical chemistry are presented, of which the fundamentals of electrochemistry are built. Theory of electrochemical methods for material analyses and material modifications are discussed with emphasis on the scaling behaviors. This year electrochemical energy generation/storage devices with focus on batteries will be discussed in class. Journals articles are reviewed within the framework of the course with focus on current problems and needs in and energy conversion and storage.

*3 units, Sum (Staff)*

**ME 421. Thought Leaders Seminar for European Entrepreneurship and Innovation**

Lessons from real-world experiences and challenges in European startups, corporations, universities, non-profit research institutes and venture finance organizations. Speakers include entrepreneurs, leaders from global technology companies, university researchers, venture capitalists, legal experts, senior policy makers and other guests from selected European countries and regions. Geographic scope encompasses Ireland to Russia, and Scandinavia to the Mediterranean region. Enrollment open to undergraduates and graduates in any school or department at Stanford.

*1 unit, Win (Leifer, L; Lee, B)*

**ME 423. D.HEALTH: Design Thinking for Health**

In the U.S., 75% of medical expenditures are for illnesses that are lifestyle related such as diabetes and heart disease. If patients could change their lifestyles, medical problems could be avoided and a healthier and happier life achieved. Class employs design thinking in teams. Individual projects and small and large team projects with multiple milestones. Students work in the field, and present in class. Design Institute class; see <http://dschool.stanford.edu>.

*3 units, Win (Klebahn, P; Boyle, D; Kelley, D)*

**ME 429. COMMERCIAL MEMS DESIGN**

This course, taught by Dr. Gary O'Brien of the Bosch RTC, will provide insight into the issues and challenges in designing MEMS

device for commercial and automotive applications. Topics to be covered in the class will include device simulation and design, design of experiments, compensation for cross-wafer and wafer-to-wafer fabrication variations, design for extreme environments, analysis and management of reliability issues including package stress, shock, drift, cost analysis of manufacturing processes, and some discussion of the unique challenges for consumer and automotive customers and markets. Student teams will develop a device design, fabrication process, and manufacturing analysis in response to a specification.

3 units, Spr (O'Brien, G)

#### **ME 440. Electronic States and Transitions In Quantum Confined Structures**

Summary of selected quantum mechanical concepts with focus on phenomena related to charge separation and transfer. The physics and thermodynamics of excitons described and related to experimental observations. The energy state of electrons as function of confinement size and strength. Presentations include on electron tunneling, measuring the density of electronic states, dielectric behavior of materials, Bose Einstein condensation of quasi particles, and excitons in quantum wells and dots.

3 units, not given this year

#### **ME 450. Advances in Biotechnology**

Guest academic and industrial speakers. Latest developments in fields such as bioenergy, green process technology, production of industrial chemicals from renewable resources, protein pharmaceutical production, industrial enzyme production, stem cell applications, medical diagnostics, and medical imaging. Biotechnology ethics, business and patenting issues, and entrepreneurship in biotechnology.

3 units, not given next year

#### **ME 451A. Advanced Fluid Mechanics Multiphase Flows**

Single particle and multi-particle fluid flow phenomena, mass, momentum and heat transfer, characteristic time and length scales, non-dimensional groups; collection of dispersed-phase elements: instantaneous and averaged descriptions for multiphase flow, Eulerian-Eulerian and Lagrangian-Eulerian statistical representations, mixture theories; models for drag, heat and mass transfer; dilute to dense two-phase flow, granular flows; computer simulation approaches for multiphase flows, emerging research topics. Prerequisites: graduate level fluid mechanics and engineering mathematics, and undergraduate engineering mechanics and thermodynamics.

3 units, Win (Staff)

#### **ME 451B. Advanced Fluid Mechanics**

Waves in fluids: surface waves, internal waves, inertial and acoustic waves, dispersion and group velocity, wave trains, transport due to waves, propagation in slowly varying medium, wave steepening, solitons and solitary waves, shock waves. Instability of fluid motion: dynamical systems, bifurcations, Kelvin-Helmholtz instability, Rayleigh-Benard convection, energy method, global stability, linear stability of parallel flows, necessary and sufficient conditions for stability, viscosity as a destabilizing factor, convective and absolute instability. Focus is on flow instabilities. Prerequisites: graduate courses in compressible and viscous flow.

3 units, alternate years, not given this year

#### **ME 451C. Advanced Fluid Mechanics**

Compressible flow: governing equations, Crocco-Vazsonyi's equations, creation and destruction of vorticity by compressibility effects, shock waves. Modal decomposition of compressible flow, linear and nonlinear modal interactions, interaction of turbulence with shock waves. Energetics of compressible turbulence, effects of compressibility on free-shear flows, turbulent boundary layers, Van Driest transformation, recovery temperature, and shock/boundary layer interaction. Strong Reynolds analogy, modeling compressible turbulent flows. Prerequisites: 355, 361A, or equivalents.

3 units, not given this year

#### **ME 451D. Microhydrodynamics**

(Same as CHEMENG 310) Transport phenomena on small-length scales appropriate to applications in microfluidics, complex fluids, and biology. The basic equations of mass, momentum, and energy, derived for incompressible fluids and simplified to the slow-flow

limit. Topics: solution techniques utilizing expansions of harmonic and Green's functions; singularity solutions; flows involving rigid particles and fluid droplets; applications to suspensions; lubrication theory for flows in confined geometries; slender body theory; and capillarity and wetting. Prerequisites: 120A,B, 300, or equivalents.

3 units, Win (Fuller, G)

#### **ME 453A. Finite Element-Based Modeling and Simulation of Linear Fluid/Structure Interaction Problems**

Basic physics behind many fluid/structure interaction phenomena. Finite element-based computational approaches for linear modeling and simulation in the frequency domain. Vibrations of elastic structures. Linearized equations of small movements of inviscid fluids. Sloshing modes. Hydroelastic vibrations. Acoustic cavity modes. Structural-acoustic vibrations. Applications to liquid containers and underwater signatures. Prerequisite: graduate course in the finite element method or consent of instructor.

3 units, not given this year

#### **ME 453B. Computational Fluid Dynamics Based Modeling of Nonlinear Fluid/Structure Interaction Problems**

Basic physics behind many high-speed flow/structure interaction phenomena. Modern computational approaches for nonlinear modeling and simulation in the time domain. Dynamic equilibrium of restrained and unrestrained elastic structures. Corotational formulation for large structural displacements and rotations. Arbitrary Lagrangian-Eulerian description of inviscid and viscous flows. Time-accurate CFD on moving and deforming grids. Discrete geometric conservation laws. Discretization of transmission conditions on non-matching discrete fluid/structure interfaces. Coupled fluid/mesh-motion/structure time integration schemes. Application to divergence, flutter, and buffeting. Prerequisites: graduate course in the finite element method, and in computational fluid dynamics.

3 units, not given this year

#### **ME 455. Complex Fluids and Non-Newtonian Flows**

(Same as CHEMENG 462) Definition of a complex liquid and microrheology. Division of complex fluids into suspensions, solutions, and melts. Suspensions as colloidal and non-colloidal. Extra stress and relation to the stresslet. Suspension rheology including Brownian and non-Brownian fibers. Microhydrodynamics and the Fokker-Planck equation. Linear viscoelasticity and the weak flow limit. Polymer solutions including single mode (dumbbell) and multimode models. Nonlinear viscoelasticity. Intermolecular effects in nondilute solutions and melts and the concept of reptation. Prerequisites: low Reynolds number hydrodynamics or consent of instructor.

3 units, not given this year

#### **ME 457. Fluid Flow in Microdevices**

Physico-chemical hydrodynamics. Creeping flow, electric double layers, and electrochemical transport such as Nernst-Planck equation; hydrodynamics of solutions of charged and uncharged particles. Device applications include microsystems that perform capillary electrophoresis, drug dispensation, and hybridization assays. Emphasis is on bioanalytical applications where electrophoresis, electro-osmosis, and diffusion are important. Prerequisite: consent of instructor.

3 units, Spr (Santiago, J)

#### **ME 458. Advanced Topics in Electrokinetics**

Electrokinetic theory and electrokinetic separation assays. Electroneutrality approximation and weak electrolyte electrophoresis theory. Capillary zone electrophoresis, field amplified sample stacking, isoelectric focusing, and isotachopheresis. Introduction to general electrohydrodynamics (EHD) theory including the leaky dielectric concept, the Ohmic model formulation, and electrokinetic flow instabilities. Prerequisite: ME 457.

3-5 units, not given this year

#### **ME 461. Advanced Topics in Turbulence**

Turbulence phenomenology; statistical description and the equations governing the mean flow; fluctuations and their energetics; turbulence closure problem, two-equation turbulence models, and second moment closures; non-local effect of pressure; rapid distortion analysis and effect of shear and compression on turbulence; effect of body forces on turbulent flows; buoyancy-generated turbulence; suppression of turbulence by stratification;

turbulent flows of variable density; effect of rotation on homogeneous turbulence; turbulent flows with strong vortices. Prerequisites: 351B and 361A, or consent of instructor.

3 units, Aut (Lele, S)

**ME 463. Advanced Topics in Plasma Science and Engineering**  
Research areas such as plasma diagnostics, plasma transport, waves and instabilities, and engineering applications.

3 units, not given this year

**ME 468. Experimental Research in Advanced User Interfaces**  
(Same as COMM 168, COMM 268, COMM 368) Project-based course involves small (3-4) person teams going through all parts of the experimental process: question generation, experiment design, running, and data analysis. Each team creates an original, publishable project that represents a contribution to the research and practicum literatures. All experiments involve interaction between people and technology, including cars, mobile phones, websites, etc. Prerequisite: consent of instructor.

1-5 units, not given this year

**ME 469. Computational Methods in Fluid Mechanics**

The last two decades have seen the widespread use of Computational Fluid Dynamics (CFD) for analysis and design of thermal-fluids systems in a wide variety of engineering fields. Numerical methods used in CFD have reached a high degree of sophistication and accuracy. The objective of this course is to introduce classical approaches and algorithms used for the numerical simulations of incompressible flows. In addition, some of the more recent developments are described, in particular as they pertain to unstructured meshes and parallel computers. An in-depth analysis of the procedures required to certify numerical codes and results will conclude the course.

3 units, Aut (Iaccarino, G)

**ME 469B. Computational Methods in Fluid Mechanics**

Advanced CFD codes. Geometry modeling, CAD-CFD conversion. Structured and unstructured mesh generation. Solution methods for steady and unsteady incompressible Navier-Stokes equations. Turbulence modeling. Conjugate (solid/fluid) heat transfer problems. Development of customized physical models. Batch execution for parametric studies. Final project involving solution of a problem of student's choosing. Prerequisite: ME 300C/CME 206.

3 units, not given this year

**ME 470. Uncertainty Quantification**

Uncertainty analysis in computational science. Probabilistic data representation, propagation techniques and validation under uncertainty. Mathematical and statistical foundations of random variables and processes for uncertainty modeling. Focus is on state-of-the-art propagation schemes, sampling techniques, and stochastic Galerkin methods. The concept of model validation under uncertainty and the determination of confidence bounds estimates. Prerequisite: basic probability and statistics at the level of CME 106 or equivalent.

3 units, not given this year

**ME 471. Turbulent Combustion**

Basis of turbulent combustion models. Assumption of scale separation between turbulence and combustion, resulting in Reynolds number independence of combustion models. Level-set approach for premixed combustion. Different regimes of premixed turbulent combustion with either kinematic or diffusive flow/chemistry interaction leading to different scaling laws and unified expression for turbulent velocity in both regimes. Models for non-premixed turbulent combustion based on mixture fraction concept. Analytical predictions for flame length of turbulent jets and NO<sub>x</sub> formation. Partially premixed combustion. Analytical scaling for lift-off heights of lifted diffusion.

3 units, Spr (Urzay Lobo, J)

**ME 484. Computational Methods in Cardiovascular Bioengineering**

(Same as BIOE 484) Lumped parameter, one-dimensional nonlinear and linear wave propagation, and three-dimensional modeling techniques applied to simulate blood flow in the cardiovascular system and evaluate the performance of cardiovascular devices. Construction of anatomic models and extraction of physiologic quantities from medical imaging data. Problems in blood flow within the context of disease research,

device design, and surgical planning.

3 units, not given this year

**ME 485. Modeling and Simulation of Human Movement**

(Same as BIOE 485) Direct experience with the computational tools used to create simulations of human movement. Lecture/labs on animation of movement; kinematic models of joints; forward dynamic simulation; computational models of muscles, tendons, and ligaments; creation of models from medical images; control of dynamic simulations; collision detection and contact models. Prerequisite: 281, 331A,B, or equivalent.

3 units, Spr (Delp, S)

**ME 491. Ph.D. Teaching Experience**

Required of Ph.D. students. May be repeated for credit.

3 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**ME 492. Mechanical Engineering Teaching Assistance Training**

1 unit, Aut (Edwards, C; Gardella, I), Win (Staff), Spr (Staff)

**ME 495. Mechanical Engineering Lecture Series**

This seminar will feature a series of early career mechanical engineers working on leading edge problems in controls, dynamics, fluid mechanics, biomechanics, combustion, and related disciplines. The visitors will come from top universities both within the US and internationally, and will be discussing both their past research and plans for building a research program in the future.

1 unit, Spr (Staff)

**ME 500. Thesis (Ph.D.)**

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**ME 801. TGR Project**

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**ME 802. TGR Dissertation**

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

## MEDICINE (MED) COURSES

### UNDERGRADUATE COURSES IN MEDICINE

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**MED 1A. Leadership in Multicultural Health**

First of a three-quarter sequence designed for undergraduates serving as staff for the Stanford Medical Youth Science Summer Residential Program (SRP). Structured opportunities for SRP staff to learn, observe, participate in, and evaluate leadership development, multicultural health theories and practices, and social advocacy. Students explore approaches for tracking multicultural health and equity issues, foster relationships with campus and community partners, and learn fundamental skills necessary to implement activities for the biomedical Summer Residential Program.

2 units, Spr (Staff)

**MED 1B. Leadership In Multicultural Health**

Second of a three quarter sequence for undergraduates serving as staff for the Stanford Medical Youth Science Program Summer Residential Program (SRP). Provides experiences in conducting Community Based Participatory Research (CBPR). Utilizes service learning as a pedagogical approach to developing an understanding of the intersections between power and privilege and health disparities, fostering the knowledge and skills to become social advocates to address forms of inequities. Hands-on learning through CBPR; opportunities to conduct community assessments, collect and analyze data, and develop evaluation tools. Prerequisite: MED 1A.

3 units, Aut (Ned, J; Winkleby, M)

**MED 1C. Leadership in Multicultural Health**

Last of a three quarter sequence for students who served as staff for the Stanford Medical Youth Science Program Summer Residential Program (SRP). An individual study service learning course designed to develop understanding of the intersection between power and privilege, and health disparities. Students

submit a written reflective term paper based on their experience as staff for the Summer Residential Program as it relates to service learning and Community Based Participatory Research (CBPR). Prerequisite: MED 1A,B.

*1 unit, Win (Ned, J; Winkleby, M)*

**MED 24SI. Alternative Spring Break: A Veteran's Affair - Issues and Policies Affecting American Veterans**

As we celebrate Veterans Day with storewide sales, our veteran population commemorates years of armed service with mental illness, homelessness, and substance abuse. One of every three homeless persons has served our country in uniform; half of all veterans are mentally ill. Through a combination of academic and service learning, this course addresses the public health and socio-economic status of our veterans and evaluates how current government actions are shaping veterans' rights. Weekly forums with clinicians, policy makers, and economists complement direct discussions with veterans and current Iraqi service men and women. Optional field trips to homeless shelters in the San Francisco area. Prerequisite: Acceptance into the Alternative Spring Break Program.

*1 unit, Win (Staff)*

**MED 27SI. Alternative Spring Break: Healthcare of Underserved Communities in Central California**

Pre-field group directed reading for Alternative Spring Break: Healthcare of Underserved Communities in Central California.

*1 unit, Win (Garcia, G)*

**MED 30SI. Alternative Spring Break: Step Up From the Streets - Helping the Homeless**

The paradox of homelessness in our moderately wealthy society. Explores factors that contribute to homelessness, what the current homeless situation is like in the US, what is being done about homelessness through nonprofit and government work. Promotes a better understanding of the homeless community through connecting with the Night Outreach Program and the Palo Alto Opportunities Center. Student-directed reading prepares students for ASB trip to Washington D.C. Prerequisite: acceptance into SUFTS ASB 2011.

*1 unit, Win (Staff)*

**MED 70Q. Cancer and the Immune System**

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Myths and facts surrounding the idea that the immune system is capable of recognizing malignant cells. The biological basis and function of effector arms of the immune system; how these mechanisms may be used to investigate the biological basis and potential therapy of cancer. How the immune system functions.

*3 units, Win (Negrin, R)*

**MED 86Q. Seeing the Heart**

(F,Dial) Stanford Introductory Dialogue. Introduction to biomedical technology, science, clinical medicine, and public policy through cardiovascular imaging. Invasive and noninvasive techniques to detect early stage heart disease and to see inside the heart and blood vessels. Topics include: common forms of heart disease, how they develop, and why they affect so many people; imaging technologies such as ultrasound, CT, MRI, PET, and optical; a cost-effective public screening program. Field trips to Stanford Medical Center imaging centers.

*2 units, Win (McConnell, M)*

**MED 87Q. Women and Aging**

(S,Sem) (Same as HUMBIO 87Q) Stanford Introductory Seminar. Preference to sophomores. Biology, clinical issues, social and health policies of aging; relationships, lifestyles, and sexuality; wise women and grandmothers. Sources include scientific articles, essays, poetry, art, and film. Service-learning experience with older women. Service Learning Course (certified by Haas Center). GER:EC-Gender

*5 units, Spr (Winograd, C)*

**MED 88Q. Dilemmas in Current Medical Practice**

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Social, political, scientific, and economic forces influencing medical practice. Spiraling costs, impaired access to health care, and disillusionment toward the health care system. Attempts by government and medical insurers to control costs through managed care and health maintenance organizations. Medical education and how it has affected the practice of medicine. Alternative health

care, preventive medicine, and the doctor-patient relationship. The paradox of health in America: why do so many people who are healthy feel unhealthy? Mandatory observation of instructors in their medical practices.

*3 units, Aut (Croke, J; Jones, E)*

**MED 93Q. The AIDS Epidemic: Biology, Behavior, and Global Responses**

Preference to sophomores. How the discovery of the causative agent and the modes of transmission of HIV fueled a quest for prevention, treatments, and a vaccine. Discoveries in biology, biotechnology, epidemiology, and medicine during the last 20 years. Hypotheses about the origins of HIV as a human disease; the spread of AIDS and HIV; social, political, and economic consequences of the epidemic; and national and global responses.

*3 units, not given this year*

**MED 94Q. Hormones, Health, and Disease**

Preference to sophomores. The role of hormones in maintaining health; how abnormalities in hormones cause disease. Topics include: the pituitary, the master gland; thyroid hormones and metabolism; insulin and diabetes; adrenal steroids and hypertension; vitamin D, parathyroid hormone, and osteoporosis; sex hormones, birth control, pregnancy, and menopause; androgens, erectile dysfunction, and athletic performance; cholesterol, obesity, and cardiovascular risk. Recommended: background in human biology and physiology.

*3 units, alternate years, not given this year*

**MED 108Q. Human Rights and Health**

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. History of human-rights law. International conventions and treaties on human rights as background for social and political changes that could improve the health of groups and individuals. Topics such as: regional conflict and health, the health status of refugees and internally displaced persons; child labor; trafficking in women and children; HIV/AIDS; torture; poverty, the environment and health; access to clean water; domestic violence and sexual assault; and international availability of drugs. Possible optional opportunities to observe at community sites where human rights and health are issues. Guest speakers from national and international NGOs including Doctors Without Borders; McMaster University Institute for Peace Studies; UC Berkeley Human Rights Center; Kiva. PowerPoint presentation on topic of choice required.

*3 units, Spr (Laws, A)*

**MED 120Q. Pathophysiology and Clinical Aspects of Diseases of the Heart and Blood Vessels**

Preference to sophomores. Anatomy, physiology, pathology, and clinical aspects that comprise the discipline of cardiovascular medicine. Anatomy and physiology of the heart and blood vessels as an introduction to pathology states such as heart attack, stroke, congestive heart failure, rhythm disturbances of the heart, and sudden cardiac death. Underlying principles of diagnosis and treatment of the disease.

*3 units, not given this year*

**MED 130. YES+Empowerment Course**

Adapted for Residential Education from the national YES+ workshop program, an innovative, dynamic, and fun life skills program which empowers students with tools to eliminate stress, increase energy, handle negative emotions, increase mental focus, heighten awareness, and develop strong social and leadership skills. Students learn a set of powerful breath-based meditation techniques which clear the mind and enhance success in school, work, and interpersonal relationships. See <http://us.yesplus.org/> for further insight into the program. Enrollment limited; priority to residents of Castano Hall; others selected by application.

*1 unit, Aut (Sengupta, D; Molfino, M; Kao, P), Win (Sengupta, D; Kao, P; Molfino, M), Spr (Staff)*

**MED 143A. Patient Health Education in Community Clinics**

(Same as MED 243A) Open to undergraduate, graduate, and medical students. Principles of health education, theories of behavior change, methods for risk reduction. Presentations of health education modules, focusing on topics prevalent among underserved populations. Students apply theoretical frameworks to health education activities in the Cardinal Free Clinics. Pre- or corequisite: MED 157. Application required. Contact [evelynh@stanford.edu](mailto:evelynh@stanford.edu)

2 units, Aut (Martin, M; Osterberg, L)

**MED 143B. Patient Health Education in Community Clinics - Practicum**

(Same as MED 243B) Open to undergraduate, graduate, and medical students. For students who have completed MED 143A/243A and currently volunteer in one of the course-affiliated clinic sites. Objective is to expand health education skills, discuss more complex health education topics, and reflect upon experiences in the clinic. Prerequisite: successful completion of MED 143A/243A.

2 units, Win (Martin, M; Osterberg, L)

**MED 143C. Patient Health Education in Community Clinics - Practicum**

(Same as MED 243C) Open to undergraduate, graduate, and medical students. For students currently volunteering in one of the course-affiliated clinic sites. Students apply health education skills, discuss more complex health education topics, and reflect upon experiences in the clinic. Pre-requisites: MED 143A/243A, Med 143B/243B.

2 units, Spr (Staff)

**MED 147. Methods in Community Assessment, Evaluation, and Research**

(Same as MED 247) Development of pragmatic skills for design, implementation, and analysis of structured interviews, focus groups, survey questionnaires, and field observations. Topics include: principles of community-based participatory research, including importance of dissemination; strengths and limitations of different study designs; validity and reliability; construction of interview and focus group questions; techniques for moderating focus groups; content analysis of qualitative data; survey questionnaire design; and interpretation of commonly-used statistical analyses.

3 units, Spr (Staff)

**MED 149. Medical Interpreting: Skills and Etiquette**

(Same as MED 249) Open to medical students, graduate students, and undergraduates. The skills and etiquette of medical interpreting from a crosscultural perspective. All students are required to volunteer at the Pacific or Arbor Free Clinic. Completion qualifies students to become volunteer interpreters at the Pacific or Arbor Free Clinic. Service Learning Course (certified by Haas Center). Prerequisite: fluency in a language other than English.

1 unit, Aut (Pompei, P; Osterberg, L; Londono Tobon, A), Spr (Staff)

**MED 157. Foundations for Community Health Engagement**

Open to undergraduate, graduate, and MD students. Examination and exploration of community health principles and their application at the local level. Designed to prepare students to make substantive contributions in a variety of community health settings (e.g. clinics, government agencies, non-profit organization, advocacy groups). Topics include community health assessment; health disparities; health promotion and disease prevention; strategies for working with diverse, low-income, and underserved populations; and principles of ethical and effective community engagement.

3 units, Aut (Garcia, G; Heaney, C)

**MED 160. Physician Shadowing: Stanford Immersion in Medicine Series (SIMS)**

Undergraduates are paired with a physician mentor at Stanford Hospital and Clinics, Lucile Packard Children's Hospital, or the Veteran's Administration Hospital. May be repeated for credit. Prerequisite: Application and acceptance to the SIMS program.

1 unit, Aut (Gesundheit, N; Lewis, P; Williams, R), Win (Gesundheit, N; Lewis, P; Williams, R), Spr (Staff)

**MED 199. Undergraduate Research**

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**GRADUATE COURSES IN MEDICINE**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**MED 201. Internal Medicine: Body as Text**

Body as Text refers to the idea that every patient's body tells a story. The narrative includes the past and present of a person's social and medical condition; it is a demonstration of the phenotype. The art of reading the body as text was at its peak in the first half of the 20th century, but as technology has become ascendant, bedside skills and the ability to read the text have faded. Beyond scientific knowledge and medical facts, it is this often forgotten craft which is at the heart of the excitement of being an internist. This course introduces students to the art of the clinical exam, to developing a clinical eye, and learning to see the body in a completely different way.

1 unit, Aut (Verghese, A; Shah, A; Kita, R)

**MED 202. Alternative Spring Break: Rural and American Indian Health Disparities**

Open to MD, graduate, and undergraduate students. Classroom preparation followed by a one week spring break service learning experience on a reservation in South Dakota. Introduces students to the challenges and promise of Native American and rural health care, and the role of communities as leaders and problem solvers. Includes lectures, discussion and readings pertaining to Native American culture, current research in Native American health, and the methods and practice of community based participatory research. Culminates in formulation of a plan for communicating with and engaging community partners in South Dakota: Indian Health Services, Habitat for Humanity, Porcupine Clinic, Teach for America, and Sinte Gleska University.

3 units, Win (Garcia, G; Morrison, S)

**MED 203. Stanford - Papua New Guinea Medical Project**

Discussion group focused on ethnography and global health education opportunities in rural settings of Papua New Guinea. Students who have or are interested in working in Papua New Guinea to expand health education are invited to participate. Topics include empowerment of clients to stay healthy through intelligent nutrition and exercise, and through safe sexual practices.

1 unit, Spr (Staff)

**MED 204. Access and Delivery of Essential Medicines to Poor and Underserved Communities**

Student initiated lecture series. Guest speakers. Topics include: neglected diseases, underserved and impoverished markets, disease profiles of lower and middle income countries, pricing and distribution of biomedical end products, intellectual property in medicine and its effect on delivery of healthcare.

1 unit, Aut (Vogel, L; Barry, M)

**MED 206. Meta-research: Appraising Research Findings, Bias, and Meta-analysis**

(Same as HRP 206, STATS 211) Open to graduate, medical, and undergraduate students. Appraisal of the quality and credibility of research findings; evaluation of sources of bias. Meta-analysis as a quantitative (statistical) method for combining results of independent studies. Examples from medicine, epidemiology, genomics, ecology, social/behavioral sciences, education. Collaborative analyses. Project involving generation of a meta-research project or reworking and evaluation of an existing published meta-analysis. Prerequisite: knowledge of basic statistics.

3 units, Win (Olkin, I; Ioannidis, J)

**MED 207. History of Medicine**

Weekly lectures that trace the development of Western medical tradition from Babylonian, Egyptian, and Greek ancient cultures to the present.

1 unit, Win (Camargo, C)

**MED 217. Technological Frontiers in Digestive Diseases**

Focused on introducing engineering, bioengineering, and physical sciences students to technologies used in the clinical setting. Topics include: endoscopes to detect and remove cancer; minimally invasive surgery to treat obesity; measurements of propulsion through the intestine; and technologies to detect and stop internal bleeding. Observations in the clinical setting; visits to laboratories engaged in the development of new technologies.

1 unit, Spr (Friedland, S)

**MED 223. Cardiovascular and Pulmonary Sciences Seminar**

Weekly modified journal club primarily for CVP Scholarly



Application students, Cardiovascular Institute graduate students, clinical and research fellows, and faculty. Open to other graduate students and medical students (Advanced undergraduate students with permission of instructor). Each meeting begins with an overview of a particular area by a faculty member, followed by presentation of a seminal paper in that area by a postdoctoral fellow or a graduate student. Discussion follows the presentation, after which the faculty moderator meets separately with the medical students for further questions and discussion.

2 units, Aut (Cooke, J; Rabinovitch, M; Rockson, S; Tsao, P), Win (Cooke, J; Rabinovitch, M; Rockson, S; Tsao, P), Spr (Staff)

#### **MED 227. Bedside Ultrasound**

For pre-clinical or clinical medical students, and others with permission. Introduces students to diagnostic ultrasound at the bedside. The normal anatomy of the heart, abdomen, and pelvis pertinent to ultrasound is taught. Some pathology involving these areas is also introduced. As the students' proficiency increases, those electing to can visit the Pacific Free Clinic to be introduced to scanning patients. 1 unit for class attendance only; 2 units for class attendance and participation in the Pacific Free Clinic.

1-2 units, Aut (Kao, P; Thompson, N; Tran, P), Win (Kao, P; Thompson, N; Tran, P), Spr (Staff)

#### **MED 228. Physicians and Social Responsibility**

Social and political context of the roles of physicians and health professionals in social change; policy, advocacy, and shaping public attitudes. How physicians have influenced governmental policy on nuclear arms proliferation; environmental health concerns; physicians in government; activism through research; the effects of poverty on health; homelessness; and gun violence. Guest speakers from national and international NGOs.

1 unit, Aut (Laws, A; Vilendrer, S)

#### **MED 230. Rethinking Global Health**

(Same as HRP 240) Challenges for those seeking to improve global health include contending with: a dynamic balance between infectious and chronic non-communicable disease that differs across and within countries; issues relating to the proximate and more removed causes of disease and illness, including nutrition, infrastructure, governance, economic development, and environmental changes; diverse proposed responses with arguments for particular courses of action appealing to cost-effectiveness, egalitarian, and rights-based principles. The course goal is to begin to make sense of these challenging issues, requiring data and evidence derived via multiple methodologies, critical thinking, and sound reasoning. Prerequisite: a course dealing with global health, such as HUMBIO 129S, or consent of instructor.

3 units, Spr (Staff)

#### **MED 231. Measuring Global Health**

(Same as HRP 241) Open to MD, graduate, and undergraduate students. Assessing the global burden of disease, its distribution among and within countries, its causes, and appropriate interventions requires rigorous quantitative approaches. This course develops skills in these areas by critically examining questions like: How do we know who is sick and where? How are risk factors incorporated into our projections of future disease trends? How do we combine mortality and morbidity in a meaningful way? What works for improving health efficiently? Workshops build familiarity with relevant data and their analysis. Prerequisite: Course in statistics, biostatistics, econometrics, or equivalent.

4 units, Spr (Bendavid, E; Goldhaber-Fiebert, J)

#### **MED 240. Sex Differences in Human Physiology and Disease**

(Same as OBGYN 240, HUMBIO 140) Chromosomal and hormonal influences on cells, tissues, and organs that underlie the development of reproductive organs and sexual dimorphism of the neuroendocrine system. Effects of endogenous and exogenous sex hormones and environmental factors that differ between men and women on the musculoskeletal, neurological, cardiovascular, and immunological systems over the lifecourse, from conception to puberty, through reproductive phases (including changes during the menstrual cycle up to and beyond menopause in women and with aging in men). Transgender health issues. Guest lecturers. Prerequisite: Human Biology core or equivalent, or consent of instructor

2-3 units, Win (Stefanick, M)

#### **MED 241. Context and Practice of Health Care in Free Clinics**

Preparation for working in free clinics, awareness of health care context and health disparities among underinsured patients, and introduction to key skills for patient care. Topics include: patient history, screening tests, health insurance, cultural sensitivity, role of interpreters, and tuberculosis testing. Meets at either Arbor or Pacific free clinic to increase familiarity with free clinic operations and environment. Integrates with concurrent Practice of Medicine course.

1 unit, not given this year

#### **MED 242. Physicians and Human Rights**

Weekly lectures on how human rights violations affect health. Topics include: regional conflict and health, the health status of refugees and internally displaced persons; child labor; trafficking in women and children; HIV/AIDS; torture; poverty, the environment and health; access to clean water; domestic violence and sexual assault; and international availability of drugs. Guest speakers from national and international NGOs including Doctors Without Borders; McMaster University Institute for Peace Studies; UC Berkeley Human Rights Center; Kiva.

1 unit, Win (Laws, A; Anand, P)

#### **MED 243A. Patient Health Education in Community Clinics**

(Same as MED 143A) Open to undergraduate, graduate, and medical students. Principles of health education, theories of behavior change, methods for risk reduction. Presentations of health education modules, focusing on topics prevalent among underserved populations. Students apply theoretical frameworks to health education activities in the Cardinal Free Clinics. Pre- or corequisite: MED 157. Application required. Contact evelynh@stanford.edu

2 units, Aut (Martin, M; Osterberg, L)

#### **MED 243B. Patient Health Education in Community Clinics - Practicum**

(Same as MED 143B) Open to undergraduate, graduate, and medical students. For students who have completed MED 143A/243A and currently volunteer in one of the course-affiliated clinic sites. Objective is to expand health education skills, discuss more complex health education topics, and reflect upon experiences in the clinic. Prerequisite: successful completion of MED 143A/243A.

2 units, Win (Martin, M; Osterberg, L)

#### **MED 243C. Patient Health Education in Community Clinics - Practicum**

(Same as MED 143C) Open to undergraduate, graduate, and medical students. For students currently volunteering in one of the course-affiliated clinic sites. Students apply health education skills, discuss more complex health education topics, and reflect upon experiences in the clinic. Pre-requisites: MED 143A/243A, MED 143B/243B.

2 units, Spr (Staff)

#### **MED 246. The Medical Interview for Spanish Speakers**

Student led forum for practicing and learning medical Spanish related specifically to the medical interview. Prepares clinical students to interact more effectively with Spanish speaking patients in clinics. Classes are topical; each class includes a demonstration, medical vocabulary practice, and conversational practice on the topic of the day.

1 unit, Aut (Garcia, G; Londono Tobon, A), Win (Garcia, G; Londono Tobon, A), Spr (Staff)

#### **MED 247. Methods in Community Assessment, Evaluation, and Research**

(Same as MED 147) Development of pragmatic skills for design, implementation, and analysis of structured interviews, focus groups, survey questionnaires, and field observations. Topics include: principles of community-based participatory research, including importance of dissemination; strengths and limitations of different study designs; validity and reliability; construction of interview and focus group questions; techniques for moderating focus groups; content analysis of qualitative data; survey questionnaire design; and interpretation of commonly-used statistical analyses.

3 units, Spr (Staff)



**MED 248. Student Rounds**

Teams of preclinical students meet weekly with a clinical student to hear the history and physical of a recent case the clinical student encountered on the wards. Following the presentation, the preclinical students work together under the guidance of the clinical student to develop a problem list and plan, which are then compared with the problem list, plan, and orders made by the actual admitting team. In the course of presenting the cases, the clinical student describes personal experiences and practical components of ward work and daily clinical routine.

*1 unit, Aut (Kenny, K), Win (Kenny, K), Spr (Kenny, K), Sum (Kenny, K)*

**MED 249. Medical Interpreting: Skills and Etiquette**

(Same as MED 149) Open to medical students, graduate students, and undergraduates. The skills and etiquette of medical interpreting from a crosscultural perspective. All students are required to volunteer at the Pacific or Arbor Free Clinic. Completion qualifies students to become volunteer interpreters at the Pacific or Arbor Free Clinic. Service Learning Course (certified by Haas Center). Prerequisite: fluency in a language other than English.

*1 unit, Aut (Pompei, P; Osterberg, L; Londono Tobon, A), Spr (Staff)*

**MED 253. The Impact of Multinationals Upon Global Health**

(Same as GSBGEN 553) Open to medical, graduate, and undergraduate students. The role of global industries and multinational organizations in shaping the health of individuals around the globe. Explores the salient debates on the impact of industries such as food, tobacco, and aluminum; the role of global health initiatives and foreign aid industries they spawned; how the changing landscape of human health and disease is affected by these industries; historical legacies and future prospects. Illustrative cases and lectures with a distinguished roster of guest speakers including: Sir Richard Feachem, former director of the Global Fund to Fight AIDS, Tuberculosis and Malaria, on the link between the aid industry and health; FDA commissioner David Kessler on the tobacco industry evasion and its impact on health; Mark Cullen, Stanford Professor of Medicine, on Alcoa's aluminum multinational taking on a health mission; Derek Yach, Director of Global Health at Pepsico on how Pepsi and the

*2 units, not given this year*

**MED 255. The Responsible Conduct of Research**

Forum. How to identify and approach ethical dilemmas that commonly arise in biomedical research. Issues in the practice of research such as in publication and interpretation of data, and issues raised by academic/industry ties. Contemporary debates at the interface of biomedical science and society regarding research on stem cells, bioweapons, genetic testing, human subjects, and vertebrate animals. Completion fulfills NIH/ADAMHA requirement for instruction in the ethical conduct of research. Prerequisite: research experience recommended.

*1 unit, Aut (Karkazis, K), Win (Karkazis, K), Spr (Staff)*

**MED 255C. The Responsible Conduct of Research for Clinical Researchers**

Engages clinical researchers in discussions about ethical issues commonly encountered during their clinical research careers and addresses contemporary debates at the interface of biomedical science and society. Graduate students required to take RCR who are or will be conducting clinical research are encouraged to enroll in this version of the course. Prerequisite: research experience recommended.

*1 unit, Aut (Karkazis, K), Spr (Staff)*

**MED 256. Global HIV/AIDS**

(Same as HUMBIO 156) Public health, policy, and research issues. Identify resources at Stanford, and from government, NGOs, and pharmaceutical, advocacy, and international organizations. Sources include biomedical, social, and behavioral sciences. Emphasis on student projects which feature methodologies in the development and design of Operational Research and Implementation Science in AIDS/TB and Malaria in response to PEPFAR and Global Fund programs. Guest lectures. Prerequisite: Human Biology core or equivalent, or consent of instructor.

*3 units, Aut (Katzenstein, D)*

**MED 257A. Community Health Advocacy**

A three quarter service-learning practicum designed to provide students with concrete skills for working in community-based clinics and to broaden and deepen their understanding of the context of this work and the populations being served. The social role of physicians is a central theme. Students must make a commitment to weekly shifts in one of the course-affiliated clinic sites throughout the academic year and must take responsibility for integrating clinic and classroom experiences. Full participation in the classroom is required; students must come to class prepared to reflect on clinic shifts and to practice skills through role-playing and other exercises. Pre-or co-requisite: MED 157; application required prior to start of autumn quarter. Contact cburks@stanford.edu. Service Learning Course (certified by Haas Center).

*2 units, Aut (Garcia, G; Banchoff, A)*

**MED 257B. Community Health Advocacy**

Second quarter of a three quarter service-learning practicum designed to provide students with concrete skills for working in community-based clinics and to broaden and deepen their understanding of the context of this work and the populations being served. The social role of physicians is a central theme. Students must make a commitment to weekly shifts in one of the course-affiliated clinic sites throughout the academic year and must take responsibility for integrating clinic and classroom experiences. Full participation in the classroom is required; students must come to class prepared to reflect on clinic shifts and to practice skills through role-playing and other exercises. Students who complete a clinic-identified service project are required to enroll for 4 units. Prerequisites: MED 257A, and instructor approval. Service Learning Course (certified by Haas Center).

*3-4 units, Win (Garcia, G)*

**MED 257C. Community Health Advocacy**

Third quarter of a three quarter service-learning practicum designed to provide students with concrete skills for working in community-based clinics and to broaden and deepen their understanding of the context of this work and the populations being served. The social role of physicians is a central theme. Students must make a commitment to weekly shifts in one of the course-affiliated clinic sites throughout the academic year and must take responsibility for integrating clinic and classroom experiences. Full participation in the classroom is required; students must come to class prepared to reflect on clinic shifts and to practice skills through role-playing and other exercises. Students who complete a clinic-identified service project are required to enroll for 4 units. Prerequisites: MED 257A,B and instructor approval. Service Learning Course (certified by Haas Center).

*3-4 units, Spr (Staff)*

**MED 258A. Advanced Community Health Advocacy**

A three quarter course for students who have completed at least one full year in the Community Health Advocacy Program (MED 257A,B,C); designed to augment the individual- and systems-level advocacy skills developed in the MED 257 series, with a focus on policy and media advocacy. The course also provides a forum for leadership development and continued growth in the clinic-based community advocate role. Students are expected to assist in the training and mentoring of MED 257 students at partner sites, and to act as a liaison between the clinic partner and the course directors. Equal dedication to both advocacy skills development and program leadership role fulfillment is expected. Class time includes guest speakers, discussions on current events related to community health, case studies of clinical experiences, and coordinator check-ins. Service Learning Course (certified by Haas Center). Unit value based on extent of clinic participation. Prerequisite: MED 257A,B,C.

*2-3 units, Aut (Garcia, G; Banchoff, A)*

**MED 258B. Advanced Community Health Advocacy**

Second quarter of a three quarter course for students who have completed at least one full year in the Community Health Advocacy Program (MED 257A,B,C); designed to augment the individual- and systems-level advocacy skills developed in the MED 257 series, with a focus on policy and media advocacy. The course also provides a forum for leadership development and continued growth in the clinic-based community advocate role. Students are expected to assist in the training and mentoring of

MED 257 students at partner sites, and to act as a liaison between the clinic partner and the course directors. Equal dedication to both advocacy skills development and program leadership role fulfillment is expected. Class time includes guest speakers, discussions on current events related to community health, case studies of clinical experiences, and coordinator check-ins. Service Learning Course (certified by Haas Center). Unit value based on extent of clinic participation. Prerequisite: MED 257A,B,C;  
2-3 units, Win (Garcia, G)

#### **MED 258C. Advanced Community Health Advocacy**

Third quarter of a three quarter course for students who have completed at least one full year in the Community Health Advocacy Program (MED 257A,B,C); designed to augment the individual- and systems-level advocacy skills developed in the MED 257 series, with a focus on policy and media advocacy. The course also provides a forum for leadership development and continued growth in the clinic-based community advocate role. Students are expected to assist in the training and mentoring of MED 257 students at partner sites, and to act as a liaison between the clinic partner and the course directors. Equal dedication to both advocacy skills development and program leadership role fulfillment is expected. Class time includes guest speakers, discussions on current events related to community health, case studies of clinical experiences, and coordinator check-ins. Service Learning Course (certified by Haas Center). Unit value based on extent of clinic participation. Prerequisite: MED 257A,B,C;  
2-3 units, Spr (Staff)

#### **MED 259. Oaxacan Health on Both Sides of the Border**

Required for students participating in the Community Health in Oaxaca summer program. Introduction to the health literacy and health-seeking behaviors of Oaxacan and other Mexican migrants; the health challenges these groups face. Through discussion and reflection, students prepare for clinical work and community engagement in Oaxaca, while also gaining knowledge and insight to make connections between their experiences in Mexico and their health-related work with Mexican immigrants in the Bay Area. Service Learning Course (certified by Haas Center). Prerequisite: application and acceptance into the Community Health in Oaxaca Summer Program (<http://och.stanford.edu/oaxaca.html>).  
2 units, Spr (Staff)

#### **MED 260. HIV: The Virus, the Disease, the Research**

(Same as IMMUNOL 260) Open to medical students, graduate students in biological sciences, undergraduates with strong biological background. Topics: immunopathogenesis immune deficits, opportunistic infections including TB, and malignancies; genomics viral genetic analyses that have traced the origin of HIV-1 and HIV-2 to primates, dated the spread of infection in humans, and characterized the evolution of the virus within infected individuals; antiretroviral drug development identification of drug targets, structure-based drug design, overcoming drug resistance, pivotal clinical trials, and role of community activism; clinical management solutions in high- and low-income countries; vaccine development learning from past failures and the future of engineering the human immune response. 4 units includes a final project assigned in consultation with the instructor to fit the individual student's background and area of HIV interest.  
3-4 units, Spr (Staff)

#### **MED 262. Economics of Health Improvement in Developing Countries**

(Same as ECON 127) Application of economic paradigms and empirical methods to health improvement in developing countries. Emphasis is on unifying analytic frameworks and evaluation of empirical evidence. How economic views differ from public health, medicine, and epidemiology; analytic paradigms for health and population change; the demand for health; the role of health in international development. Prerequisites: ECON 50 and 102B.  
5 units, Win (Miller, N)

#### **MED 263. Advanced Decision Science Methods and Modeling in Health**

(Same as HRP 263) Advanced methods currently used in published model-based cost-effectiveness analyses in medicine and public health, both theory and technical applications. Topics include: Markov and microsimulation models, model calibration and evaluation, and probabilistic sensitivity analyses. Prerequisites: a course in probability, a course in statistics or biostatistics, a course

on cost-effectiveness such as HRP 392, a course in economics, and familiarity with decision modeling software such as TreeAge.

3 units, Spr (Staff)

#### **MED 271. Global Biodesign: Medical Technology in an International Context**

(Same as BIOE 371) (Same as OIT 587) Seminar examines the development and commercialization of medical technologies in the global setting focusing primarily on Europe, India and China. Faculty and guest speakers from industry and government discuss the status of the industry, as well as opportunities in and challenges to medical technology innovation unique to each geography. Topics related to development of technologies for bottom of the pyramid markets are also addressed. Students enrolling for 2 units are required to write and deliver a final paper. Application may be required due to high demand.

1-2 units, Spr (Doshi, R; Shen, C; Yock, P; Pietzsch, J)

#### **MED 272A. Biodesign Innovation: Needs Finding and Concept Creation**

(Same as BIOE 374A, ME 368A) (Same as OIT 384) Two quarter sequence. Inventing new medical devices and instrumentation, including: methods of validating medical needs; techniques for analyzing intellectual property; basics of regulatory (FDA) and reimbursement planning; brainstorming and early prototyping. Guest lecturers and practical demonstrations.

4 units, Win (Yock, P; Zenios, S; Milroy, J; Brinton, T)

#### **MED 272B. Biodesign Innovation: Concept Development and Implementation**

(Same as BIOE 374B, ME 368B) (Same as OIT 385) Two quarter sequence. How to take a medical device invention forward from early concept to technology translation and development. Topics include prototyping; patent strategies; advanced planning for reimbursement and FDA approval; choosing translation route (licensing versus start-up); ethical issues including conflict of interest; fundraising approaches and cash requirements; essentials of writing a business or research plan; strategies for assembling a development team. Prerequisite: MED 272A, ME368A, OIT 384 or BIOE 374A.

4 units, Spr (Yock, P; Zenios, S; Milroy, J; Brinton, T)

#### **MED 274. Design for Service Innovation**

(Same as HRP 274) (Same as OIT 344) Open to graduate students from all schools and departments. An experiential course in which students work in multidisciplinary teams to design new services (including, but not limited to, web services) to address the needs of an underserved population of users. Students learn to identify the key needs of the target population and to design services to address these needs. Projects in 2012 will focus on services for young adult survivors of severe childhood diseases such as cystic fibrosis, rheumatoid arthritis, major cardiac repairs, organ transplants, genetic metabolic disorders, and cancer. The first wave of survivors is reaching young adulthood (ages 18-25). Many aspects of the young adult world are not yet user-friendly for them: applying to and entering college, adherence to required medication and diet, prospects for marriage and parenthood, participation in sports, driving, drinking, drugs, and more. The aspiration is to develop services to improve these young

4 units, Spr (Staff)

#### **MED 275. Introduction to Biopharmaceutical Innovation**

Open to all students. Biotechnology and the pharmaceutical industry. Topics include the biopharmaceutical industry, historical trends and experiences; research and development; intellectual property; drug approval: regulatory issues and agencies; business development; marketing; manufacturing; capital structure and financing; careers in biopharmaceutical industry. 2-unit option, lectures and weekly assignments, MED or S/NC grading only. 3-unit option, including a group project and final presentation, may be taken for a letter grade. May be repeated for credit.

2-3 units, Win (Gardner, P)

#### **MED 276. Careers in Medical Technology**

Career tracks in biomedical technology for medical, life science, engineering, business, and law students of all levels. Industry professionals describe career tracks, current roles, and industry perspectives. 2-unit option, lectures and weekly assignments, MED or S/NC grading only. 3-unit option, including a group project and final presentation, may be taken for a letter grade. May be repeated

for credit.

2-3 units, *Spr (Gardner, P)*

### **MED 282. Early Clinical Experience at the Cardinal Free Clinics**

Students provide health care in a student-run clinic for the homeless and uninsured. Student volunteers are guided in the practice of medical interviews, history-taking and physical examinations as appropriate. Clinical students and attending physicians provide support and guidance as the team arrives at a diagnosis and management plan. One unit for students who volunteer a minimum of twice a month. Two units of credit for Steering Committee members or students whose volunteer commitment is greater than twice a month.

1-2 units, *Aut (Osterberg, L), Win (Martin, M; Osterberg, L), Spr (Martin, M; Osterberg, L), Sum (Martin, M; Osterberg, L)*

### **MED 289. Introduction to Bioengineering Research**

(Same as BIOE 390) Preference to medical and bioengineering graduate students with first preference given to Bioengineering Scholarly Concentration medical students. Bioengineering is an interdisciplinary field that leverages the disciplines of biology, medicine, and engineering to understand living systems, and engineer biological systems and improve engineering designs and human and environmental health. Students and faculty will make presentations during the course. Students will be expected to make presentations, complete a short paper, read selected articles, and take quizzes on the material.

1-2 units, *Aut (Gold, G; Wang, P)*

### **MED 295. Advanced Cardiac Life Support**

(For clinical MD students only) Prepares students to manage the victim of a cardiac arrest. Knowledge and skills necessary for resuscitation of critically-ill patients. Clinical scenarios and small group discussions address cardiovascular pharmacology, arrhythmia recognition and therapy, acute coronary syndrome including myocardial infarction, ventricular dysrhythmias and defibrillation, and acute ischemic stroke. Requires pre-course preparation and an intensive two-day session on a Friday and Saturday. Students should get the approval of their Clerkship Coordinator before registering for the course. Recommended prerequisites: Medicine 300A, Pediatrics 300A, or Surgery 300A.

2 units, *Aut (Giacomini, J), Win (Giacomini, J), Spr (Giacomini, J)*

### **MED 299. Directed Reading in Medicine**

Prerequisite: consent of instructor.

1-18 units, *Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

### **MED 370. Medical Scholars Research**

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

4-18 units, *Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

### **MED 399. Graduate Research**

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

1-18 units, *Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

## **MEDICINE INTERDISCIPLINARY (INDE) COURSES**

### **GRADUATE COURSES IN MEDICINE INTERDISCIPLINARY**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

#### **INDE 200. The Future of Academic Medicine**

Required for first-year MSTP students; limited to MSTP. Presentations of research directions and opportunities by chairs of basic science, clinical departments, and PhD programs. Prerequisite: instructor consent.

1 unit, *Aut (Kim, S; Utz, P), Win (Kim, S; Utz, P)*

#### **INDE 201. Practice of Medicine I**

Six quarter series extending throughout the first two years of the

MD program, interweaving core skills training in medical interviewing and the physical examination with other major threads addressing the context of medical practice: information literacy, nutrition principles, clinical epidemiology and biostatistics, evidence-based practice, psychiatry, biomedical ethics, health policy, population health. Core clinical skills are acquired through hands-on practice, and evaluated through an extensive program of simulated medical encounters, in which students interview, examine, and manage patients in a mock clinic. The information literacy thread introduces students to informatics and knowledge management, biomedical informatics, and evidence-based medicine searching. Nutrition principles are acquired through interactive, web-based instruction, and reinforced through problem-based learning cases, which run in parallel to the basic science components over the first year. In epidemiology

11 units, *Aut (Basaviah, P)*

#### **INDE 202. Practice of Medicine II**

Medical interview and physical examination skills, information literacy, nutrition principles, evidence-based practice, health policy, and population health are covered. At the end of this quarter, students participate in a performance-based assessment of their medical interview and physical examination skills. See INDE 201 for a complete description of the Practice of Medicine course series.

8 units, *Win (Basaviah, P)*

#### **INDE 203. Practice of Medicine III**

Medical interview and physical examination skills, biomedical literature retrieval and appraisal, nutrition principles, evidence-based practice, biomedical ethics, and population health are covered. Students begin clinical problem-solving sessions to learn the approach to common and important clinical problems. Cases integrate other course themes of population health, evidence-based practice, clinical ethics, nutrition, health policy, and behavioral medicine. Students begin transition from comprehensive to problem-focused patient encounters. Students also gain exposure to geriatrics, pediatrics, and interprofessional healthcare teams, and practice mental health interview skills. At the end of this quarter, students participate in a performance-based assessment of their medical interview and physical examination skills. See INDE 201 for a complete description of the Practice of Medicine course series.

8 units, *Spr (Staff)*

#### **INDE 204. Practice of Medicine IV**

In second-year POM, there are two major educational categories: clinical reasoning and clinical exam skills. These two components are taught within five curricular components that include Clinical Reasoning teaching rounds and small group, Clinical Practicum, Clinical Procedures / Introduction to the Management of the Ill Patient simulation (IMIP), Advanced Clinical Skills, and Psychiatry. Within Clinical Reasoning sessions, students analyze case vignettes that integrate course themes described above with clinical medicine scenarios. Within Practicum, students spend alternate one-half day(s) per week in a clinical setting with a supervising faculty member, practicing medical interview and physical examination skills. Advanced Clinical Skills sessions provide hands-on practice working with faculty and patients on particular clinical themes that correlate with the basic science curriculum as well as the clinical curriculum. Specialists often co-teach these sessions, providing a focused

10 units, *Aut (Basaviah, P)*

#### **INDE 205. Practice of Medicine V**

In second-year POM, there are two major educational categories: clinical reasoning and clinical exam skills. These two components are taught within five curricular components that include Clinical Reasoning teaching rounds and small group, Clinical Practicum, Clinical Procedures / Introduction to the Management of the Ill Patient simulation (IMIP), Advanced Clinical Skills, and Psychiatry. Within Clinical Reasoning sessions, students analyze case vignettes that integrate course themes described above with clinical medicine scenarios. Within Practicum, students spend alternate one-half day(s) per week in a clinical setting with a supervising faculty member, practicing medical interview and physical examination skills. Advanced Clinical Skills sessions provide hands-on practice working with faculty and patients on particular clinical themes that correlate with the basic science

curriculum as well as the clinical curriculum. Specialists often co-teach these sessions, providing a focused

*8 units, Win (Basaviah, P)*

**INDE 206. Practice of Medicine VI**

Prep for the Clerkships is a month-long curriculum focused on preparing students with skills, knowledge, and approaches directly applicable to their upcoming clinical rotations. The experience provides hands-on workshops, simulated sessions, patient encounters, small group sessions, and a few large group sessions comprising a capstone for the two-year longitudinal curriculum in POM. In general, the individual sessions are tied to clinically relevant themes, including: procedural skills (cadaver lab, EMED); clinical skills (Master Clinician session, bedside rounds, advanced presentations, patient safety, abuse and reporting responsibilities with survivor panel); clinical specialty sessions (dermatology, palliative medicine, ophthalmology); clinical essentials (EKG, interventional radiology, fluid and electrolytes, electronic medical records); and professionalism (Everyday Professionalism session, ethics sessions).

*9 units, Spr (Staff)*

**INDE 207A. Medical Mandarin I: Beginning**

Develops essential medical vocabularies and conversational communication skills. Teaches the pinyin pronunciation system, which provides an accessible method of learning basic phrases. The foundations of taking a comprehensive patient history in Mandarin and doing medical interviews at individual hospital divisions, including making introductions, soliciting symptoms, explaining health concepts (e.g. diseases and prescriptions). Main goals are to improve rapport with Chinese patients through Mandarin fluency in the medical setting and to promote understanding of Chinese culture in the context of health care. Students registering for 3 units participate in clinic visits and field activities.

*2-3 units, Aut (Wang, X; So, S)*

**INDE 207B. Medical Mandarin II: Intermediate**

For students who already have a basic command of spoken Chinese. Conversational communication skills practiced in a more advanced setting, including more sophisticated assessment of patient history and cultural components that influence diseases found in Chinese-speaking patients. Builds working vocabulary for organ system disease processes to conduct a full physical exam, and to describe treatment modalities for Chinese-speaking patients (diagnostic and therapeutic). Students registering for 3 units participate in clinic visits and field activities. Prerequisite: one quarter of college-level Chinese or instructor assessment of fluency.

*2-3 units, Aut (Wang, X; So, S)*

**INDE 207C. Medical Mandarin III: Advanced**

Access advanced professional medical vocabulary, conduct medical research, and engage in discussions in Chinese. Aims at a proficiency level of medical interpreting or doing other independent work in Chinese. Students are also assisted in doing a project or projects related to a specific field of medicine. 3 units Includes clinic visits and field activities. Prerequisite: completion of Medical Mandarin II, or advanced Chinese proficiency.

*2-3 units, Aut (Wang, X; So, S)*

**INDE 207D. Mandarin for Medical Professionals I**

Designed for students who have completed Advanced Medical Mandarin and want to seek further professional development with respect to medical Mandarin. Coursework includes selected research and projects, clinic visits and field activities, via Mandarin. Students choose to enroll for 2 units or 3 units depending upon an agreed upon workload approved by the instructor. Prerequisite: completion of Advanced Medical Mandarin, INDE 209C.

*2-3 units, Aut (Wang, X; So, S)*

**INDE 208A. Medical Mandarin I: Beginning**

Continuation of 207A. See description for 207A. Students participating in classroom and online instruction only register for 2 units. Students registering for 3 units participate in clinic visits and field activities as well.

*2-3 units, Win (Wang, C; So, S)*

**INDE 208B. Medical Mandarin II: Intermediate**

Continuation of 207B. See description for 207B. Students

participating in classroom and online instruction only register for 2 units. Students registering for 3 units participate in clinic visits and field activities as well.

*2-3 units, Win (Wang, C; So, S)*

**INDE 208C. Medical Mandarin III: Advanced**

Access advanced professional medical vocabulary, conduct medical research, and engage in discussions in Chinese. Aims at a proficiency level of medical interpreting or doing other independent work in Chinese. Students are also assisted in doing a project or projects related to a specific field of medicine. 3 units Includes clinic visits and field activities. Prerequisite: completion of 207C, or advanced Chinese proficiency.

*2-3 units, Win (Wang, C; So, S)*

**INDE 208D. Mandarin for Medical Professionals II**

Continuation of INDE 207D. Designed for students who have completed Advanced Medical Mandarin and want to seek further professional development with respect to medical Mandarin. Coursework includes selected research and projects, clinic visits and field activities, via Mandarin. Students choose to enroll for 2 units or 3 units depending upon an agreed upon workload approved by the instructor. Prerequisite: INDE 207D.

*2-3 units, Win (Wang, C; So, S)*

**INDE 209A. Medical Mandarin III: Beginning**

Continuation of 207A/208A. See description for 207A. Students participating only in classroom and online instruction register for 2 units. Students registering for 3 units participate in clinic visits and field activities as well.

*2-3 units, Spr (Staff)*

**INDE 209B. Medical Mandarin III: Intermediate**

Continuation of 207B/208B. See description for 207B. Students participating only in classroom and online instruction register for 2 units. Students registering for 3 units participate in clinic visits and field activities as well.

*2-3 units, Spr (Staff)*

**INDE 209C. Medical Mandarin III: Advanced**

Access advanced professional medical vocabulary, conduct medical research, and engage in discussions in Chinese. Aims at a proficiency level of medical interpreting or doing other independent work in Chinese. Students are also assisted in doing a project or projects related to a specific field of medicine. 3 units Includes clinic visits and field activities. Prerequisite: completion of 208C or advanced Chinese proficiency.

*2-3 units, Spr (Staff)*

**INDE 209D. Mandarin for Medical Professionals III**

Continuation of INDE 208D. Designed for students who have completed Advanced Medical Mandarin and want to seek further professional development with respect to medical Mandarin. Coursework includes selected research and projects, clinic visits and field activities, via Mandarin. Students choose to enroll for 2 units or 3 units depending upon an agreed upon workload approved by the instructor. Prerequisite: INDE 208D.

*2-3 units, Spr (Staff)*

**INDE 211. Creative Writing**

For medical students - all levels of writing skill. Examines uses of creative writing, including understanding the experience of medical training. May be repeated for credit.

*1 unit, Win (Shafer, A)*

**INDE 212. The Human Condition: Medicine, Arts, and Humanities**

The interdisciplinary field of medical humanities: the use of the arts and humanities to examine medicine in personal, social, and cultural contexts. Topics include the doctor/patient relationship, the patient perspective, the meaning of doctoring, and the meaning of illness. Sources include visual and performing arts, film, and literary genres such as poetry, fiction, and scholarly writing. Designed for medical students in the Biomedical Ethics and Medical Humanities Scholarly Concentration, but all students are welcome.

*2 units, Spr (Staff)*

**INDE 214. Stanford Medical Student Journal**

Provides an opportunity for editors of all levels to cultivate their skills and assist in preparing pieces submitted by colleagues for publication in the Stanford Medical Student Journal. Students

enrolled in the course work closely with student authors as well as other editors. Editors examine multiple categories of writing, including opinion pieces, poetry, memoirs, book reviews, case reports and investigative reports. The Journal is published two to three times per year and highlights the diverse talents of Stanford medical students in both scientific writing and the humanities.

*1 unit, Aut (Connolly, A; Shafer, A), Win (Shafer, A; Connolly, A), Spr (Staff)*

**INDE 215. Queer Health and Medicine**

Explores specific, pertinent, and timely issues impacting the health of the lesbian, gay, bisexual, and transgender community; examines the role of the primary care physician in addressing the health care needs of this community. Guest lecturers provide a gender-sensitive approach to the medical care of the LGBT patient, breaking down homophobic barriers and reaffirming patient diversity. May be repeated for credit.

*1 unit, Spr (Staff)*

**INDE 216. Cells to Tissues**

Focuses on the cell biology and structural organization of human tissues as self-renewing systems. Topics include identification and differentiation of stem cells, regulation of the cell cycle and apoptosis in normal and cancerous cells, cell adhesion and polarity in epithelial tissues, intracellular transport, and cell migration. Histology laboratory sessions examine normal and abnormal samples of blood, epithelia, connective tissue, muscle, bone and cartilage. Patient presentations and small group discussions of current medical literature illustrate how cell biology influences medical practice.

*3 units, Aut (Connolly, A; Theriot, J)*

**INDE 220. Human Health and Disease I**

Establishes the foundation for the Human Health and Disease block which spans Q3 (Spring quarter Year One) through Q5 (Winter quarter Year Two). The Human Health and Disease block presents organ system-based histology, pathology, physiology, pharmacology, and infectious disease in a sequence of interdisciplinary courses. Each organ-specific integrated course includes a review of the anatomy and related histology, normal function of that organ system, how the organ system is affected by and responds to disease including infection, and how diseases of that organ system are treated (therapeutics).

*3 units, Win (Siegel, R; Whitlock, J; Regula, D)*

**INDE 221. Human Health and Disease II**

Structure, function, disease, and therapeutics of the respiratory system and the cardiovascular system. See INDE 220 for a description of the Human Health and Disease block .

*12 units, Spr (Staff)*

**INDE 222. Human Health and Disease III**

Structure, function, disease, and therapeutics of the renal/genitourinary system, the gastrointestinal system, the endocrine system, male and female reproductive systems, and women's health. See INDE 220 for a description of the Human Health and Disease block .

*15 units, Aut (Bhalla, V; Connolly, A; Gesundheit, N; Hillard, P; Lowe, A; Pao, A; Regula, D; Siegel, R)*

**INDE 223. Human Health and Disease IV**

Structure, function, disease, and therapeutics of the central nervous system, hematologic system and multi-systemic diseases. See INDE 220 for a description of the Human Health and Disease block.

*11 units, Win (Connolly, A; DeBattista, C; Glader, B; Regula, D; Schwartz, N; Siegel, R)*

**INDE 225. Popular and Clinical Nutrition: Food Facts, Fads, and Pharmacology**

Designed for medical students and other health care professionals. Lunchtime lectures review the epidemiological and clinical research related to eating patterns and misconceptions of the public, the mechanisms of pharmacological effects of food, and related topics common to patient nutritional concerns. Topics include fad diets, the impact of dietary addiction, longevity associated with caloric restriction, toxins in foods and the action of phytonutrients. Epidemiological, clinical, and biochemical studies are reviewed in the discussion of these and other topics.

*1 unit, not given this year*

**INDE 226. History of Medicine Online**

Via Internet. Topics include: ancient medicine, Egypt and Babylonia, ancient Greece and Rome, Europe in the Middle Ages and the Renaissance, 18th-century schools of thought, and technological medicine. Sources include Kleinman's core clinical functions, and text, pictures, hypertext links, and sound clips. For assistance accessing the course, email: cwpsupport@lists.stanford.edu. Enroll in Axess, then ask cwpsupport to be added to the course site as a student

*1 unit, Aut (Shafer, A), Win (Shafer, A), Spr (Shafer, A)*

**INDE 227. Careers in Medicine: Pathways in the Medical Sciences**

Open to medical students, graduate and undergraduate students. Interactive, seminar-style sessions expose students to diverse career opportunities and the challenges of developing work-life balance in medicine. Recognized experts in clinical medicine and biomedical research who have been innovators in their careers discuss their work, decision-points in their career pathways, and lifestyle aspects of their choices.

*1 unit, Spr (Staff)*

**INDE 228. Career Transition Planning: Taking Action Today for a Successful Tomorrow**

Open to School of Medicine MD and graduate students; post-docs and clinical fellows may audit by consent of instructor. How to prioritize career goals and develop an effective job search campaign. Topics: translating scientific and clinical training into a variety of workplace environments, professional network development, professional interest assessment, recruiters' perspectives, credentials development, and creating a marketing plan. Guest speakers from myriad career fields. May be repeated for credit.

*1 unit, Spr (Staff)*

**INDE 229. Managing Difficult Conversations**

(Same as GSBGEN 568) Dealing effectively with difficult interpersonal situations in medical contexts. Focus is on improving students' judgment as to how to prepare for and confront difficult discussions in medical situations. Relevant principles of professionalism, leadership, and psychology underlie the course pedagogy. Case-based; student-to-student and student-to-instructor role-playing in actual medical situations. Patient and physician-expert participation as class guests. Enrollment limited to 20 medical students (2nd year and beyond) and 15 2nd year MBA students.

*1 unit, Aut (Grousbeck, I; Prober, C)*

**INDE 230. Scientific Management Series**

Designed for postdocs and advanced graduate students. Reviews management skills necessary for successfully assuming leadership roles in scientific research. Addresses some of the most difficult aspects of developing, directing, and managing people and projects and running a research group, especially issues that new faculty have traditionally learned by trial and error over a number of years. Topics include: the faculty job search process and strategies, key elements in starting a lab, basic principles regarding legal dimensions of scientific activity (intellectual property, royalties, links with industry), leading a team, communication and negotiation skills, and writing and securing grants.

*1 unit, Win (Sanford, R; Pringle, J)*

**INDE 231. Future Faculty Seminar**

(Same as CTL 231) For graduate students from all disciplines who are considering faculty careers. Postdoctoral fellows, TGR students, and research/clinical trainees may audit by consent of instructor. Explores the broad spectrum of duties and opportunities presented through faculty positions beyond the research-related aspects. Develops awareness of resources and skills that lead to faculty success; answers field-specific and related faculty job questions through discussions with representatives of a variety of academic institutions and fellow course participants. Topics include: finding and obtaining faculty positions, negotiating and navigating the first year, and working toward tenure. May be repeated for credit.

*1 unit, Aut (Eberle, S; Puglisi, J; Wright-Dunbar, R)*

**INDE 232. Introduction to Academic Medicine for Physician-Scientists**

Open only to accepted MSTP students. Presentations by Stanford

faculty on professional development topics, including: choosing a dissertation advisor, giving oral presentations, writing a grant proposal, attending scientific meetings, developing a research career. Substantial writing component.

*3 units, not given this year*

#### **INDE 233. Medical Education Seminar Series**

For pre-clinical and clinical medical students. A series of sessions rotating among the following formats: Medical Education journal club; education works-in-progress; topics in medical education design, implementation, and evaluation; teaching M&M; hot topics and controversies in medical education. May be repeated for credit.

*1 unit, Aut (Braddock, C; Irvine, C; Violanti, M), Win (Braddock, C; Violanti, M; Irvine, C), Spr (Staff)*

#### **INDE 234. Introduction to Writing Research Proposals**

Practical instruction in proposal writing. Suitable for advanced graduate students. Substantial writing component. Enrollment by instructor approval only.

*3 units, not given this year*

#### **INDE 235. Wilderness Leadership and Mentorship Skills for Medical Students**

For MD/Master of Medicine wilderness pre-orientation trip (SWEAT) leaders. Training to engage with and prepare incoming first-year medical students for the rigors of medical school. Topics include: fundamentals of wilderness survival, wilderness equipment use, wilderness first aid, camping, outdoor leadership, mentorship, team building, improvisation, risk management, cultural competency, professionalism as a physician, reflection and resiliency, first-year curriculum, stress management and coping. Guest lectures from Stanford faculty, emergency medicine physicians, National Outdoor Leadership School wilderness instructors, learning strategy specialists, and mentorship development specialists.

*1 unit, Spr (Staff)*

#### **INDE 236. Introduction to Teaching and Mentoring**

Enrollment limited to medical students. An introduction to medical education teaching principles and skills. Topics include assessment of current teaching skills, reviews of performance, giving appropriate learner feedback, and best practices for interactive teaching. Also introduces the literature around the value of peer mentoring in the medical setting and how to apply this information. Recommended for medical students interested in or currently serving as teaching assistants or interested in future academic positions.

*1 unit, Aut (Selig, S; Braddock, C)*

#### **INDE 255A. Health Policy, Finance and Economics I**

Open to medical students and resident physicians. Introduction to basic concepts and current issues in health policy, health finance, and health economics. Goals are to promote understanding of the forces that shape healthcare; to integrate medical students with graduate medical education (residents); to motivate participants to pursue further scholarly activity in these subjects through coursework, graduate programs or research. Team taught by world-renowned experts in their respective fields. Prerequisite: instructor consent.

*1 unit, not given this year*

#### **INDE 255B. Health Policy, Finance and Economics II**

Continuation of INDE 255A. Open to medical students and resident physicians. Introduction to basic concepts and current issues in health policy, health finance, and health economics. Goals are to promote understanding of the forces that shape healthcare; to integrate medical students with graduate medical education (residents); to motivate participants to pursue further scholarly activity in these subjects through coursework, graduate programs or research. Team taught by world-renowned experts in their respective fields. For medical students 255A is not prerequisite to 255B. Prerequisite: instructor consent.

*1 unit, not given this year*

#### **INDE 297. Reflections, Research, and Advances in Patient Care**

For clinical MD students. Two-year curriculum designed to provide structured time for students to step back from clerkships, in order to promote reflection on and reinforcement for their learning in the clinical environment. Goals are: to discuss and reflect upon critical experiences in clerkships; to provide

continuity of instruction in translational science topics across the curriculum; to reinforce and extend the study of behavioral, cultural, ethical, social and socioeconomic topics introduced in the Practice of Medicine course sequence; to expose students to recent advances in medical discoveries, emphasizing their application to clinical practice (translational medicine); and to develop research and critical thinking skills, acquiring new information in areas related to the Scholarly Concentrations. Components of this curriculum include Doctoring with CARE small groups, the Translating Discoveries lecture/seminar series, and Scholarly Concentration breakout groups. Prerequisite:

*4 units, Aut (Shafer, A; Prober, C), Win (Staff), Spr (Staff), Sum (Staff)*

#### **INDE 298. Women's Health Independent Project**

Required for Women's Health Scholarly Concentration. Students pursue individual projects under the supervision of a faculty member. Prerequisite: consent of instructor.

*1 unit, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

## MICROBIOLOGY AND IMMUNOLOGY (MI) COURSES

### UNDERGRADUATE COURSES IN MICROBIOLOGY AND IMMUNOLOGY

Primarily for undergraduates; graduate students may enroll with consent of adviser.

#### **MI 17SC. Smallpox: Lethal Legacy, Forbidding Future**

Case studies related to the evolutionary origins of smallpox, monkeypox, and other emerging pox infections. Topics include public health policy, socio-cultural factors related to pox eradication, research funding, and the use of pox viruses in bioterrorism and as vectors for gene therapy. Fieldtrips and guest speakers on the development of novel drugs, personal accounts of the eradication efforts, current clinical trials for pox vaccines, and current laboratory studies of pox.

*2 units, not given this year*

#### **MI 70Q. Photographing Nature**

(S,Sem) Stanford Introductory Seminar. Utilizes the idiom of photography to learn about nature, enhance observation, and explore scientific concepts. Builds upon the pioneering photographic work of Eadweard J. Muybridge on human and animal locomotion. A secondary goal is to learn the grammar, syntax, composition, and style of nature photography to enhance the use of this medium as a form of scientific communication and also to explore the themes of change across time and space. Scientific themes to be explored include: taxonomy, habitat preservation, climate change; species diversity; survival and reproductive strategies; ecological niches and coevolution, carrying capacity and sustainability, population densities, predation, and predator-prey relationships, open-space management, the physics of photography. Extensive use of field trips and class critique.

*3 units, Aut (Siegel, R)*

#### **MI 104. Innate Immunology**

(Same as IMMUNOL 204, MI 204) Innate immune mechanisms as the only defenses used by the majority of multicellular organisms. Topics include Toll signaling, NK cells, complement, antimicrobial peptides, phagocytes, neuroimmunity, community responses to infection, and the role of native flora in immunity. How microbes induce and defeat innate immune reactions, including examples from vertebrates, invertebrates, and plants.

*3 units, Spr (Staff)*

#### **MI 115B. The Vaccine Revolution**

(Same as HUMBIO 155B) Advanced seminar. Human aspects of viral disease, focusing on recent discoveries in vaccine development and emerging infections. Journal club format: students choose articles from primary scientific literature, write formal summaries, and synthesize them into a literature review. Emphasis is on analysis, experimental design, and interpretation of data. Oral presentations. Enrollment limited to 10. Prerequisites: HUMBIO 155H, MI 155V.

6 units, Aut (Siegel, R)

### MI 116. The Human Virosphere

(Same as MI 216) Focus on interaction of humans and viruses from a number of perspectives: historical, cultural, political, and demographic. Organismal, molecular biological, biochemical, human and viral interactions; clinical aspects of viral disease, epidemiology and risk factors, public and international health, aspects of virology including emerging viruses and biological weapons. Case studies involving particular viruses: human herpes viruses, retroviruses, oncogenic viruses; vaccination and disease eradication, evolution of viruses as tools for research and therapy. Emphasis on general principles of biology and matters of decision making policy. Prerequisite: Biology core, Human Biology core, or consent of instructor.

5 units, not given this year

### MI 155H. Humans and Viruses I

(Same as HUMBIO 155H) Introduction to human virology integrating epidemiology, molecular biology, clinical sciences, social sciences, history, and the arts. Emphasis is on host pathogen interactions and policy issues. Topics: polio and vaccination, smallpox and eradication, yellow fever and history, influenza and genomic diversity, rubella and childhood infections, adenovirus and viral morphology, ebola and emerging infection, lassa fever and immune response.

6 units, Aut (Siegel, R)

### MI 155V. Humans and Viruses II

Introduction to human virology integrating epidemiology, molecular biology, clinical sciences, social sciences, history, and the arts. Emphasis on host pathogen interactions and policy issues. Topics: measles and viral epidemiology, rotavirus and world health, rabies and infections of the brain, HPV and cancer-causing viruses, herpes simplex and viral latency, CMV and viral teratogenesis, retrovirology and endogenous viral sequences, HIV and viral treatment, viral hepatitis and chronic infections, prions and diseases of life style. Prerequisite: MI155H.

6 units, Aut (Staff)

### MI 185. Topics in Microbiology

(Same as MI 285) For advanced undergraduates and graduate students. 1/3rd of the course consists of lectures by the instructor/colleagues. These cover, at an advanced level, with emphasis on bacteria, topics not covered elsewhere, e.g., phylogeny, molecular regulation, and bioenergetics. The remainder of the course involves interactive discussion of a topic of current interest in microbiology, chosen with student participation, and includes student presentations. (The topic last year was: Gene therapy.) Satisfies Central Menu Area 3 for BIO majors. Prerequisites: CHEM 31X, Biology core.

3 units, Win (Mattin, A)

### MI 198. Directed Reading in Microbiology and Immunology

Fields of study are decided in consultation with sponsoring professor. Prerequisite: consent of instructor.

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### MI 199. Undergraduate Research

Investigations sponsored by individual faculty members. Possible fields: microbial molecular biology and physiology, microbial pathogenicity, immunology, virology, and molecular parasitology. Prerequisite: consent of instructor.

1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

## GRADUATE COURSES IN MICROBIOLOGY AND IMMUNOLOGY

Primarily for graduate students; undergraduates may enroll with consent of instructor.

### MI 204. Innate Immunology

(Same as IMMUNOL 204, MI 104) Innate immune mechanisms as the only defenses used by the majority of multicellular organisms. Topics include Toll signaling, NK cells, complement, antimicrobial peptides, phagocytes, neuroimmunity, community responses to infection, and the role of native flora in immunity. How microbes induce and defeat innate immune reactions, including examples from vertebrates, invertebrates, and plants.

3 units, Spr (Staff)

### MI 209. Advanced Pathogenesis of Bacteria, Viruses, and

### Eukaryotic Parasites: Part I

For graduate students and advanced undergraduates; required of first-year graduate students in Microbiology and Immunology. Emphasis is on mechanisms to establish infection in the host and responses of the host to infection. Current literature. Prerequisite: background in biochemistry and molecular biology.

4 units, not given this year

### MI 210. Advanced Pathogenesis of Bacteria, Viruses, and Eukaryotic Parasites

For graduate and medical students, and advanced undergraduates; required of first-year graduate students in Microbiology and Immunology. The molecular mechanisms by which microorganisms invade animal and human hosts, express their genomes, interact with macromolecular pathways in the infected host, and induce disease. Current literature.

4 units, Win (Monack, D)

### MI 211. Advanced Immunology I

(Same as IMMUNOL 201) For graduate students, medical students and advanced undergraduates. Topics include the innate and adaptive immune systems; genetics, structure, and function of immune molecules; lymphocyte activation and regulation of immune responses. Prerequisites: undergraduate course in Immunology and familiarity with experimental approaches in biochemistry, molecular biology, and cell biology.

3 units, Win (Chien, Y)

### MI 215. Principles of Biological Technologies

(Same as IMMUNOL 215) The principles underlying novel as well as commonly utilized techniques to answer biological questions. Lectures and primary literature critiques on topics such as fluorescence microscopy, including applications such as FRET and single-cell analysis; human and murine genetic analysis; FACS; proteomics and analysis of noncoding RNAs. Class participation is emphasized. Prerequisite: biochemistry. Required of first-year graduate students in Microbiology and Immunology and the Immunology program.

3 units, Spr (Staff)

### MI 216. The Human Virosphere

(Same as MI 116) Focus on interaction of humans and viruses from a number of perspectives: historical, cultural, political, and demographic. Organismal, molecular biological, biochemical, human and viral interactions; clinical aspects of viral disease, epidemiology and risk factors, public and international health, aspects of virology including emerging viruses and biological weapons. Case studies involving particular viruses: human herpes viruses, retroviruses, oncogenic viruses; vaccination and disease eradication, evolution of viruses as tools for research and therapy. Emphasis on general principles of biology and matters of decision making policy. Prerequisite: Biology core, Human Biology core, or consent of instructor.

5 units, not given this year

### MI 233. The Biology of Small Modulatory RNAs

(Same as GENE 233, PATH 233) Open to graduate and medical students. Explores recent progress and unsolved questions in the field of RNA interference and microRNA biology. Students are required to read assigned primary literature before each class and actively participate in guided discussions on related technical and conceptual issues during class meetings. Assignments include critiques of assigned papers and developing a novel research proposal.

2 units, alternate years, not given this year

### MI 234. Fundamentals of RNA Biology

(Same as GENE 234, PATH 234) For graduate or medical students and (if space allows) to active participants from other segments of the Stanford Community (e.g., TGR students); undergraduates by instructor consent. Fundamental issues of RNA biology, with the goal of setting a foundation for students to explore the expanding world of RNA-based regulation. Each week a topic is covered by a faculty lecture and journal club presentations by students.

2 units, Aut (Fire, A; Chen, C)

### MI 245. Computational Modeling of Microbial Communities

(Same as BIOE 45) Innovative new sequencing technologies are permitting the generation of massive amounts of sequence data and changing the way we think about and pursue biological questions. Coupled to these opportunities are tremendous challenges for



biologists to grapple with the manipulation and analysis of large datasets and to address quantitative questions on a systems scale. The goal of this course is to provide biologists with basic computational tools and knowledge to confront large datasets in a quantitative manner. Students will learn basic programming skills in Matlab and Perl. Covered material will include: image analysis, bioinformatics algorithms, reaction-diffusion modeling, Monte Carlo algorithms, and population dynamics. Students will apply computational skills to a miniature research project studying the human microbiome or biofuel-related photosynthetic microbial communities. Spr 2012, (Huang, K., Sonnenburg, J., and Vora, T.)  
4 units, Spr (Huang, K.; Sonnenburg, J.; Vora, T)

#### MI 250. Frontiers in Microbiology and Immunology

Required of first- and second-year students in Microbiology and Immunology. How to evaluate biological research. Held in conjunction with the Microbiology and Immunology Friday noon seminar series. Before the seminar, students and faculty discuss one or more papers from the speaker's primary research literature on a related topic. After the seminar, students meet informally with the speaker to discuss their research.

1 unit, Aut (Schneider, D), Win (Schneider, D), Spr (Schneider, D)

#### MI 285. Topics in Microbiology

(Same as MI 185) For advanced undergraduates and graduate students. 1/3rd of the course consists of lectures by the instructor/colleagues. These cover, at an advanced level, with emphasis on bacteria, topics not covered elsewhere, e.g., phylogeny, molecular regulation, and bioenergetics. The remainder of the course involves interactive discussion of a topic of current interest in microbiology, chosen with student participation, and includes student presentations. (The topic last year was: Gene therapy.) Satisfies Central Menu Area 3 for BIO majors. Prerequisites: CHEM 31X, Biology core.

3 units, Win (Matin, A)

#### MI 299. Directed Reading in Microbiology and Immunology

Prerequisite: consent of instructor.

1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

#### MI 370. Medical Scholars Research

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

4-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

#### MI 399. Graduate Research

Students who have completed the necessary foundation courses undertake investigations in general bacteriology, bacterial physiology and ecology, bacterial genetics, microbial pathogenicity, immunology, parasitology, or virology sponsored by individual faculty members. Prerequisite: consent of instructor.

1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

#### MI 801. TGR Master's Project

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

#### MI 802. TGR PhD Dissertation

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

## MODERN THOUGHT AND LITERATURE (MTL) COURSES

### UNDERGRADUATE COURSES IN MODERN THOUGHT AND LITERATURE

Primarily for undergraduates; graduate students may enroll with consent of adviser.

#### MTL 130. Introduction to Environmental Humanities: Cultures of Nature in the American West

(Same as AMSTUD 130) What do we mean when we use the terms nature and culture? This course examines these two complex ideas in the context of the nineteenth, twentieth, and twenty-first century American West. Topics include Los Angeles as a lived space and its place in the national spatial imaginary, urban environmental movements, mining cultures, toxics legacies,

geographies of social difference, animal studies, and biodiversity and Native American DNA databases. The approach is interdisciplinary, and includes environmental history, cultural geography, critical race studies, literature, and documentary film methodologies and texts. GER:DB-Hum

3-5 units, not given this year

### GRADUATE COURSES IN MODERN THOUGHT AND LITERATURE

Primarily for graduate students; undergraduates may enroll with consent of instructor.

#### MTL 210. Critical Theory and The Environment

(Same as AMSTUD 210, ANTHRO 210B) Critical theoretical approaches (such as cultural studies, Marxism, postcolonial theory, cultural geography, feminism, and science studies) have generally been underutilized as methodologies for grappling with environmental situations, yet they hold much promise for addressing their complexity. This course asks: How does critical theory about the environment construe the current situation? What kinds of political or technological solutions do these theories call for or imply? The first half of the seminar introduces critical approaches and methodologies in relation to the environment. In the second section, we will use a variety of theoretical approaches to address Native American environmental politics, water, agriculture, toxics, and animals.

3-5 units, Spr (Koelle, A)

#### MTL 299. Edgework: New Directions in the Study of Culture

Workshop. Required of first-year students in the doctoral program. Methodologies of different disciplines, the possibility and difficulty of interdisciplinary work within these disciplines, and their connection with the individual projects of students in Modern Thought and Literature. May be repeated for credit.

1-3 units, Spr (Moya, P)

#### MTL 334A. Concepts of Modernity 1: Philosophical Foundations

Modernism, modernity the obsessive question (asked since the age that we call 'Renaissance') of what is 'now' will be approached from the perspective of historically changing 'chronotopes' (i.e. 'social constructions of time'). The different ways in which different cultures shape the horizons of past, present, and future determine changing modalities of experience and perception, action and behavior, and they thus offer a complex access to and understanding of cultural institutions and discourses. Works by (among others) Kant, Hume, Baudelaire, Marx, Nietzsche, Apollinaire, Heidegger, Beauvoir, Arendt, Lyotard.

5 units, Aut (Gumbrecht, H)

#### MTL 334B. Concepts of Modernity 2: The Study of Culture in the Age of Globalization

(Same as ENGLISH 334B) A survey of 20th-century theory with focus on the concept of culture and methods of studying it from diverse disciplines including sociology, anthropology, history, literary and cultural studies. Discussions will emphasize modernization, postmodernization and globalization processes in their relations to culture broadly understood, cultures in their regional, national and diasporic manifestations, and cultures as internally differentiated (high and low culture, subcultures, media cultures).

5 units, Win (Moya, P)

#### MTL 390. Qualifying Paper

Preparation and writing of the qualifying paper for the Ph.D. in Modern Thought and Literature. (Staff)

1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

#### MTL 398. Graduate Independent Study

Students pursue a special subject of investigation under supervision of a member of the committee or another faculty member. May be repeated for credit.

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

#### MTL 399. Reading for Orals

Reading in preparation for the University Oral Examination. May be repeated for credit.

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

#### MTL 802. TGR Dissertation

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)



# MOLECULAR AND CELLULAR PHYSIOLOGY (MCP) COURSES

## UNDERGRADUATE COURSES IN MOLECULAR AND CELLULAR PHYSIOLOGY

Primarily for undergraduates; graduate students may enroll with consent of adviser.

### MCP 126. Neurons and Disease

Diseases of the nervous system. First lecture of each week focuses on the clinical, epidemiological and behavioral aspects of a selected disease or syndrome. Second lecture exposes the cell biological, electrophysiological, biochemical and/or molecular biological processes that underlie each disease presented. Instructors maintain some flexibility in the diseases chosen for elucidation, but students can expect those covered to range from the relatively straightforward, for example Multiple Sclerosis (MS) or Amyotrophic Lateral Sclerosis (ALS), to the more complex, for example, Schizophrenia or Obsessive Compulsive Disorder (OCD). 3 units for lecture and discussion only; 4 units includes a paper. Prerequisite: Biology or Human Biology core.

3-4 units, not given this year

### MCP 156. How Cells Work: Energetics, Compartments, and Coupling in Cell Biology

(Same as MCP 256) Open to graduate and medical students, and advanced undergraduates. Dynamic aspects of cell behavior and function, including cellular energetics, homeostasis, heterogeneity of membranes, structure and function of organelles, solute and water transport, signaling and motility. Emphasis is on the principles of how coupling of molecular processes gives rise to essential functions at the cellular level. Mathematical models of cell function. Student presentations.

4 units, alternate years, not given this year

### MCP 199. Undergraduate Research

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

## GRADUATE COURSES IN MOLECULAR AND CELLULAR PHYSIOLOGY

Primarily for graduate students; undergraduates may enroll with consent of instructor.

### MCP 200. Cardiovascular Physiology

Offered jointly with the Department of Medicine. Lectures, small group instruction, clinical presentations, and lab demonstrations of normal and disordered human cardiovascular physiology. Prerequisite: understanding of general biochemistry.

5 units, Spr (Staff)

### MCP 202. Advanced Immunology II

(Same as IMMUNOL 202) Readings of immunological literature. Classic problems and emerging areas based on primary literature. Student and faculty presentations. Prerequisite: IMMUNOL 201/MI 211.

3 units, Spr (Staff)

### MCP 216. Genetic Analysis of Behavior

(Same as NBIO 216) Advanced seminar. Findings and implications of behavioral genetics as applied to invertebrate and vertebrate model systems. Topics include biological clocks, and sensation and central pattern generators. Relevant genetic techniques and historical perspective. Student presentation.

4 units, alternate years, not given this year

### MCP 221. Advanced Cell Biology

(Same as BIO 214, BIOC 224) For Ph.D. students. Current research on cell structure, function, and dynamics. Topics include complex cell phenomena such as cell division, apoptosis, compartmentalization, transport and trafficking, motility and adhesion, differentiation, and multicellularity. Current papers from the primary literature. Prerequisite for advanced undergraduates: BIO 129A,B, and consent of instructor.

2-5 units, Win (Kopito, R; Nachury, M; Straight, A; Pfeffer, S; Theriot, J)

### MCP 222. Imaging: Biological Light Microscopy

(Same as BIO 152) Survey of instruments which use light and other radiation for analysis of cells in biological and medical research. Topics: basic light microscopy through confocal fluorescence and video/digital image processing. Lectures on physical principles; involves partial assembly and extensive use of lab instruments. Lab. Prerequisites: some college physics, Biology core.

3 units, Spr (Lewis, R; Smith, S)

### MCP 232. Advanced Imaging Lab in Biophysics

(Same as APPPHYS 232, BIO 132, BIO 232, BIOPHYS 232) Laboratory and lectures. Advanced microscopy and imaging, emphasizing hands-on experience with state-of-the-art techniques. Students construct and operate working apparatus. Topics include microscope optics, Koehler illumination, contrast-generating mechanisms (bright/dark field, fluorescence, phase contrast, differential interference contrast), and resolution limits. Laboratory topics vary by year, but include single-molecule fluorescence, fluorescence resonance energy transfer, confocal microscopy, two-photon microscopy, and optical trapping. Limited enrollment. Recommended: basic physics, Biology core or equivalent, and consent of instructor.

4 units, Spr (Block, S; Smith, S; Stearns, T; Schnitzer, M)

### MCP 256. How Cells Work: Energetics, Compartments, and Coupling in Cell Biology

(Same as MCP 156) Open to graduate and medical students, and advanced undergraduates. Dynamic aspects of cell behavior and function, including cellular energetics, homeostasis, heterogeneity of membranes, structure and function of organelles, solute and water transport, signaling and motility. Emphasis is on the principles of how coupling of molecular processes gives rise to essential functions at the cellular level. Mathematical models of cell function. Student presentations.

4 units, alternate years, not given this year

### MCP 299. Directed Reading in Molecular and Cellular Physiology

Prerequisite: consent of instructor.

1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### MCP 370. Medical Scholars Research

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

4-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### MCP 399. Graduate Research

Students undertake investigations sponsored by individual faculty members. Research fields include endocrinology, neuroendocrinology, and topics in molecular and cellular physiology. Prerequisite: consent of instructor. (Staff)

1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### MCP 801. TGR Project

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### MCP 802. TGR Dissertation

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

## MUSIC (MUSIC) COURSES

### UNDERGRADUATE COURSES IN MUSIC

Primarily for undergraduates; graduate students may enroll with consent of adviser.

#### MUSIC 1A. Music, Mind, and Human Behavior

An introductory exploration of the question of why music is a pervasive and fundamental aspect of human existence. The class will introduce aspects of music perception and cognition as well as anthropological and cultural considerations. GER:DB-Hum

3 units, not given this year

#### MUSIC 2C. An Introduction to Opera

The lasting appeal of opera as a lavishly hybrid genre from the 1600s to the present. How and why does opera set its stories to

music? What is operatic singing? Who is the audience? How do words, music, voices, movement, and staging collaborate in different operatic eras and cultures? Principal works by Monteverdi, Handel, Mozart, Verdi, Wagner, Strauss, Britten, and Adams. We will also study and attend two works performed by the San Francisco Opera. GER:DB-HUM

3 units, Aut (Grey, T)

#### **MUSIC 5G. Introduction to Guzheng**

Introduction to Chinese music through learning how to play guzheng, a 21-stringed traditional Chinese instrument. The cultural, social, and historical significance of guzheng. 15 guzheng techniques, how to read Chinese music and guzheng notation, and two simple classic guzheng pieces. May be repeated for credit a total of 14 times. (AU)

1 unit, Aut (You, H), Win (You, H), Spr (You, H)

#### **MUSIC 7B. Musical Cultures of the World**

An overview of selected musical cultures from Africa, Asia, Europe, and the Americas. Course objectives: cultivate an appreciation for the diversity of human musical expression; discover how music is used to shape social interactions and systems of meaning; develop active listening skills that can be used when encountering any music; gain a preliminary understanding of ethnomusicological concepts and vocabulary. No musical experience is necessary. Class format: Lecture, discussion, listening, guest performances, musical participation, and a concert analysis. GER:DB-Hum, EC-GlobalCom

3 units, Win (Schultz, A)

#### **MUSIC 8A. Rock, Sex, and Rebellion**

Development of critical listening skills and musical parameters through genres in the history of rock music. Focus is on competing aesthetic tendencies and subcultural forces that shaped the music. Rock's significance in American culture, and the minority communities that have enriched rock's legacy as an expressively diverse form. Lectures, readings, listening, and video screenings. GER:DB-Hum, EC-AmerCul

3 units, Spr (Staff), alternate years, not given next year

#### **MUSIC 10AX. Sound Art**

The course will explore the use of sound as a medium for artistic expression, from recording and manipulating environmental sounds to studio-created and processed sounds and musical instrument recordings. We will study the physics of sound, how sound is perceived, how to record and manipulate sound, and how to combine all of this knowledge into the creation of sound art. Instruction will include using portable sound recorders, using the recording studio, and how to think about sound as a medium of expression. A final project will combine these elements in the creation of a presentation of the works we produce in the class.

2 units, Aut (Kadis, J; Leitman, S)

#### **MUSIC 11N. A View from the Podium: The Art of Conducting**

(F,Sem) Stanford Introductory Seminar. How a conductor interprets music, realizes a personal vision through the rehearsal process, and communicates with orchestra and audience. Conducting as based on human communication skills. How to apply these lessons to other fields of endeavor. GER:DB-Hum

3 units, Aut (Cai, J)

#### **MUSIC 12A. Introductory Piano Class**

(A=level 1; B=level 2; C=level 3)

1 unit, Aut (Zerlang, T), Win (Zerlang, T), Spr (Zerlang, T), Sum (Staff)

#### **MUSIC 12B. Introductory Piano Class**

(A=level 1; B=level 2; C=level 3)

1 unit, Aut (Zerlang, T), Win (Zerlang, T), Spr (Zerlang, T), Sum (Staff)

#### **MUSIC 12C. Introductory Piano Class**

(A=level 1; B=level 2; C=level 3.) May be repeated for credit a total of 14 times.

1 unit, Aut (Zerlang, T), Win (Zerlang, T), Spr (Zerlang, T), Sum (Staff)

#### **MUSIC 12SC. Musical Collisions and Radical Creativity**

The margins of musical culture; nonconformist, maverick, and eccentric creative impulses that expand the definition of art. Laboratory atmosphere and daily rehearsals in which students create collaborative works with a final public concert involving

collaborations with local musicians and presentations of student-composed works created during the course.

2 units, not given this year

#### **MUSIC 13N. South Asian Regional and Popular Music on the Move**

(F,Sem) Stanford Introductory Seminar. Introduction to regional and popular musical styles of India and Pakistan, including Marathi kirtan, Punjabi bhangra, Manganiyar music of Rajasthan, Bhojpuri wedding songs, Tamil drum ensembles, Baul music of Bengal, Sufi qawwali, and Hindi film music, and explores how these musics are woven into the fabric of social life in South Asia and its diaspora. How people perform music to: articulate relationship to the divine; make social commentary; effect political change; bring families together; celebrate rites of passage; and, cope with rapid socio-economic changes. GER:DB-Hum

3 units, Aut (Schultz, A)

#### **MUSIC 13Q. Classical Music and Politics: Western Music in Modern China**

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Social history, cultural studies, China studies, international relations, and music. From the Italian Jesuit, Matteo Ricci who presented a clavichord to the Chinese emperor to the emergence of a modern generation of Chinese musicians. GER:DB-Hum, EC-GlobalCom

3 units, Spr (Cai, J)

#### **MUSIC 15N. The Aesthetics of Data**

(F,Sem) Stanford Introductory Seminar. Focus on visual and auditory display of data, specifically, the importance of aesthetic principles in effective data display, and the creative potential of scientific, biological, environmental and other data as inspiration for artistic expression. GER:DB-Hum

3 units, Win (Berger, J)

#### **MUSIC 16N. Music, Myth, and Modernity: Wagner's Ring Cycle and Tolkien's Lord of the Rings**

(Same as GERLIT 16N) Preference to freshmen. Roots of Wagner's operatic cycle and Tolkien's epic trilogy in a common core of Norse, Germanic, and Anglo-Saxon mythology. The role of musical motive and characterization in Wagner's music dramas and the film version of Tolkien's trilogy. Music as a key element in the psychological, political, and cultural revision of ancient myth in modern opera and film. GER:DB-Hum, EC-GlobalCom

3 units, not given this year

#### **MUSIC 17Q. Perspectives in North American Taiko**

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Taiko, or Japanese drum, is a newcomer to the American music scene. Emergence of the first N. American taiko groups coincided with increased Japanese American activism, and to some it is symbolic of Japanese American identity. N. American taiko is associated with Japanese American Buddhism. Musical, cultural, historical, and political perspectives of taiko. Hands-on drumming. Japanese music and Japanese American history, and relations among performance, cultural expression, community, and identity. GER:DB-Hum, EC-AmerCul

4 units, Win (Sano, S; Uyechi, L)

#### **MUSIC 18A. Jazz History: Ragtime to Bebop, 1900-1940**

From the beginning of jazz to the war years. GER:DB-Hum, EC-AmerCul

3 units, Win (Berry, F)

#### **MUSIC 18B. Jazz History: Bebop to Present, 1940-Present**

Modern jazz styles from Bebop to the current scene. Emphasis is on the significant artists of each style. GER:DB-Hum, EC-AmerCul

3 units, Spr (Berry, F)

#### **MUSIC 19A. Introduction to Music Theory I**

For non-music majors and Music majors or minors unable to pass the proficiency test for entry to MUSIC 21. The fundamentals of music theory and notation, basic sight reading, sight singing, ear training, keyboard harmony; melodic, rhythmic, and harmonic dictation. Skill oriented, using piano and voice as basic tools to develop listening and reading skills. GER:DB-Hum

3 units, Aut (Berger, T)

#### **MUSIC 19B. Intermediate Music Theory**

This course is an introduction to music theory geared toward

students who have basic literacy skills (i.e. fundamental notation, identifying major and minor scales, keys, etc). Using musical materials from repertoire selected from campus and area concerts, and incorporating the opportunity to attend these concerts, the course will introduce elements of harmony, melody, form, orchestration and arrangement. The course is an appropriate successor to Music 19A. Students who successfully complete Music 19B can go on directly to Music 21.

3 units, Spr (Berger, T)

#### **MUSIC 20A. Jazz Theory**

Introduces the language and sounds of jazz through listening, analysis, and compositional exercises. Students apply the fundamentals of music theory to the study of jazz. Prerequisite: 19 or consent of instructor. GER:DB-Hum

3 units, Aut (Nadel, J)

#### **MUSIC 20B. Advanced Jazz Theory**

Approaches to improvisation through listening and transcribing, and developing familiarity with important contributors to this music. Topics: scale theory, altered dominants, and substitute harmony. Prerequisite: 20A or consent of instructor. GER:DB-Hum

3 units, alternate years, not given this year

#### **MUSIC 20C. Jazz Arranging and Composition**

Jazz arranging and composition for small ensembles. Foundation for writing for big band. Prerequisite: 20A or consent of instructor.

3 units, Win (Nadel, J)

#### **MUSIC 21. Elements of Music I**

Preference to majors. Introduction to tonal theory. Practice and analysis. Diatonic harmony focusing on melodic and harmonic organization, functional relationships, voice-leading, and tonal structures. Ear-training and keyboard-harmony skills; analytical methods and listening strategies. Enrollment limited to 40. Prerequisites: (1) Piano Proficiency Exam (must be passed within the first two weeks of the term) or MUSIC 12A (may be taken concurrently); (2) Passing grade on a basic musical skills proficiency examination on the first day of class or MUSIC 19. GER:DB-Hum

4 units, Aut (Aquilanti, G), Win (Berger, T)

#### **MUSIC 22. Elements of Music II**

Preference to majors. Introduction to chromatic harmony focusing on secondary functions, modulations, harmonic sequences, mode mixture, and the Neapolitan, and augmented sixth chords. Analysis of musical forms and harmonizations complemented by harmonic and melodic dictation, sight singing, and other practical skills. Prerequisites: (1) MUSIC 21; (2) Piano Proficiency Exam or MUSIC 12B (may be taken concurrently). GER:DB-Hum

4 units, Win (Aquilanti, G), Spr (Berger, T)

#### **MUSIC 23. Elements of Music III**

Preference to majors. Continuation of chromatic harmony, complex forms, and introduction to early 20th-century techniques. Satisfactory passage of ear-training proficiency exam, part of the course's final, is a requirement for course completion and for continuation in the major sequence. Prerequisites: (1) MUSIC 22; (2) Piano Proficiency Exam or MUSIC 12C (may be taken concurrently). GER:DB-Hum

4 units, Aut (Berger, T), Spr (Ulman, E)

#### **MUSIC 34N. Performing America: The Broadway Musical from Little Johnny Jones to American Idiot**

(F,Sem) Stanford Introductory Seminar. 20th C. musical comedy in dialogue with American culture at large. How themes, characters, stories, and songs of the Broadway musical reflect, and construct, ideas of American identity over the last hundred years. Intersections with jazz, movies, rock, and popular song. Social themes of race, class, gender roles, and sexual identity. Works of Gershwin, Cole Porter, Irving Berlin, Rodgers and Hammerstein, and Lerner and Lowe. Includes opportunities to perform, arrange, direct scenes, as well as to attend one or more local productions. GER:DB-Hum

3-4 units, Spr (Staff)

#### **MUSIC 36N. Humor in Music**

(F,Sem) Stanford Introductory Seminar. Through theoretical readings the course will touch on psychological and neurological bases of humor, explore contingent, tactical, modal, and ontological difficulties in the apprehension of humor, and address

ethical issues surrounding humor in music. In addition to in-class listening and screening sessions, analytic discussions will be led by students who will find and present examples of humor in music. Students will also be invited to compose original humorous song lyrics and to create collaborative works of musical humor. GER:DB-Hum

3 units, Aut (Applebaum, M)

#### **MUSIC 38N. Singing Early Music**

Preference to freshmen. 15th- and 16th-century musical repertoires and their contexts; performance practice. GER:DB-Hum

3 units, not given this year

#### **MUSIC 39N. The Beatles**

Preference to freshmen. The music of the Beatles and their contributions as musical innovators and experimentalists. Their artistic antecedents, subsequent musical influence, and cultural impact; the emergence of the supergroup identity and development of new modes of musical production and collaborative songwriting; notions of commoditization, uniqueness and originality, and the perceived boundary of art and pop; speculations on the exportation and appropriation of an African American cultural legacy. GER:DB-Hum

3 units, not given this year

#### **MUSIC 40. Music History to 1600**

Pre- or corequisite: 21. GER:DB-Hum

4 units, Aut (Sargent, J)

#### **MUSIC 41. Music History 1600-1830**

Pre- or corequisite: 22. GER:DB-Hum

4 units, Win (Hadlock, H)

#### **MUSIC 42. Music History Since 1830**

Pre- or corequisite: 23. GER:DB-Hum

4 units, Spr (Kronengold, C)

#### **MUSIC 65A. Voice Class I**

Group (7 students to a section) beginning voice for the non-major (A = level 1; B = level 2). May be repeated for credit.

1 unit, Aut (Giovannetti, C), Win (Giovannetti, C), Spr (Giovannetti, C), Sum (Staff)

#### **MUSIC 65B. Voice Class II**

Group (7 students to a section) beginning voice for the non-major (A = level 1; B = level 2). May be repeated for credit.

1 unit, Aut (Giovannetti, C), Win (Giovannetti, C), Spr (Giovannetti, C), Sum (Staff)

#### **MUSIC 72A. Intermediate Piano Class**

For intermediate students. May be repeated for credit a total of 14 times. Prerequisites: 12C or equivalent, audition.

1 unit, Aut (Zerlang, T), Win (Zerlang, T), Spr (Zerlang, T), Sum (Staff)

#### **MUSIC 72C. Harpsichord Class**

For beginning harpsichord students who have keyboard skills. May be repeated for credit a total of 14 times.

1 unit, Aut (Thornburgh, E), Win (Thornburgh, E), Spr (Thornburgh, E)

#### **MUSIC 72D. Jazz Piano Class**

By invitation only; priority to majors and jazz-ensemble participants. May be repeated for credit a total of 14 times.

1 unit, Aut (Low, M), Win (Low, M), Spr (Low, M)

#### **MUSIC 73. Intermediate Voice Class**

For intermediate students. Admission by audition. May be repeated for credit a total of 14 times.

1 unit, Aut (Giovannetti, C), Win (Giovannetti, C), Spr (Giovannetti, C)

#### **MUSIC 74C. Classical Guitar Class**

May be repeated for credit a total of 14 times.

1 unit, Aut (Ferguson, C), Win (Ferguson, C), Spr (Ferguson, C)

#### **MUSIC 74D. Harp Class**

May be repeated for credit a total of 14 times.

1 unit, Aut (Chauvel, M), Win (Chauvel, M), Spr (Chauvel, M)

#### **MUSIC 75B. Renaissance Wind Instruments Class**

May be repeated for credit.

1 unit, Aut (Myers, H), Win (Myers, H), Spr (Myers, H)

**MUSIC 76. Brass Instruments Class**

May be repeated for credit a total of 14 times.

*1 unit, Aut (Kenley, M), Win (Kenley, M), Spr (Kenley, M)*

**MUSIC 77. Percussion Class**

May be repeated for credit a total of 14 times.

*1 unit, Aut (Veregge, M), Win (Veregge, M), Spr (Veregge, M)*

**MUSIC 120. Sonification Seminar**

A project-based seminar on the use of sound, and in particular, musical sound, to represent scientific, medical, atmospheric, and other types of data, including time-critical data such as physical motion, and sonification of still and moving images.

*1-3 units, Win (Berger, J)*

**MUSIC 121. Analysis of Tonal Music**

Complete movements, or entire shorter works of the 18th and 19th centuries, are analyzed in a variety of theoretical approaches. Prerequisites: 23 or consent of instructor; and pass the ear-training and piano-proficiency examinations. GER:DB-Hum

*4 units, Win (Ulman, E)*

**MUSIC 122A. Renaissance and Baroque Counterpoint**

Analysis and composition of contrapuntal styles from the Renaissance and Baroque periods. Use of keyboard, ear training, and sight singing underlies all written work. Prerequisites: 23 and successful completion of the ear-training and piano-proficiency examinations. GER:DB-Hum

*4 units, not given this year*

**MUSIC 122B. Harmonic Materials of 19th Century**

Analysis of 19th-century music, with compositional exercises based on 19th-century models. Prerequisites: 23 or consent of instructor; and pass the ear-training and piano-proficiency examinations. GER:DB-Hum

*4 units, Spr (Ulman, E)*

**MUSIC 122C. Introduction to 20th-Century Composition**

Contemporary works, with emphasis on music since 1945. Projects in free composition based on 20th-century models. Prerequisites: 23 or consent of instructor; and pass the ear-training and piano-proficiency examinations. GER:DB-Hum

*4 units, Aut (Ferneyhough, B)*

**MUSIC 123. Undergraduate Seminar in Composition**

Current trends in composition. May be repeated for credit a total of 7 times. Prerequisites: Music major; 23 or consent of instructor. GER:DB-Hum

*3 units, Aut (Kapuscinski, J), Win (Ulman, E)*

**MUSIC 125. Individual Undergraduate Projects in Composition**

May be repeated for credit a total of 14 times. Prerequisites: music major, and one quarter of 123.

*1-3 units, Aut (Staff), Win (Staff), Spr (Staff)*

**MUSIC 126. Introduction to Thoroughbass**

The development of continuo techniques and skills for figured-bass realization. Performance and analysis of selected repertoire, using thoroughbass principles and exercises based on historical theoretical treatises. Prerequisite: 21.

*1-3 units, Win (Berger, T)*

**MUSIC 127. Instrumentation and Orchestration**

Individual instruments, instrumental groups within the orchestra, and combinations of groups. Arrangements from piano to orchestral music. Score analysis with respect to orchestration. Practical exercises using chamber ensembles and school orchestra. Prerequisite: 23. GER:DB-Hum

*3 units, Aut (Aquilanti, G), alternate years, not given next year*

**MUSIC 128. Stanford Laptop Orchestra: Composition, Coding, and Performance**

(Same as CS 170) Classroom instantiation of the Stanford Laptop Orchestra (SLOrk) which includes public performances. An ensemble of more than 20 humans, laptops, controllers, and special speaker arrays designed to provide each computer-mediated instrument with its sonic identity and presence. Topics and activities include issues of composing for laptop orchestras, instrument design, sound synthesis, programming, and live performance. May be repeated four times for credit.

*1-5 units, Spr (Wang, G)*

**MUSIC 130A. Introduction to Conducting**

Baton techniques and rehearsal procedures. The development of coordination of the members of the body involved in conducting; fluency in beat patterns and meters; dynamics, tempi, cueing, and use of the left hand in conducting. Prerequisites: 121 and diagnostic musicianship exam given first day of class; preference to students who have completed 122B.

*3 units, alternate years, not given this year*

**MUSIC 130B. Elementary Orchestral Conducting**

Prerequisites: 127 or previous orchestral performance experience, 130A.

*3 units, alternate years, not given this year*

**MUSIC 130C. Elementary Choral Conducting**

Techniques specific to the conducting of choral ensembles: warm-ups, breathing, balance, blend, choral tone, isolation principles, recitative conducting, preparation, and conducting of choral/orchestral works. Prerequisite: 130A.

*3 units, alternate years, not given this year*

**MUSIC 140. Studies in Medieval Music**

(Same as MUSIC 240) Prerequisites: MUSIC 21, MUSIC 40. (WIM at 4-unit level only.) GER:DB-Hum

*3-4 units, Aut (Mahrt, W)*

**MUSIC 141. Studies in Renaissance Music**

(Same as MUSIC 241) Prerequisites: MUSIC 21, MUSIC 40. (WIM at 4-unit level only.) GER:DB-Hum

*2-4 units, alternate years, not given this year*

**MUSIC 142. Studies in Baroque Music**

(Same as MUSIC 242) Prerequisites: MUSIC 22, MUSIC 41. (WIM at 4-unit level only.) GER:DB-Hum

*3-4 units, alternate years, not given this year*

**MUSIC 143. Studies in Classic Music**

(Same as MUSIC 243) Prerequisites: MUSIC 22, MUSIC 41. (WIM at 4-unit level only.) GER:DB-Hum

*3-4 units, alternate years, not given this year*

**MUSIC 144. Studies in Romantic Music**

(Same as MUSIC 244) Prerequisites: MUSIC 23, MUSIC 42. (WIM at 4-unit level only.) GER:DB-Hum

*3-4 units, Win (Grey, T)*

**MUSIC 145. Studies in Modern Music**

(Same as MUSIC 245) Prerequisites: MUSIC 23, MUSIC 42. (WIM at 4-unit level only.) GER:DB-Hum

*3-4 units, not given this year*

**MUSIC 146. Music and Urban Film**

(Same as MUSIC 246) How music and sound work in urban cinema. What happens when music's capacity to transform everyday reality combines with the realism of urban films? Provides an introduction to traditional theories of film music and film sound; considers how new technologies and practices have changed the roles of music in film. Readings discuss film music, realistic cinema, urban musical practices and urban culture. Viewing includes action/adventure, Hindi film, documentary, film noir, hip hop film, the musical, and borderline cases by Jean-Luc Godard, Spike Lee, Wong Kar-Wai and Tsai Ming-Liang. Pre- or corequisite (for music majors): MUSIC 22. (WIM at 4 unit level only.) GER:DB-Hum, EC-GlobalCom

*3-4 units, Spr (Kronengold, C)*

**MUSIC 147. The Soul Tradition in African American Music**

(Same as MUSIC 247) The African American tradition of soul music from its origins in blues, gospel, and jazz to its influence on today's r&b, hip hop, and dance music. Style such as rhythm and blues, Motown, Southern soul, funk, Philadelphia soul, disco, Chicago house, Detroit techno, trip hop, and neo-soul. Soul's cultural influence and global reach; its interaction with politics, gender, place, technology, and the economy. Pre-/corequisite (for music majors): MUSIC 22. (WIM at 4 units only.) GER:DB-Hum, EC-AmerCul

*3-4 units, not given this year*

**MUSIC 147A. Music Ethnography of the Bay Area**

(Same as MUSIC 247A) An introduction to music ethnography through student research on musical life in the Bay Area. Focus is on the intersections of music, social life, and cultural practice by engaging with people as they perform music and culture in situ. Techniques taught include participant-observation, interviewing

and oral history, writing fieldnotes, recording, transcription, analysis, and ethnographic writing. Pre-/corequisite (for music majors): MUSIC 22. (WIM at 4- or 5-unit level only.) GER:DB-Hum

3-5 units, *Spr* (Schultz, A)

**MUSIC 148. Musical Shakespeare: Theater, Song, Opera, and Film**

(Same as MUSIC 248) The role of music in productions, adaptations, and interpretations of Shakespeare's plays as theater, opera, and film from the Elizabethan era through the present. Emphasis is on the role of songs, stage music, and music in operatic and film adaptations. Incidental music, orchestral tone poems, and art-song settings of lyrics from the plays. Plays include *Romeo and Juliet*, *Othello*, *Macbeth*, *Hamlet*, *The Tempest*, *Midsummer Night's Dream*, and *Twelfth Night*. Pre-/corequisite (for music majors): MUSIC 22. (WIM at 4- or 5-unit level only.) GER:DB-Hum

3-5 units, *not given this year*

**MUSIC 149. Reactions to the Record: Early Recordings, Lost Styles, and Music's Future**

(Same as MUSIC 249) Seminar. The transformation of musical style, audience expectations, the composer-performer relationship, and the musical score from the late 1800s to the present. Sources include: recordings from Stanford's Archive of Recorded Sound; recordings of (Brahms, Debussy, Rachmaninoff, Saint-Saëns, Prokofiev, Bartók; concert programs; interviews; and reviews. Readings include Hamilton's *After the Golden Age* and Philip's *Performing Music in the Age of Recording*. Emphasis is on voice, strings, piano, chamber music, and orchestra. Guest residencies in conjunction with April 2012 symposium; see <http://music.stanford.edu/Events/StanfordMusicSymposium/>. May be repeated for credit. Pre-/corequisite (for music majors): MUSIC 22. (WIM at 4-unit level only.) GER:DB-Hum

3-4 units, *Aut* (Barth, G; Arul, K)

**MUSIC 150. Musical Acoustics**

The physics of vibrating systems, waves, and wave motion. Time- and frequency-domain analysis of sound. Room acoustics, reverberation, and spatialization. The acoustics of musical instruments: voice, strings, and winds. Emphasis is on the practical aspects of acoustics in making music. Hands-on and computer-based lab. See <http://ccrma.stanford.edu/courses/150/>. Prerequisites: music performance/composition experience, basic algebra, calculus, and physics. GER:DB-EngrAppSci

3 units, *Win* (Rossing, T)

**MUSIC 150G. Wagnerian Echos: A Cultural History from Modernism to Popular Culture**

(Same as GERGEN 161) The afterlives of mythological themes from the operas and music dramas of Richard Wagner (*The Flying Dutchman*, *Tannhäuser*, *Lohengrin*, *Ring Cycle*, *Parsifal*) in literature, modernist aesthetics, fascist politics, film, philosophy, and contemporary media. GER:DB-Hum

3-5 units, *not given this year*

**MUSIC 154. Composition and Performance of Instrumental Music with Electronics**

Aesthetic and analytical issues from the pioneers of *Musique Concrète* to the electro of the 2000's. Electroacoustic scholarship over the past 60 years discussing problems and development of the genre. Emphasis on listening, writing, tools development, space, serendipity, concert ritual, interdisciplinarity, relationship with other styles of music, gesture, and sound/image. Considered composers include: Schaeffer, Henry, Varese, Xenakis, Stockhausen, Messiaen, Boulez, Ferrari, Risset, Berio, Chowning, Parmegiani, Bayle, Chion, Dhomont. Focus on one or a few works leading to a public performance at the end of the quarter. Prerequisite: experience in analysis of contemporary music and in electronic music. May be repeated for credit once.

1-5 units, *not given this year*

**MUSIC 155. INTERMEDIA WORKSHOP**

(Same as ARTSTUDI 239, MUSIC 255) Students develop and produce intermedia works. Musical and visual approaches to the conceptualization and shaping of time-based art. Exploration of sound and image relationship. Study of a wide spectrum of audiovisual practices including experimental animation, video art, dance, performance, non-narrative forms, interactive art and

installation art. Focus on works that use music/sound and image as equal partners. Limited enrollment. Prerequisites: consent of instructors, and one of FILMPROD 114, ARTSTUDI 131, 138, 167, 177, 179, or MUSIC 123, or equivalent.

3-4 units, *Win* (DeMarinis, P; Kapuscinski, J)

**MUSIC 156. sic: Improvisation Collective**

Small ensemble devoted to learning trans-idiomatic improvisation techniques and composing indeterminate pieces in a workshop setting. One major concert. Prerequisite: access to an instrument and successful small group audition during the prior quarter. Improvisational experience and conventional instrumental virtuosity not required. May be repeated for credit for a total of 3 times.

1 unit, *Win* (Applebaum, M)

**MUSIC 157. Introduction to Mariachi Ensemble**

Introduction to the practice of mariachi music, tradition, and history. Focus is on learning traditional *sones*, *rancheras*, *huapangos*, and *boleros*. Requirements: ability to play and access to instruments (violin, trumpet, guitar, *vihuela*, and *guitarrón*). May be repeated for credit.

1 unit, *Aut* (Clark, J), *Win* (Clark, J), *Spr* (Clark, J)

**MUSIC 158. Soundwire Ensemble**

Stanford's Internet2-based Soundwire Ensemble rehearses with the East Coast Tintinnabulate Ensemble directed by Pauline Oliveros, Rensselaer Polytechnic Institute. Concerts, composition, and improvisation projects using resources available when connecting with remote musicians. State-of-the-art audio and video technology developed by ensemble participants. May be repeated for credit.

2-3 units, *not given this year*

**MUSIC 159. Early Music Singers**

Small choir specializing in Medieval, Renaissance, and early Baroque vocal music. One major concert per quarter. May be repeated for credit for a total of 14 times.

1 unit, *Aut* (Mahrt, W), *Win* (Mahrt, W), *Spr* (Mahrt, W)

**MUSIC 160. Stanford Symphony Orchestra**

70- to 100-member ensemble performing major orchestral works; minimum one concert per quarter. May be repeated for credit a total of 14 times.

1 unit, *Aut* (Cai, J), *Win* (Cai, J), *Spr* (Cai, J)

**MUSIC 160A. Stanford Philharmonia Orchestra**

Prerequisite: audition, one year of 160, or consent of instructor. May be repeated for credit.

1 unit, *Aut* (Cai, J), *Win* (Cai, J), *Spr* (Cai, J)

**MUSIC 160B. Stanford New Ensemble**

Performing compositions of the 20th century, recent works of this century, and new works by Stanford faculty and student composers. Musicians collaborate with composers and artists visiting and performing at Stanford. One concert per quarter. May be repeated for credit.

1 unit, *Aut* (Cai, J), *Win* (Cai, J), *Spr* (Cai, J)

**MUSIC 160S. Summer Orchestra**

50- to 100-member ensemble performing major orchestral works. Auditions on June 24-26. First rehearsal on June 28th. Program: Tchaikovsky's *Serenade for Strings Op.48*, Piazzolla's *Tangazo*, and Brahms *Symphony no.1*. Concert: Friday, July 15th 8:00PM. See <http://music.stanford.edu/Ensembles/SummerSSO.html> for additional information. Questions: Contact Martín Fraile, music director and conductor at: <mailto:mfraile@stanford.edu>. May be repeated for credit.

1 unit, *Sum* (Staff)

**MUSIC 161A. Stanford Wind Ensemble**

40- to 50-member ensemble performing transcriptions of symphonic music, brass band music, and repertoire composed specifically for symphonic band. One concert per quarter. May be repeated for credit a total of 14 times.

1 unit, *Aut* (Aquilanti, G), *Win* (Aquilanti, G), *Spr* (Aquilanti, G)

**MUSIC 161B. Jazz Orchestra**

Big band format. Repertoire drawn primarily from the contemporary jazz-ensemble literature. One formal concert per quarter. May be repeated for credit a total of 14 times.

1 unit, *Aut* (Berry, F), *Win* (Berry, F), *Spr* (Berry, F)

**MUSIC 161C. Red Vest Band**

A small ensemble of the Leland Stanford Junior University Marching Band open to members of the LSJUMB by audition and consent of instructor. Members perform at all men's and women's home basketball games and travel to some away and post-season games. Twice-weekly rehearsals focus on introduction of new student arrangements and the LSJUMB's repertoire of rock, funk, and traditional styles. May be repeated for credit a total of 7 times.

*1 unit, Win (Aquilanti, G), Spr (Aquilanti, G)*

**MUSIC 161D. Stanford Brass Ensemble**

Performance of works for full brass choir and for smaller ensembles of brass instruments. Once weekly rehearsals. May be repeated for credit. Prerequisite: audition and consent of instructor.

*1 unit, Aut (Kenley, M), Win (Kenley, M), Spr (Kenley, M)*

**MUSIC 162. Symphonic Chorus**

180- to 200-voice choral ensemble, performing major choral masterworks with orchestra. One concert per quarter. May be repeated for credit a total of 14 times.

*1 unit, Aut (Sano, S), Win (Sano, S), Spr (Sano, S)*

**MUSIC 163. Memorial Church Choir**

Official choir of Memorial Church, furnishing music for Sunday services and special occasions in the church calendar. May be repeated for credit a total of 14 times.

*1 unit, Aut (Morgan, R), Win (Morgan, R), Spr (Morgan, R)*

**MUSIC 165. Chamber Chorale**

Select 24-voice choral ensemble, specializing in virtuoso choral repertoire from all periods of Western art music. Annual touring commitment required. May be repeated for credit a total of 14 times.

*1 unit, Aut (Sano, S), Win (Sano, S), Spr (Sano, S)*

**MUSIC 167. University Singers**

Select, 50-voice choral ensemble, performing choral repertoire from all periods of Western art music. May be repeated for credit a total of 14 times.

*1 unit, Aut (Morgan, R), Win (Morgan, R), Spr (Morgan, R)*

**MUSIC 167S. Summer Chorus**

80- to 100-voice non-auditioned ensemble, performing major choral masterworks and choral repertoire from all periods of Western art music.

*1 unit, Sum (Staff)*

**MUSIC 169. Stanford Taiko**

Select 15- to 18-member North American taiko ensemble, performing all-original repertoire for Japanese drums. Multiple performances in Winter and Spring quarters, also touring; instrument construction and maintenance. Admission by audition in Autumn Quarter only. May be repeated for credit a total of 14 times.

*1 unit, Aut (Sano, S; Uyechi, L), Win (Sano, S; Uyechi, L), Spr (Sano, S; Uyechi, L)*

**MUSIC 170. Collaborative Piano**

Performance class in a workshop setting. Techniques of collaboration with vocalists and instrumentalists in repertoire ranging from songs and arias to sonatas and concertos. Prerequisite: private-lesson proficiency level in piano, or consent of instructor.

*1 unit, Aut (Dahl, L)*

**MUSIC 171. Chamber Music**

Audition required. Weekly one-hour coachings from Music department faculty. Classical string quartets and piano/string groups are supervised by the St. Lawrence String Quartet and require attendance at a weekly Wednesday 4:15 p.m. master class. May be repeated for credit.

*1 unit, Aut (Staff), Win (Staff), Spr (Staff)*

**MUSIC 172A. Piano**

Private lessons and group master class weekly. May be repeated for credit a total of 14 times.

*1-3 units, Aut (Barth, G), Win (Barth, G), Spr (Barth, G)*

**MUSIC 172B. Organ**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Morgan, R), Win (Morgan, R), Spr (Morgan, R)*

**MUSIC 172C. Harpsichord**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Thornburgh, E), Win (Thornburgh, E), Spr (Thornburgh, E)*

**MUSIC 172D. Jazz Piano**

By invitation only; priority to majors and jazz-ensemble participants. May be repeated for credit a total of 14 times.

*1-3 units, Aut (Low, M), Win (Low, M), Spr (Low, M)*

**MUSIC 172E. Fortepiano**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Barth, G), Win (Barth, G), Spr (Barth, G)*

**MUSIC 172F. Carillon**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Zerlang, T), Win (Zerlang, T), Spr (Zerlang, T)*

**MUSIC 173. Voice**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Giovannetti, C), Win (Giovannetti, C), Spr (Giovannetti, C)*

**MUSIC 174A. Violin**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Staff), Win (Staff), Spr (Staff)*

**MUSIC 174B. Viola**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Robertson, L), Win (Robertson, L), Spr (Robertson, L)*

**MUSIC 174C. Violoncello**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Harrison, S), Win (Harrison, S), Spr (Harrison, S)*

**MUSIC 174D. Contrabass**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Moyer, B), Win (Moyer, B), Spr (Moyer, B)*

**MUSIC 174E. Viola Da Gamba**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Dornenburg, J), Win (Dornenburg, J), Spr (Dornenburg, J)*

**MUSIC 174F. Classical Guitar**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Ferguson, C), Win (Ferguson, C), Spr (Ferguson, C)*

**MUSIC 174G. Harp**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Chauvel, M), Win (Chauvel, M), Spr (Chauvel, M)*

**MUSIC 174H. Baroque Violin**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Martin, A), Win (Martin, A), Spr (Martin, A)*

**MUSIC 174I. Jazz Bass**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (McCain, J), Win (McCain, J), Spr (McCain, J)*

**MUSIC 174J. Jazz Guitar**

Individual lessons in jazz guitar.

*1-3 units, Aut (Vandivier, R), Win (Vandivier, R), Spr (Vandivier, R)*

**MUSIC 175A. Flute**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Hawley, A), Win (Hawley, A), Spr (Hawley, A)*

**MUSIC 175B. Oboe**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Mitchell, P), Win (Matheson, J), Spr (Matheson, J)*

**MUSIC 175C. Clarinet**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Brandenburg, M), Win (Brandenburg, M), Spr (Brandenburg, M)*

**MUSIC 175D. Bassoon**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Olivier, R), Win (Olivier, R), Spr (Olivier, R)*

**MUSIC 175E. Recorder/Renaissance Wind Instruments**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Myers, H), Win (Myers, H), Spr (Myers, H)*

**MUSIC 175F. Saxophone**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (McCarthy, C), Win (McCarthy, C), Spr (McCarthy, C)*

**MUSIC 175G. Baroque Flute**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Staff), Win (Staff), Spr (Staff)*

**MUSIC 176A. French Horn**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Ragent, L), Win (Ragent, L), Spr (Ragent, L)*

**MUSIC 176B. Trumpet**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Johnson-Hamilton, J), Win (Johnson-Hamilton, J), Spr (Johnson-Hamilton, J)*

**MUSIC 176C. Trombone**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Kenley, M), Win (Kenley, M), Spr (Kenley, M)*

**MUSIC 176D. Tuba**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Clements, A), Win (Clements, A), Spr (Clements, A)*

**MUSIC 177. Percussion**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Veregge, M), Win (Veregge, M), Spr (Veregge, M)*

**MUSIC 182. Diction for Singers**

The international phonetic alphabet and its application to German, French, and Italian vocal literature. Open also to pianists interested in vocal coaching and choral conducting.

*1 unit, Win (Dahl, L)*

**MUSIC 183A. German Art Song Interpretation**

By audition only. For advanced singers and pianists as partners. Performance class in a workshop setting. Composers include Beethoven, Schubert, Wolf and Strauss. May be repeated for credit a total of 2 times. Enrollment limit: 20 (ten singers maximum). Prerequisite: consent of instructor. Recommended prerequisite: 170 (pianists) or 182 (singers).

*1 unit, Spr (Dahl, L)*

**MUSIC 183B. French Art Song Interpretation**

By audition only. For advanced singers and pianists as partners. Performance class in a workshop setting. Composers include Fauré, Debussy, Ravel and Poulenc. May be repeated for credit a total of 2 times. Enrollment limit: 20 (ten singers maximum). Prerequisite: consent of instructor. Recommended prerequisite: 170 (pianists) or 182 (singers).

*1 unit, alternate years, not given this year*

**MUSIC 184. Vocal Repertory Workshop**

This course is a practical workshop in vocal repertoire. Each quarter, offering emphasizes a specific genre or period, therefore the course can be repeated with permission of the instructor. In addition to broadening the student's knowledge of vocal repertoire, the following skills are developed: text preparation, foreign language translation and diction; historically informed performance practice; editorial practice through comparison or preparation; rehearsal for performance and/or recording. Prerequisite: vocal or instrumental instruction, as the class is open to singers or collaborative artists.

*1-3 units, Aut (Catsalis, M), Win (Catsalis, M), Spr (Catsalis, M)*

**MUSIC 192A. Foundations of Sound-Recording Technology**

For upper division undergraduates and graduate students; preference given to Music majors with MST specialization. Topics: elementary electronics; the physics of sound transduction and microphone operation, selection, and placement; mixing consoles; connectors and device interconnection; grounding and shielding; principles of analog magnetic recording; operation maintenance of recording equipment; and principles of recording engineering. Enrollment limited. Prerequisites: MUSIC 150, algebra, physics basics, and consent of instructor. GER:DB-EngrAppSci

*3 units, Aut (Kadis, J)*

**MUSIC 192B. Advanced Sound Recording Technology**

Topics: noise reduction techniques; dynamics and time-delay audio effects; the principles of digital audio; disk- and tape-based digital recorders; digital audio workstations and editing; advanced multitrack techniques; SMPTE and MIDI time code and device synchronization; MIDI sequencing and synchronization. See <http://ccrma.stanford.edu/courses/>. Prerequisite: 192A. GER:DB-EngrAppSci, DB-Hum

*3 units, Win (Kadis, J)*

**MUSIC 192C. Session Recording**

Independent engineering of recording sessions. May be repeated for credit a total of 14 times. Prerequisites: 192A,B.

*1-2 units, Aut (Kadis, J), Win (Kadis, J), Spr (Kadis, J)*

**MUSIC 197. Undergraduate Teaching Apprenticeship**

Work in an apprentice-like relationship with faculty teaching a student-initiated course. Prerequisite: consent of instructor. (Staff)

*1-2 units, Aut (Staff), Win (Sano, S), Spr (Sano, S)*

**MUSIC 198. Concentrations Project**

For concentration program participants only. Must be taken in senior year. Multiple concentrators may enroll in one section of 198 per concentration.

*4 units, Aut (Staff), Win (Staff), Spr (Staff)*

**MUSIC 199. Independent Study**

For advanced undergraduates and graduate students who wish to do work outside the regular curriculum. Before registering, student must present specific project and enlist a faculty sponsor. May be repeated for credit a total of 14 times.

*1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**MUSIC 201. CCRMA Colloquium**

Weekly review of work being done in the field, research taking place at CCRMA, and tools to make the most of the CCRMA technical facilities.

*1 unit, Aut (Leitman, S; Wilkerson, C)*

**MUSIC 222. Sound in Space**

Historical background, techniques and theory on the use of space in music composition and diffusion. Listening and analysis of relevant pieces. Experimental work in spatialization techniques leading to short studies to be diffused in concert at the end of the quarter.

*1-4 units, not given this year*

**MUSIC 251. Psychophysics and Music Cognition**

Lecture, lab and experiment-based course in perception, psychoacoustics, cognition, and neuroscience of music. (WIM at 4 or 5 units only.) GER:DB-Hum

*1-5 units, Spr (Staff)*

**MUSIC 252. Music Notation Software: An Introduction**

Learn to use music notation programs Finale®, Sibelius® and open-source alternatives.

*1-2 units, alternate years, not given this year*

**GRADUATE COURSES IN MUSIC**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**MUSIC 200. Graduate Proseminar**

Required of first-year graduate students in music. Introduction to research in music, bibliographical materials, major issues in the field, philosophy, and methods in music history. Guest lecturers and individual research topics.

*3-4 units, Aut (Hadlock, H; McBride, J)*

**MUSIC 220A. Fundamentals of Computer-Generated Sound**

Techniques for digital sound synthesis, effects, and reverberation. Topics: summary of digital synthesis techniques (additive, subtractive, nonlinear, wavetable, spectral-modeling, and physical-modeling); digital effects algorithms (phasing, flanging, chorus, pitch-shifting, and vocoding); and techniques for digital reverberation. Majors (undergraduate or graduate) must take for 4 units. See <http://ccrma.stanford.edu/>.

*2-4 units, Aut (Chafe, C)*

**MUSIC 220B. Compositional Algorithms, Psychoacoustics, and Computational Music**

The use of high-level programming language as a compositional aid in creating musical structures. Advanced study of sound



synthesis techniques. Simulation of a reverberant space and control of the position of sound within the space. See <http://ccrma.stanford.edu/>. Prerequisite: 220A.

2-4 units, *Win (Wang, G)*

**MUSIC 220C. Research Seminar in Computer-Generated Music**

Individual projects in composition, psychoacoustics, or signal processing. See <http://ccrma.stanford.edu/>. May be repeated for credit. Prerequisite: 220B.

2-4 units, *Spr (Chafe, C)*

**MUSIC 220D. Research in Computer-Generated Music**

Independent research projects in composition, psychoacoustics, or signal processing. See <http://ccrma.stanford.edu/>. May be repeated for credit. Prerequisite: 220C.

1-10 units, *Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**MUSIC 221. Topics in the History of Theory**

The intersection of music theory and compositional practice in different eras of Western music history. Primary sources in music theory and issues such as notation, rhythm, mode, dissonance treatment, counterpoint, tonality, form, rhetoric, affect and imitation, expression, linear analysis, 12-tone and set theory, in light of relevant repertoire and modern scholarship. May be repeated for credit a total of 5 times.

3-5 units, *Win (Kronengold, C), not given next year*

**MUSIC 223. Composition for Electronic Musicians**

Composition for any combination of acoustic and electroacoustic instrumentation, computer-generated sound, invented instruments, sound-sculptures, and multi-disciplinary elements including theater and visual media. Project-based laboratory to advance original student works, supported by lectures on the fundamentals of composition. Concert performance of final works. Taught at CCRMA with a focus on engendering deliberate conversation on the enrichment of a cultural context for new media. Open to undergraduates and graduates.

1-4 units, *Spr (Applebaum, M)*

**MUSIC 230. Advanced Orchestral Conducting**

May be repeated for credit a total of 8 times. Prerequisite: 130B.

2-4 units, *Aut (Cai, J), Win (Cai, J), Spr (Cai, J)*

**MUSIC 231. Advanced Choral Conducting**

Individual instruction continuing trajectory of Music 130C. Focus on gestural technique and analysis of works by genre and historical period. May be repeated for credit a total of 8 times. Prerequisite: 130C.

2-4 units, *Aut (Sano, S), Win (Sano, S), Spr (Sano, S)*

**MUSIC 240. Studies in Medieval Music**

(Same as MUSIC 140) Prerequisites: MUSIC 21, MUSIC 40. (WIM at 4-unit level only.)

3-4 units, *Aut (Mahrt, W)*

**MUSIC 241. Studies in Renaissance Music**

(Same as MUSIC 141) Prerequisites: MUSIC 21, MUSIC 40. (WIM at 4-unit level only.)

2-4 units, *alternate years, not given this year*

**MUSIC 242. Studies in Baroque Music**

(Same as MUSIC 142) Prerequisites: MUSIC 22, MUSIC 41. (WIM at 4-unit level only.)

3-4 units, *alternate years, not given this year*

**MUSIC 243. Studies in Classic Music**

(Same as MUSIC 143) Prerequisites: MUSIC 22, MUSIC 41. (WIM at 4-unit level only.)

3-4 units, *alternate years, not given this year*

**MUSIC 244. Studies in Romantic Music**

(Same as MUSIC 144) Prerequisites: MUSIC 23, MUSIC 42 (WIM at 4-unit level only.)

3-4 units, *Win (Grey, T)*

**MUSIC 245. Studies in Modern Music**

(Same as MUSIC 145) Prerequisites: MUSIC 23, MUSIC 42. (WIM at 4-unit level only.)

3-4 units, *not given this year*

**MUSIC 246. Music and Urban Film**

(Same as MUSIC 146) How music and sound work in urban cinema. What happens when music's capacity to transform everyday reality combines with the realism of urban films?

Provides an introduction to traditional theories of film music and film sound; considers how new technologies and practices have changed the roles of music in film. Readings discuss film music, realistic cinema, urban musical practices and urban culture. Viewing includes action/adventure, Hindi film, documentary, film noir, hip hop film, the musical, and borderline cases by Jean-Luc Godard, Spike Lee, Wong Kar-Wai and Tsai Ming-Liang. Pre- or corequisite (for music majors): MUSIC 22. (WIM at 4 unit level only.)

3-4 units, *Spr (Kronengold, C)*

**MUSIC 247. The Soul Tradition in African American Music**

(Same as MUSIC 147) The African American tradition of soul music from its origins in blues, gospel, and jazz to its influence on today's r&b, hip hop, and dance music. Style such as rhythm and blues, Motown, Southern soul, funk, Philadelphia soul, disco, Chicago house, Detroit techno, trip hop, and neo-soul. Soul's cultural influence and global reach; its interaction with politics, gender, place, technology, and the economy. Pre-/corequisite (for music majors): MUSIC 22. (WIM at 4 units only.)

3-4 units, *not given this year*

**MUSIC 247A. Music Ethnography of the Bay Area**

(Same as MUSIC 147A) An introduction to music ethnography through student research on musical life in the Bay Area. Focus is on the intersections of music, social life, and cultural practice by engaging with people as they perform music and culture in situ. Techniques taught include participant-observation, interviewing and oral history, writing fieldnotes, recording, transcription, analysis, and ethnographic writing. Pre-/corequisite (for music majors): MUSIC 22. (WIM at 4- or 5-unit level only.)

3-5 units, *Spr (Schultz, A)*

**MUSIC 248. Musical Shakespeare: Theater, Song, Opera, and Film**

(Same as MUSIC 148) The role of music in productions, adaptations, and interpretations of Shakespeare's plays as theater, opera, and film from the Elizabethan era through the present. Emphasis is on the role of songs, stage music, and music in operatic and film adaptations. Incidental music, orchestral tone poems, and art-song settings of lyrics from the plays. Plays include Romeo and Juliet, Othello, Macbeth, Hamlet, The Tempest, Midsummer Night's Dream, and Twelfth Night. Pre-/corequisite (for music majors): MUSIC 22. (WIM at 4- or 5-unit level only.)

3-5 units, *not given this year*

**MUSIC 249. Reactions to the Record: Early Recordings, Lost Styles, and Music's Future**

(Same as MUSIC 149) Seminar. The transformation of musical style, audience expectations, the composer-performer relationship, and the musical score from the late 1800s to the present. Sources include: recordings from Stanford's Archive of Recorded Sound; recordings of (Brahms, Debussy, Rachmaninoff, Saint-Saëns, Prokofiev, Bartók; concert programs; interviews; and reviews. Readings include Hamilton's *After the Golden Age* and Philip's *Performing Music in the Age of Recording*. Emphasis is on voice, strings, piano, chamber music, and orchestra. Guest residencies in conjunction with April 2012 symposium; see <http://music.stanford.edu/Events/StanfordMusicSymposium/>. May be repeated for credit. Pre-/corequisite (for music majors): MUSIC 22. (WIM at 4-unit level only.)

3-4 units, *Aut (Barth, G; Arul, K)*

**MUSIC 250A. HCI Theory and Practice**

HCI issues as they relate to music applications in composition and performance. Project-oriented, examining issues from the technical and theoretical perspectives of computer science, haptics, and music theory. See <http://ccrma.stanford.edu/>.

3-4 units, *Aut (Ju, W; Berdahl, E)*

**MUSIC 250B. HCI Performance Systems**

Continuation of 250A, concentrating on interactive computer-music performance systems. See <http://ccrma.stanford.edu/courses/250b/>. Prerequisite: 250A.

1-4 units, *alternate years, not given this year*

**MUSIC 253. Music Notation and Representation Software**

Focus on symbolic data for music applications including advanced notation systems, optical music recognition, musical data conversion, and internal structure of MIDI files.

2-4 units, *alternate years, not given this year*



**MUSIC 254. Symbolic Music Analysis and Retrieval**

Leveraging off three synchronized sets of symbolic data resources for notation and analysis, the lab portion introduces students to the open-source Humdrum Toolkit for music representation and analysis. Issues of data content and quality as well as methods of information retrieval, visualization, and summarization are considered in class. Grading based primarily on student projects. Prerequisite: 253 or consent of instructor.

2-4 units, alternate years, not given this year

**MUSIC 255. INTERMEDIA WORKSHOP**

(Same as ARTSTUDI 239, MUSIC 155) Students develop and produce intermedia works. Musical and visual approaches to the conceptualisation and shaping of time-based art. Exploration of sound and image relationship. Study of a wide spectrum of audiovisual practices including experimental animation, video art, dance, performance, non-narrative forms, interactive art and installation art. Focus on works that use music/sound and image as equal partners. Limited enrollment. Prerequisites: consent of instructors, and one of FILMPROD 114, ARTSTUDI 131, 138, 167, 177, 179, or MUSIC 123, or equivalent.

3-4 units, Win (DeMarinis, P; Kapuscinski, J)

**MUSIC 256A. Music, Computing, and Design I: Software Paradigms for Computer Music**

(Same as CS 476A) Software design and implementation for computer audio. Strategies, best practices, and tradeoffs in building audio software systems of various sizes (S, M, L, XL), with a focus on interactive (real-time) systems. Lectures examine high-level designs as well as dissect code in a hands-on manner. Course work includes small programming assignments and a final software project. This course is the prerequisite for MUSIC 256B. Prerequisite: experience in C/C++ and/or Java.

1-4 units, Aut (Wang, G)

**MUSIC 256B. Music, Computing, Design II: Mobil Music**

(Same as CS 476B) Aesthetic, design, and implementation of mobile music, centered around the modern super smartphones such as the iPhone). Similarities and intrinsic differences between mobile and traditional computing and design for music. Topics include mobile software design, social and cloud computing, mobile interface design, and programming phones, in the service of music. Prerequisite: MUSIC 256A.

1-4 units, Win (Wang, G)

**MUSIC 260. Music of South Asia**

Focuses on the history, theory, and practice of South Asian music with particular emphasis on the classical traditions of North and South India. Also addresses regional folk, popular, and devotional musical styles of India, Pakistan, and Afghanistan. Topics include: raga, tala, vocal and instrumental genres, improvisation, aesthetics, music transmission, musical nationalism, social organization of musicians, music and ritual, music and gender, and technology. Lecture with discussion, some singing (no experience necessary), guest performances, reading, listening, and analysis.

3-4 units, not given this year

**MUSIC 269. Research in Performance Practices**

Directed reading and research. May be repeated for credit a total of 5 times.

1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**MUSIC 272A. Advanced Piano**

Private lessons and group masterclass weekly. May be repeated for credit a total of 14 times.

1-3 units, Aut (Barth, G), Win (Barth, G), Spr (Barth, G)

**MUSIC 272B. Advanced Organ**

May be repeated for credit a total of 14 times.

1-3 units, Aut (Morgan, R), Win (Morgan, R), Spr (Morgan, R)

**MUSIC 272C. Advanced Harpsichord**

May be repeated for credit a total of 14 times.

1-3 units, Aut (Thornburgh, E), Win (Thornburgh, E), Spr (Thornburgh, E)

**MUSIC 272D. Advanced Jazz Piano**

By invitation only; priority to majors and jazz-ensemble participants. May be repeated for credit a total of 14 times.

1-3 units, Aut (Low, M), Win (Low, M), Spr (Low, M)

**MUSIC 272E. Advanced Fortepiano**

May be repeated for credit a total of 14 times.

1-3 units, Aut (Barth, G), Win (Barth, G), Spr (Barth, G)

**MUSIC 272F. Advanced Carillon**

May be repeated for credit a total of 14 times.

1-3 units, Aut (Zerlang, T), Win (Zerlang, T), Spr (Zerlang, T)

**MUSIC 273. Advanced Voice**

May be repeated for credit.

1-3 units, Aut (Giovannetti, C), Win (Giovannetti, C), Spr (Giovannetti, C)

**MUSIC 274A. Advanced Violin**

May be repeated for credit a total of 14 times.

1-3 units, Aut (Staff), Win (Staff), Spr (Staff)

**MUSIC 274B. Advanced Viola**

May be repeated for credit a total of 14 times.

1-3 units, Aut (Robertson, L), Win (Robertson, L), Spr (Robertson, L)

**MUSIC 274C. Advanced Violoncello**

May be repeated for credit a total of 14 times.

1-3 units, Aut (Harrison, S), Win (Harrison, S), Spr (Harrison, S)

**MUSIC 274D. Advanced Contrabass**

May be repeated for credit a total of 14 times.

1-3 units, Aut (Moyer, B), Win (Moyer, B), Spr (Moyer, B)

**MUSIC 274E. Advanced Viola da Gamba**

May be repeated for credit a total of 14 times.

1-3 units, Aut (Dornenburg, J), Win (Dornenburg, J), Spr (Dornenburg, J)

**MUSIC 274F. Advanced Classical Guitar**

May be repeated for credit a total of 14 times.

1-3 units, Aut (Ferguson, C), Win (Ferguson, C), Spr (Ferguson, C)

**MUSIC 274G. Advanced Harp**

May be repeated for credit a total of 14 times.

1-3 units, Aut (Chauvel, M), Win (Chauvel, M), Spr (Chauvel, M)

**MUSIC 274H. Advanced Baroque Violin**

May be repeated for credit a total of 14 times.

1-3 units, Aut (Martin, A), Win (Martin, A), Spr (Martin, A)

**MUSIC 274I. Advanced Jazz Bass**

1-3 units, Aut (McCain, J), Win (McCain, J), Spr (McCain, J)

**MUSIC 274J. Advanced Jazz Guitar**

Individual lessons in jazz guitar

1-3 units, Aut (Vandivier, R), Win (Vandivier, R), Spr (Vandivier, R)

**MUSIC 275A. Advanced Flute**

May be repeated for credit a total of 14 times.

1-3 units, Aut (Hawley, A), Win (Hawley, A), Spr (Hawley, A)

**MUSIC 275B. Advanced Oboe**

May be repeated for credit a total of 14 times.

1-3 units, Aut (Mitchell, P), Win (Matheson, J), Spr (Matheson, J)

**MUSIC 275C. Advanced Clarinet**

May be repeated for credit a total of 14 times.

1-3 units, Aut (Brandenburg, M), Win (Brandenburg, M), Spr (Brandenburg, M)

**MUSIC 275D. Advanced Bassoon**

May be repeated for credit a total of 14 times.

1-3 units, Aut (Olivier, R), Win (Olivier, R), Spr (Olivier, R)

**MUSIC 275E. Advanced Recorder/Renaissance Wind Instruments**

May be repeated for credit a total of 14 times.

1-3 units, Aut (Myers, H), Win (Myers, H), Spr (Myers, H)

**MUSIC 275F. Advanced Saxophone**

May be repeated for credit a total of 14 times.

1-3 units, Aut (McCarthy, C), Win (McCarthy, C), Spr (McCarthy, C)

**MUSIC 275G. Advanced Baroque Flute**

May be repeated for credit a total of 14 times.

1-3 units, Aut (Staff), Win (Staff), Spr (Staff)

**MUSIC 276A. Advanced French Horn**

May be repeated for credit a total of 14 times.  
*1-3 units, Aut (Ragent, L), Win (Ragent, L), Spr (Ragent, L)*

**MUSIC 276B. Advanced Trumpet**

May be repeated for credit a total of 14 times.  
*1-3 units, Aut (Johnson-Hamilton, J), Win (Johnson-Hamilton, J), Spr (Johnson-Hamilton, J)*

**MUSIC 276C. Advanced Trombone**

May be repeated for credit a total of 14 times.  
*1-3 units, Aut (Kenley, M), Win (Kenley, M), Spr (Kenley, M)*

**MUSIC 276D. Advanced Tuba**

May be repeated for credit a total of 14 times.  
*1-3 units, Aut (Clements, A), Win (Clements, A), Spr (Clements, A)*

**MUSIC 277. Advanced Percussion**

May be repeated for credit a total of 14 times.  
*1-3 units, Aut (Veregge, M), Win (Veregge, M), Spr (Veregge, M)*

**MUSIC 280. TA Training Course**

Required for doctoral students serving as teaching assistants. Orientation to resources at Stanford, guest presentations on the principles of common teaching activities, supervised teaching experience. Students who entered in the Autumn should take 280 in the Spring prior to the Autumn they begin teaching.  
*1 unit, Spr (Sloan, N; Saiki, J)*

**MUSIC 300A. Medieval Notation**

Western notation of the Middle Ages and Renaissance: principles, purposes, and transcription.  
*4 units, Spr (Mahrt, W), alternate years, not given next year*

**MUSIC 300B. Renaissance Notation**

Western notation of the Middle Ages and Renaissance: principles, purposes, and transcription.  
*4 units, alternate years, not given this year*

**MUSIC 301A. Analysis of Music: Modal**

*4 units, Win (Mahrt, W)*

**MUSIC 301B. Analysis of Music: Tonal**

*4 units, Aut (Barth, G)*

**MUSIC 301C. Analysis of Music: Post-Tonal**

Current analytical trends, issues, and methods.  
*4 units, Spr (Ferneyhough, B)*

**MUSIC 302. Research in Musicology**

Directed reading and research. May be repeated for credit a total of 14 times.  
*1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**MUSIC 310. Research Seminar in Musicology**

For graduate students. Topics vary each quarter. May be repeated for credit a total of 8 times.  
*3-5 units, Aut (Schulz, A), Win (Hadlock, H), Spr (Hinton, S)*

**MUSIC 312A. Aesthetics and Criticism of Music, Ancients and Moderns: Plato to Nietzsche**

For graduate students. Primary texts focusing on the nature, purposes, and uses of music and other arts.  
*4 units, alternate years, not given this year*

**MUSIC 312B. Aesthetics and Criticism of Music, Contemporaries: Heidegger to Today**

For graduate students. Primary texts focusing on the nature, purposes, and uses of music and other arts.  
*4 units, alternate years, not given this year*

**MUSIC 318. Advanced Acoustics**

Current topics. May be repeated for credit.  
*1-5 units, not given this year*

**MUSIC 319. Research Seminar on Computational Models of Sound Perception**

All aspects of auditory perception, often with emphasis on computational models. Topics: music perception, signal processing, auditory models, pitch perception, speech, binaural hearing, auditory scene analysis, basic psychoacoustics, and neurophysiology. See <http://ccrma.stanford.edu/courses/>. May be repeated for credit a total of 14 times.  
*1-3 units, Aut (Slaney, M), Win (Slaney, M), Spr (Slaney, M)*

**MUSIC 320. Introduction to Digital Audio Signal Processing**

Digital signal processing for music and audio research. Topics: complex numbers, sinusoids, spectrum representation, sampling and aliasing, digital filters, frequency response, z transforms, transfer-function analysis, and associated Matlab software. See <http://ccrma.stanford.edu/courses/320/>.  
*3-4 units, Aut (Abel, J; Berners, D)*

**MUSIC 321. Readings in Music Theory**

Directed reading and research. May be repeated for credit a total of 5 times.  
*1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**MUSIC 323. Doctoral Seminar in Composition**

Illustrated discussions of compositional issues and techniques. Presentation of relevant topics, including students' own compositional practice. May be repeated for credit a total of 14 times.  
*3-4 units, Aut (Applebaum, M), Win (Ferneyhough, B), Spr (Berger, J)*

**MUSIC 325. Individual Graduate Projects in Composition**

May be repeated for credit.  
*1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**MUSIC 330. Musicology Dissertation Colloquium**

Weekly meetings for all musicology students 4th year and beyond to discuss research and writing strategies, share and critique work in progress, and discuss issues in professional development (preparing abstracts, conference papers, C.V. and job interviews, book reviews, submitting articles for publication). Open to 3rd-year students.  
*1-4 units, Spr (Grey, T)*

**MUSIC 341. Ph.D Dissertation**

May be repeated for credit a total of 5 times.  
*1-10 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**MUSIC 351. Seminar in Music Perception and Cognition**

A seminar on topics in music perception and cognition. Students will study and discuss recent research as well as design and implement experiments.  
*1-3 units, Aut (Berger, J), Win (Berger, J), Spr (Berger, J)*

**MUSIC 390. Practicum Internship**

On-the-job training under the guidance of experienced, on-site supervisors. Meets the requirements for curricular practical training for students on F-1 visas. Students submit a concise report detailing work activities, problems worked on, and key results. May be repeated for credit. Prerequisite: qualified offer of employment and consent of adviser.  
*1 unit, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**MUSIC 399. D.M.A. Final Project**

May be repeated for credit a total of 5 times.  
*1-10 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**MUSIC 420A. Signal Processing Models in Musical Acoustics**

Computational methods in musical sound synthesis and digital audio effects based on acoustic physical models. Topics: acoustic simulation with delay lines, digital filters, and nonlinear elements; comb filters; allpass filters; artificial reverberation; delay-line interpolation and sampling-rate conversion; phasing, flanging, and chorus effects; efficient computational models of strings, woodwinds, brasses, and other musical instruments. See <http://ccrma.stanford.edu/courses/420/>. Prerequisites: 320 or equivalent; PHYSICS 21 or equivalent course applying Newton's laws of motion; and CS 106B or equivalent programming in C and C++.  
*3-4 units, alternate years, not given this year*

**MUSIC 420B. Software for Sound Synthesis and Audio Effects**

Preferred software embodiments for digital sound synthesis and audio effects. Topics: The Faust language for audio signal processing, effects programming, plugin generation for various platforms, software components for stringed and wind musical instruments, delay effects, variable filters, and nonlinear effects such as compression and distortion. The principal activity is a software project due at the end of the quarter. Prerequisite: Music 420A or equivalent experience with audio signal processing in C++.  
 Recommended Corequisite: Music 424  
*1-10 units, alternate years, not given this year*

**MUSIC 421A. Audio Applications of the Fast Fourier**

**Transform (FFT)**

Spectrum analysis and signal processing using Fast Fourier Transforms (FFTs) with emphasis on audio applications. Topics: Fourier theorems; FFT windows; spectrum analysis; spectrograms; sinusoidal modeling; spectral modeling synthesis; FFT convolution; FIR filter design and system identification; overlap-add and filter-bank-summation methods for short-time Fourier analysis, modification, and resynthesis. See <http://ccrma.stanford.edu/courses/421/>. Prerequisite: Music 320 or equivalent background in spectrum analysis and linear systems.

3-4 units, Win (Smith, J)

**MUSIC 421B. Projects in Spectral Audio Signal Processing**

Frequency-domain methods for analysis and/or synthesis of sound. The principal activity is a software project. Continuing 421A, additional frequency-domain techniques for analysis, modification, and/or synthesis of audio signals will be discussed.

1-10 units, Spr (Smith, J), alternate years, not given next year

**MUSIC 422. Perceptual Audio Coding**

History and basic principles: development of psychoacoustics-based data-compression techniques; perceptual-audio-coder applications (radio, television, film, multimedia/internet audio, DVD, EMD). In-class demonstrations: state-of-the-art audio coder implementations (such as AC-3, MPEG) at varying data rates; programming simple coders. Topics: audio signals representation; quantization; time to frequency mapping; introduction to psychoacoustics; bit allocation and basic building blocks of an audio codec; perceptual audio codecs evaluation; overview of MPEG-1, 2, 4 audio coding and other coding standards (such as AC-3). Prerequisites: knowledge of digital audio principles, familiarity with C programming. Recommended: 320, EE 261. See <http://ccrma.stanford.edu/>.

3 units, Win (Bosi-Goldberg, M)

**MUSIC 423. Signal Processing Research**

Graduate research seminar. Problems in music and/or audio signal processing. Presentation of research-in-progress by graduate students, visiting scholars, and CCRMA faculty. See <http://ccrma.stanford.edu/courses/423/>. May be repeated for credit a total of 11 times.

1-4 units, Aut (Abel, J; Berners, D)

**MUSIC 424. Signal Processing Techniques for Digital Audio Effects**

Techniques for dynamic range compression, reverberation, equalization and filtering, panning and spatialization, digital emulation of analog processors, and implementation of time-varying effects. Single-band and multiband compressors, limiters, noise gates, de-essers, convolutional reverberators, parametric and linear-phase equalizers, wah-wah and envelope-following filters, and the Leslie. Students develop effects algorithms of their own design in labs. Prerequisites: digital signal processing, sampling theorem, digital filtering, and the Fourier transform at the level of 320 or EE 261; Matlab and modest C programming experience. Recommended: 420 or EE 264; audio effects in mixing and mastering at the level of 192.

3-4 units, Spr (Berners, D; Abel, J)

## NATIVE AMERICAN STUDIES (NATIVEAM) COURSES

### UNDERGRADUATE COURSES IN NATIVE AMERICAN STUDIES

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**NATIVEAM 16. Native Americans in the 21st Century: Encounters, Identity, and Sovereignty in Contemporary America**

(Same as ANTHRO 16) What does it mean to be a Native American in the 21st century? Beyond traditional portrayals of military conquests, cultural collapse, and assimilation, the relationships between Native Americans and American society. Focus is on three themes leading to in-class moot court trials:

colonial encounters and colonizing discourses; frontiers and boundaries; and sovereignty of self and nation. Topics include gender in native communities, American Indian law, readings by native authors, and Indians in film and popular culture. GER:DB-SocSci, EC-AmerCul

5 units, Win (Wilcox, M)

**NATIVEAM 109B. Indian Country Economic Development**

(Same as CSRE 109B) The history of competing tribal and Western economic models, and the legal, political, social, and cultural implications for tribal economic development. Case studies include mineral resource extraction, gaming, and cultural tourism. 21st-century strategies for sustainable economic development and protection of political and cultural sovereignty.

5 units, Spr (Biestman, K)

**NATIVEAM 117S. History of California Indians**

(Same as CSRE 117S, HISTORY 250A) Demographic, political, and economic history of California Indians, 1700s-1950s. Processes and events leading to the destruction of California tribes, and their effects on the groups who survived. Geographic and cultural diversity. Spanish, Mexican, and Anglo-American periods. The mission system. GER:EC-AmerCul

5 units, not given this year

**NATIVEAM 120. Native American Writers, 1880-1920**

(Same as CSRE 120) The period of time-1880 to 1920-is a time when many important events in American Indian history occurred. Hoxie's historical work provides a framework for analyzing what effects these policies had on American Indian people. His work does not provide an American Indian perspective; he stated at the onset, that this was not an objective in this study. His main objective was to present a study that shows Indians' relations with whites as a clash of two complex cultures from a white point of view (Hoxie xxi). Three American Indians writing during this time period provide the needed Indian perspective lacking in Hoxie's work.

5 units, not given this year

**NATIVEAM 124. Gender in Native American Societies**

Seminar examines the impact of colonialism on gender roles & gender relations in American Indian communities beginning with the 17th century. Topics include demographic changes, social transformations associated with major subsistence and settlement changes, biological and spiritual assaults, economic transformations and the dynamism of native societies. Sources include history, ethnography, biography, autobiography and the novel.

5 units, Aut (Anderson, J)

**NATIVEAM 138. American Indians in Comparative Historical Perspective**

(Same as SOC 138, SOC 238) (Graduate students register for 238.) Demographic, political, and economic processes and events that shaped relations between Euro-Americans and American Indians, 1600-1890. How the intersection of these processes affected the outcome of conflicts between these two groups, and how this conflict was decisive in determining the social position of American Indians in the late 19th century and the evolution of the doctrine of tribal sovereignty. GER:DB-SocSci, EC-AmerCul

5 units, Win (Staff)

**NATIVEAM 139. American Indians in Contemporary Society**

(Same as SOC 139, SOC 239) (Graduate students register for 239.) The social position of American Indians in contemporary American society, 1890 to the present. The demographic resurgence of American Indians, changes in social and economic status, ethnic identification and political mobilization, and institutions such as tribal governments and the Bureau of Indian Affairs. Recommended: 138 or a course in American history. GER:DB-SocSci, EC-AmerCul

5 units, not given this year

**NATIVEAM 143A. American Indian Mythology, Legend, and Lore**

(Same as ENGLISH 43A, ENGLISH 143A) (English majors and others taking 5 units, register for 143A.) Readings from American Indian literatures, old and new. Stories, songs, and rituals from the 19th century, including the Navajo Night Chant. Tricksters and trickster stories; war, healing, and hunting songs; Aztec songs from the 16th century. Readings from modern poets and novelists

including N. Scott Momaday, Louise Erdrich, and Leslie Marmon Silko, and the classic autobiography, *Black Elk Speaks*. GER:DB-Hum

3-5 units, Aut (Fields, K)

**NATIVEAM 200R. Directed Research**

1-5 units, Aut (Staff), Win (Staff), Spr (Staff)

**NATIVEAM 200W. Directed Reading**

1-5 units, Aut (Staff), Win (Staff), Spr (Staff)

## GRADUATE COURSES IN NATIVE AMERICAN STUDIES

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**NATIVEAM 240. Psychology and American Indian Mental Health**

(Same as EDUC 340) Western medicine's definition of health as the absence of sickness, disease, or pathology; Native American cultures' definition of health as the beauty of physical, spiritual, emotional, and social things, and sickness as something out of balance. Topics include: historical trauma; spirituality and healing; cultural identity; values and acculturation; and individual, school, and community-based interventions. Prerequisite: experience working with American Indian communities.

3-5 units, not given this year

## NEUROBIOLOGY (NBIO) COURSES

### UNDERGRADUATE COURSES IN NEUROBIOLOGY

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**NBIO 101. Social and Ethical Issues in the Neurosciences**

(Same as NBIO 201) Influences on public debate and policy of scientific advances in the study of the brain and behavior: theories of brain function; philosophical and scientific approaches; advances in the neurosciences, possible uses in medical therapy, and interventions involving genetic screening, genetic selection, enhancement of neurological functioning, and manipulation of behavior; questions related to medical therapy, social policy, and broader considerations of human nature such as consciousness, free will, personal identity, and moral responsibility. May be taken for 2 units without a research paper. Prerequisite: Neuroscience, Biology, or Symbolic Systems major; or Human Biology core; or consent of instructor.

2-4 units, Spr (Staff)

**NBIO 198. Directed Reading in Neurobiology**

Prerequisite: consent of instructor. (Staff)

1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**NBIO 199. Undergraduate Research**

Investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### GRADUATE COURSES IN NEUROBIOLOGY

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**NBIO 201. Social and Ethical Issues in the Neurosciences**

(Same as NBIO 101) Influences on public debate and policy of scientific advances in the study of the brain and behavior: theories of brain function; philosophical and scientific approaches; advances in the neurosciences, possible uses in medical therapy, and interventions involving genetic screening, genetic selection, enhancement of neurological functioning, and manipulation of behavior; questions related to medical therapy, social policy, and broader considerations of human nature such as consciousness, free will, personal identity, and moral responsibility. May be taken

for 2 units without a research paper. Prerequisite: Neuroscience, Biology, or Symbolic Systems major; or Human Biology core; or consent of instructor.

2-4 units, Spr (Staff)

**NBIO 206. The Nervous System**

Structure and function of the nervous system, including neuroanatomy, neurophysiology, and systems neurobiology. Topics include the properties of neurons and the mechanisms and organization underlying higher functions. Framework for general work in neurology, neuropathology, clinical medicine, and for more advanced work in neurobiology. Lecture and lab components must be taken together.

7-8 units, Win (Moore, T)

**NBIO 216. Genetic Analysis of Behavior**

(Same as MCP 216) Advanced seminar. Findings and implications of behavioral genetics as applied to invertebrate and vertebrate model systems. Topics include biological clocks, and sensation and central pattern generators. Relevant genetic techniques and historical perspective. Student presentation.

4 units, alternate years, not given this year

**NBIO 218. Neural Basis of Behavior**

Advanced seminar. The principles of information processing in the nervous system and the relationship of functional properties of neural systems with perception, behavior, and learning. Original papers; student presentations. Prerequisite: NBIO 206 or consent of instructor.

5 units, alternate years, not given this year

**NBIO 220. Central Mechanisms in Vision-based Cognition**

Contemporary visual neuroscience, emphasizing the neural mechanisms underlying primate vision and visually guided behavior. Seven foundational topics in visual neuroscience; current papers concerning each topic. Student presentations. Computer-based demonstration exercises.

2-4 units, alternate years, not given this year

**NBIO 221. Frontiers in Translational Medicine**

Small group course for first year MSTP and Master's in Medicine students only. Focus is on pathways for combining science and medicine during graduate and postdoctoral training and in one's career, and practical aspects of translational medicine. Guest lecturers are physician-scientists who have advanced the frontiers of translational medicine. Previous lecturers have included Drs. Gilbert Chu, Jamie Topper, Irv Weissman, Beverly Mitchell, Geoff Duyk, William Mobley, Judy Shizuru, Carla Shatz, Linda Boxer and David Cox. Prerequisite: consent of instructor.

1 unit, Spr (Staff)

**NBIO 227. Understanding Techniques in Neuroscience**

Techniques commonly used in the field of neuroscience, including molecular/genetic, electrophysiological, and whole brain imaging. Presentations by senior graduate students and examples from the literature. Optional laboratory demonstrations.

2 units, Aut (Pradhan, S; Adelson, J; Squire, R; Newsome, W)

**NBIO 228. Mathematical Tools for Neuroscience**

Student-instructed. For students with no math background beyond basic calculus, or as a review for more advanced students. Techniques useful for analysis of neural data including linear algebra, Fourier transforms, probability and statistics, signal detection, Bayesian inference, and information theory.

1-3 units, not given this year

**NBIO 254. Molecular and Cellular Neurobiology**

(Same as BIO 254) For graduate students. Includes lectures for BIO 154. Cellular and molecular mechanisms in the organization and functions of the nervous system. Topics: wiring of the neuronal circuit, synapse structure and synaptic transmission, signal transduction in the nervous system, sensory systems, molecular basis of behavior including learning and memory, molecular pathogenesis of neurological diseases.

5 units, alternate years, not given this year

**NBIO 258. Information and Signaling Mechanisms in Neurons and Circuits**

How synapses, cells, and neural circuits process information relevant to a behaving organism. How phenomena of information processing emerge at several levels of complexity in the nervous system, including sensory transduction in molecular cascades,

information transmission through axons and synapses, plasticity and feedback in recurrent circuits, and encoding of sensory stimuli in neural circuits.

*4 units, Aut (Baccus, S)*

#### **NBIO 299. Directed Reading in Neurobiology**

Prerequisite: consent of instructor.

*1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

#### **NBIO 300. Professional Development and Integrity in Neuroscience**

Required of Neurosciences Ph.D. students every quarter. Develops professional skills in critical assessment and oral presentation of findings from current neuroscience literature in the visual presentation of quantitative data and writing research grants. The role of animals in lab research, fraud in science, the responsibility of authors and reviewers, science in a multicultural environment, and the relationship between student and mentor. Student and faculty presentations and discussions.

*1-2 units, Aut (Baccus, S), Win (Baccus, S), Spr (Baccus, S)*

#### **NBIO 370. Medical Scholars Research**

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

*4-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

#### **NBIO 399. Graduate Research**

Investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

*1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

## NEUROLOGY AND NEUROLOGICAL SCIENCES (NENS) COURSES

### UNDERGRADUATE COURSES IN NEUROLOGY AND NEUROLOGICAL SCIENCES

Primarily for undergraduates; graduate students may enroll with consent of adviser.

#### **NENS 25SI. Discoveries and Debates in Neuroscience Research**

Contradictory results and models in the accelerating field of neuroscience research. Critical examination of controversial topics: the genetic determination of intelligence, the neurobiological correlates of consciousness, adult neural stem cell function and therapeutic potential, interpretation of cognitive tests in animals, the origin of brain tumors, the biology of addiction, and gender differences in brain function and disease. How to analyze scientific experiments and models with a critical eye.

*1-2 units, Win (Staff)*

#### **NENS 67N. Intracellular Trafficking and Neurodegeneration**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Cell structures and functions, the intracellular trafficking system that maintains exchanges of materials and information inside cells, and clinical features and pathologies of neurodegenerative diseases. Techniques for examining cellular and subcellular structures, especially cytoskeletons; functional insights generated from structural explorations. Prerequisite: high school biology.

*3 units, Spr (Yang, Y)*

#### **NENS 199. Undergraduate Research**

Students undertake research sponsored by an individual faculty member. Prerequisite: consent of instructor.

*1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

### GRADUATE COURSES IN NEUROLOGY AND NEUROLOGICAL SCIENCES

Primarily for graduate students; undergraduates may enroll with consent of instructor.

#### **NENS 202. Longevity**

(Same as HUMBIO 149L, PSYCH 102) Interdisciplinary. Challenges to and solutions for the young from increased human life expectancy: health care, financial markets, families, work, and politics. Guest lectures from engineers, economists, geneticists, and physiologists.

*4 units, Win (Carstensen, L; Rando, T)*

#### **NENS 204. Stroke Seminar**

Standing at the intersection of many fields of medicine, including neurology, internal medicine, cerebrovascular surgery, diagnostic and interventional radiology, and emergency medicine, as the third leading cause of death and the leading cause of disability, stroke is a critical topic for all practitioners of medicine. This seminar draws upon Stanford's leaders in stroke research to present and discuss the causes, presentation, treatment, and imaging characteristics of the disease.

*1 unit, Win (Lansberg, M)*

#### **NENS 205. Neurobiology of Disease Seminar**

Case demonstrations of selected disorders, discussion of the pathophysiological basis of the disorder, presentation of the basic principles underlying modern diagnostic and therapeutic management, and a discussion of recent research advances for each disease entity. Prerequisite: Neurobiology 206 or consent of instructor.

*3 units, alternate years, not given this year*

#### **NENS 206. Introduction to Neurology Seminar**

Exploration of aspects of neurology, including subspecialties. Current issues, clinical cases, and opportunities in the field.

*1 unit, Aut (Reimer, R; Jafari, A)*

#### **NENS 220. Computational Neuroscience**

Computational approaches to neuroscience applied at levels ranging from neurons to networks. Addresses two central questions of neural computation: How do neurons compute; and how do networks of neurons encode/decode and store information? Focus is on biophysical (Hodgkin-Huxley) models of neurons and circuits, with emphasis on application of commonly available modeling tools (NEURON, MATLAB) to issues of neuronal and network excitability. Issues relevant to neural encoding and decoding, information theory, plasticity, and learning. Fundamental concepts of neuronal computation; discussion focus is on relevant literature examples of proper application of these techniques. Final project. Recommended for Neuroscience Program graduate students; open to graduate, medical, and advanced undergraduate students with consent of instructor. Prerequisite: NBIO 206. Recommended: facility with linear algebra and calculus.

*4 units, alternate years, not given this year*

#### **NENS 230. Analysis Techniques for Neuroscience Using MATLAB**

Data analysis and visualization techniques commonly encountered in neuroscience research. Fundamentals of the MATLAB computing environment, programming and debugging, data import/export, data structures, plotting, simple image processing, introduction to statistical tools. Assumes no programming background. Examples and assignments draw from a range of topics in neuroscience, for example, event detection in patch-clamp recordings, spike-triggered averages, spike rasters and PSTHS, cell counting in fluorescence images, regressions, and PCA. Assignments are practical in nature, demonstrating how to implement specific analyses that a neuroscience student is likely to encounter. The skills taught are broadly applicable and a neuroscience background is not necessary.

*2 units, Aut (O'Shea, D; Stavisky, S; Huguenard, J)*

#### **NENS 267. Molecular Mechanisms of Neurodegenerative Disease**

(Same as BIO 267) The epidemic of neurodegenerative disorders such as Alzheimer's and Parkinson's disease occasioned by an aging human population. Genetic, molecular, and cellular mechanisms. Clinical aspects through case presentations.

*4 units, Win (Kopito, R; Wyss-Coray, A; Reimer, R), alternate years, not given next year*

#### **NENS 299. Directed Reading in Neurology and Neurological Science**

Prerequisite: consent of instructor.

*1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

### **NENS 370. Medical Scholars Research**

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

*4-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

### **NENS 399. Graduate Research**

Students undertake research sponsored by individual faculty members. Includes laboratory work in neurophysiology and neurochemistry.

*1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

### **NENS 801. TGR Project**

*0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

### **NENS 802. TGR Dissertation**

*0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

## NEUROSCIENCES PROGRAM (NEPR) COURSES

### **GRADUATE COURSES IN NEUROSCIENCES PROGRAM**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

#### **NEPR 299. Directed Reading in Neurosciences**

Prerequisite: consent of instructor.

*1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

#### **NEPR 399. Graduate Research**

Student Investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

*1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

#### **NEPR 801. TGR Project**

*0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

#### **NEPR 802. TGR Dissertation**

*0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

## NEUROSURGERY (NSUR) COURSES

### **UNDERGRADUATE COURSES IN NEUROSURGERY**

Primarily for undergraduates; graduate students may enroll with consent of adviser.

#### **NSUR 70Q. Experimental Stroke**

(F,Dial) Stanford Introductory Dialogue. Preference to sophomores. How stroke is studied in the laboratory; advances in stroke research over the last two decades; and future directions. Topics include: cellular and molecular mechanisms of neuronal death and survival in the brain after stroke, including necrosis, apoptosis, inflammation, and cell signaling pathways; experimental tools for stroke treatment, such as gene therapy, cell therapy, hypothermia, preconditioning, postconditioning, and other pharmacological treatments; the gap and barrier between laboratory research and clinical translation.

*2 units, Spr (Zhao, H)*

#### **NSUR 199. Undergraduate Research**

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

*1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

### **GRADUATE COURSES IN NEUROSURGERY**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

#### **NSUR 261. Principles and Practice of Stem Cell Engineering**

(Same as BIOE 261) Quantitative models used to characterize incorporation of new cells into existing tissues emphasizing pluripotent cells such as embryonic and neural stem cells. Molecular methods to control stem cell decisions to self-renew, differentiate, die, or become quiescent. Practical, industrial, and ethical aspects of stem cell technology application. Final projects: team-reviewed grants and business proposals.

*3 units, not given this year*

#### **NSUR 278A. From Science to Business: Innovation in Neurologic Disease Beyond Neurosurgery**

For medical, business, and engineering students. The process of innovation and company building in the medical field, emphasizing the neurosciences. Overview of neurological diseases; business and regulatory aspects of device and biotech product development. Guest speakers on healthcare entrepreneurship. Venture capital and entrepreneurial mentors guide interdisciplinary student teams in evaluating a solution to an unmet clinical need or a project within a biotech company. May be taken for 2 units without the team project.

*2-4 units, Win (Kallmeyer, V)*

#### **NSUR 278B. Independent Study on Healthcare Innovation and Entrepreneurship**

Continuation of NSUR 278A for students wishing to work on actual strategy and implementation of their idea developed in 278A or, more generally, for students who wish to develop a strategic plan for a specific healthcare (drug or device) venture. May be taken concurrently with 278A.

*2-4 units, Win (Kallmeyer, V), Spr (Staff)*

#### **NSUR 279. Concepts in Drug Delivery and Drug Device Combinations**

Open to all graduate students. Issues relating to drug-device combination products, including review of recently approved products such as cardiac stent, and development, regulatory, and reimbursement issues. Emphasis is on market evaluation, product development, and regulatory strategies. Lecture only for 2 units; project for 4 units.

*2-4 units, not given this year*

#### **NSUR 280. Early Clinical Experience in Neurosurgery**

Provides an observational experience as formulated by the instructor and student. Prerequisite: consent of instructor.

*1-2 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

#### **NSUR 299. Directed Reading in Neurosurgery**

Prerequisite: consent of instructor.

*1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

#### **NSUR 370. Medical Scholars Research**

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

*4-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

#### **NSUR 399. Graduate Research**

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

*1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

## OBSTETRICS AND GYNECOLOGY (OBGYN) COURSES

### **UNDERGRADUATE COURSES IN OBSTETRICS AND GYNECOLOGY**

Primarily for undergraduates; graduate students may enroll with consent of adviser.

#### **OBGYN 27SI. Alternative Spring Break: For the Sake of Women- Disparities in Women's Health and Health Policy**

Examines health disparities that uniquely affect women from the perspectives of health care providers, health educators, advocates, and policymakers. Current research in women's health, ranging from traditional women's issues such as reproductive and maternal

health to nontraditional topics including cardiovascular and autoimmune diseases; accessibility and quality concerns; allocation of resources dedicated to the health of women.

*1 unit, Win (Staff)*

#### **OBGYN 199. Undergraduate Research in Reproductive Biology**

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

*1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

### **GRADUATE COURSES IN OBSTETRICS AND GYNECOLOGY**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

#### **OBGYN 202. Assisted Reproductive Technologies**

(Same as DBIO 202, HUMBIO 150A) Primary and current literature in basic and clinical science aspects of assisted reproductive technologies (ART), and demonstrations of current ART techniques including in vitro fertilization and embryo culture, and micromanipulation procedures such as intracytoplasmic sperm injection and embryo biopsy and cryopreservation. Class only may be taken for 1 unit. 2 units includes papers and attendance at clinical demonstrations. 3 units includes a term paper. Recommended: DBIO 201, or consent of instructors.

*1-3 units, Win (Staff)*

#### **OBGYN 216. Current Issues in Reproductive Health**

Reproductive Health is a broad subject encompassing many concepts and practices. Issues and services within the context of reproductive health include such diverse topics as fertility, pregnancy, contraception, abortion, sexuality, menopause and parenting. This course focuses on topics related to abortion services, fertility and contraception; current research and practices in family planning; legislation and issues of access. Sponsored by Medical Students for Choice.

*1 unit, Win (Druzin, M)*

#### **OBGYN 230. Women's Health Medical Forum**

Required for the Women's Health Scholarly Concentration. Ten seminars featuring a Women's Health research presentation (by faculty or student), followed by discussion. Emphasis is on topics related to the five Stanford Institutes of Medicine (cardiovascular; cancer; stem cell; neurosciences; and immunity), and the subspecialties of Obstetrics & Gynecology. Assigned readings and related papers.

*1 unit, Aut (Westphal, L), Win (Westphal, L), Spr (Staff)*

#### **OBGYN 240. Sex Differences in Human Physiology and Disease**

(Same as HUMBIO 140, MED 240) Chromosomal and hormonal influences on cells, tissues, and organs that underlie the development of reproductive organs and sexual dimorphism of the neuroendocrine system. Effects of endogenous and exogenous sex hormones and environmental factors that differ between men and women on the musculoskeletal, neurological, cardiovascular, and immunological systems over the lifecourse, from conception to puberty, through reproductive phases (including changes during the menstrual cycle up to and beyond menopause in women and with aging in men). Transgender health issues. Guest lecturers. Prerequisite: Human Biology core or equivalent, or consent of instructor

*2-3 units, Win (Stefanick, M)*

#### **OBGYN 256. Current Controversies in Women's Health**

(Same as HUMBIO 125) Interdisciplinary. Focus is on the U.S. Topics include: health research; bioethical, legal, and policy issues; scientific and cultural perspectives; social influences; environmental and lifestyle effects on health; and issues related to special populations. Guest lecturers; student debates. Prerequisite: Human Biology core or equivalent, or consent of instructor.

*2-3 units, Spr (Jacobson, M; Stefanick, M)*

#### **OBGYN 280. Early Clinical Experience in Obstetrics and Gynecology**

Provides an observational experience as determined by the instructor and student. Prerequisite: consent of instructor.

*1-2 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

#### **OBGYN 282. Pregnancy, Birth, and Infancy**

(Same as PEDS 282) Comprehensive clinical experience where pre-clinical medical students follow pregnant women receiving care at Stanford hospitals to attend prenatal visits, delivery, and postnatal visits. Continuity clinic format, combined with didactic lessons and discussion seminars. Students are exposed to clinical activities in a meaningful context, bolstering classroom studies in anatomy, physiology, embryology and human development, and emphasizing social, economic, and personal issues related to medicine. This program spans one quarter, covering topics related to pregnancy, labor and delivery and newborn care. In addition to clinic experiences, students are expected to spend 1-2 hours/week in lectures and to complete a reflection of their experiences in the course. Prerequisite: pre-clinical medical student.

*3 units, Spr (Staff)*

#### **OBGYN 299. Directed Reading in Obstetrics and Gynecology**

Prerequisite: consent of instructor.

*1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

#### **OBGYN 370. Medical Scholars Research**

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

*4-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

#### **OBGYN 399. Graduate Research in Reproductive Biology**

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

*1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

## **OPHTHALMOLOGY (OPHT) COURSES**

### **UNDERGRADUATE COURSES IN OPHTHALMOLOGY**

Primarily for undergraduates; graduate students may enroll with consent of adviser.

#### **OPHT 199. Undergraduate Research**

Allows for qualified students to undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

*1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

### **GRADUATE COURSES IN OPHTHALMOLOGY**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

#### **OPHT 201. Clinical Topics in Ophthalmology**

Introduction to the professional opportunities available to the ophthalmologist in the areas of clinical research, community health, biotech and pharmaceutical development, international blindness prevention, graduate and post-graduate education.

*1 unit, Aut (Fredrick, D)*

#### **OPHT 202. Clinical Topics in Ophthalmology**

(Continuation of 201) Professional opportunities available to the ophthalmologist in the areas of clinical research, community health, biotech and pharmaceutical development, international blindness prevention, graduate and post-graduate education.

*1 unit, not given this year*

#### **OPHT 203. Introduction to Ophthalmology**

(Continuation of 202) Introduction to the practical skills used within the field of ophthalmology. Diagnostic tools and instruments; applications of these tools; practice using instruments under the guidance of faculty and residents; practice in microsurgical techniques with one-on-one guidance.

*1 unit, Spr (Staff)*

#### **OPHT 280. Early Clinical Experience in Ophthalmology**

Provides an observational experience as formulated by the instructor and student. Prerequisite: consent of instructor.

*1-2 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*



**OPHT 299. Directed Reading in Ophthalmology**

Prerequisite: consent of instructor.

*1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**OPHT 370. Medical Scholars Research**

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

*4-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**OPHT 399. Graduate Research**

Students to undertake investigations sponsored by individual faculty members. Opportunities are available at both predoctoral and postdoctoral levels. Prerequisite: consent of instructor.

*1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

## ORTHOPEDIC SURGERY (ORTHO) COURSES

### UNDERGRADUATE COURSES IN ORTHOPEDIC SURGERY

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**ORTHO 97Q. Sport, Exercise, and Health: Exploring Sports Medicine**

(S,Sem) (Same as HUMBIO 97Q) Stanford Introductory Seminar. Preference to sophomores. Sports medicine is the practice of clinical medicine at the interface between health and performance, competition and well-being. While sports medicine had its origins in providing care to athletes, medical advances developed in care of athletes exerted a great effect on the nature and quality of care to the broader community. Topics include sports injuries, medical conditions associated with sport and exercise, ethics, coaching, women's issues, fitness and health, and sports science. Case studies.

*3 units, Aut (Matheson, G), Win (Matheson, G), Spr (Matheson, G)*

**ORTHO 102. Orthopaedic Surgical Anatomy**

(Same as ORTHO 202) Open to medical, graduate and undergraduate students. Opportunity to enhance knowledge of anatomy as it pertains to the practice of Orthopaedic Surgery and to improve dissection skills. Follows the surgical anatomy syllabus used by the Stanford Orthopaedic Surgery Residency Program. Sessions led by Stanford Orthopaedic Surgery attendings and residents. Didactic sessions, prosection review, dissection.

*2 units, Sum (Staff)*

**ORTHO 110. Practical Sports Medicine and Orthopaedic Examination Skills**

(Same as ORTHO 210) Designed for students considering a career in sports medicine, orthopaedics, physical medicine and rehabilitation, emergency medicine, internal medicine or family practice. Focused physical exam skills for common sports and musculoskeletal complaints: shoulder and upper arm; elbow and forearm; hand and wrist; pelvis, hip and thigh; knee; lower leg, foot, and ankle; cervical and thoracic spine; lumbar spine. Each session consists of a lecture and relevant case for that week's topic, including interactive review of anatomy and demonstration and practice of physical exam skills, culminating in an assessment and a plan for the case presented. 1 unit requires preparation for and participation in 5 sessions; 2 units requires preparation for and participation in 8 sessions.

*1-2 units, Spr (Staff)*

**ORTHO 199. Undergraduate Research**

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

*1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

### GRADUATE COURSES IN ORTHOPEDIC SURGERY

Primarily for graduate students; undergraduates may enroll with

consent of instructor.

**ORTHO 201. Musculoskeletal Exam Practicum**

Student initiated course. Opportunity to enhance knowledge and skills for conducting musculoskeletal exams. Sessions led by Stanford Orthopaedic Surgery attendings and residents. Didactic introductions followed by hands-on practice of specific aspects of the musculoskeletal exam.

*1 unit, Win (Staff)*

**ORTHO 202. Orthopaedic Surgical Anatomy**

(Same as ORTHO 102) Open to medical, graduate and undergraduate students. Opportunity to enhance knowledge of anatomy as it pertains to the practice of Orthopaedic Surgery and to improve dissection skills. Follows the surgical anatomy syllabus used by the Stanford Orthopaedic Surgery Residency Program. Sessions led by Stanford Orthopaedic Surgery attendings and residents. Didactic sessions, prosection review, dissection.

*2 units, Sum (Staff)*

**ORTHO 210. Practical Sports Medicine and Orthopaedic Examination Skills**

(Same as ORTHO 110) Designed for students considering a career in sports medicine, orthopaedics, physical medicine and rehabilitation, emergency medicine, internal medicine or family practice. Focused physical exam skills for common sports and musculoskeletal complaints: shoulder and upper arm; elbow and forearm; hand and wrist; pelvis, hip and thigh; knee; lower leg, foot, and ankle; cervical and thoracic spine; lumbar spine. Each session consists of a lecture and relevant case for that week's topic, including interactive review of anatomy and demonstration and practice of physical exam skills, culminating in an assessment and a plan for the case presented. 1 unit requires preparation for and participation in 5 sessions; 2 units requires preparation for and participation in 8 sessions.

*1-2 units, Spr (Staff)*

**ORTHO 220. Introduction to Lifestyle Medicine**

Lifestyle medicine is an exciting new movement to empower practicing clinicians and aspiring physicians to facilitate behavioral change and promote a culture of health and wellness in patients. Focus is on both concrete, evidence-based findings and tangible, practical tools to readily translate into everyday clinical practice. A series of leading experts and guest lectures guide students through interactive, patient-focused activities in topics including, but not limited to: nutrition, exercise, sleep, motivational interviewing, meditation, and acupuncture.

*1 unit, Win (Fredericson, M; Chin, J)*

**ORTHO 222. Anatomy of Movement**

Musculoskeletal and neuromuscular anatomy and physiology form the foundation of this multi-disciplinary course. Examines normal motor function and functional deficit from disease or injury. Clinical and scientific perspectives include orthopaedic surgery, neurology, mechanical engineering, computer science, anthropology, and art. Bioengineering challenges that assist or emulate human movement, such as design of an artificial joint or simulation of orthopaedic surgery for cerebral palsy are discussed. Evolution of upright walking and hand anatomy, as it became an instrument of purpose are discussed along with the expression of human movement throughout history in art masterpieces, photography, and animation. Student team projects. Lecture only for 3 units; project for 4 units.

*3-4 units, not given this year*

**ORTHO 260. Tissue Engineering**

(Same as BIOE 260) Principles of tissue engineering and design strategies for practical applications for tissue repair. Topics include tissue components and dynamics, morphogenesis, stem cells, cellular fate processes, cell and tissue characterization, controlled drug and gene delivery, bioreactors, cell-materials interactions, and host integration. Present research proposal to solve a real life tissue engineering problem.

*3 units, Spr (Staff)*

**ORTHO 270. Orthopaedic Tissue Engineering**

Biological principles underlying the use of engineering strategies and biocompatible materials for tissue repair and regeneration. Structure, physiology, and mechanics of articular cartilage, bone, and dense soft connective tissues. Current ideas, approaches, and applications being implemented as therapeutic regimens for



arthritis, spinal deformities, and limb salvage. Multidisciplinary constraints on the design and creation of tissue constructs. Prerequisite: familiarity with basic cell and molecular mechanisms underlying tissue differentiation.

3 units, Win (Staff)

#### **ORTHO 370. Medical Scholars Research**

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

4-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

## OTOLARYNGOLOGY (OTOHNS) COURSES

### UNDERGRADUATE COURSES IN OTOLARYNGOLOGY

Primarily for undergraduates; graduate students may enroll with consent of adviser.

#### **OTOHNS 199. Undergraduate Research**

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### GRADUATE COURSES IN OTOLARYNGOLOGY

Primarily for graduate students; undergraduates may enroll with consent of instructor.

#### **OTOHNS 200. Introduction to Otolaryngology-Head and Neck Surgery**

Seminar series designed to expose students to the field, including its subspecialties and commonly performed procedures. Goals: supplement anatomical knowledge with clinical correlates; understand basic diagnosis, pathophysiology, and management of ENT problems commonly seen in primary care practice; how to perform a thorough head and neck examination. Seminars, given by faculty experts, cover major topics relating to each of the subdivisions within ENT. May be repeated for credit.

1 unit, Spr (Staff)

#### **OTOHNS 299. Directed Reading in Otolaryngology**

Prerequisite: consent of instructor.

1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

#### **OTOHNS 370. Medical Scholars Research**

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

4-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

#### **OTOHNS 399. Graduate Research**

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

## OVERSEAS STUDIES: AUSTRALIA (OSPAUSTL) COURSES

### UNDERGRADUATE COURSES IN OVERSEAS STUDIES: AUSTRALIA

#### **OSPAUSTL 10. Coral Reef Ecosystems—**

Key organisms and processes, and the complexity of coral reef ecosystems. Students explore the Great Barrier Reef from the southern end which demonstrates the physical factors that limit coral reefs, to the northern reef systems which demonstrate key aspects of these high biodiversity ecosystems. Human-related changes. Emphasis is on research experiences and development of

analytical skills. Two units only counted for the Biology major. GER:DB-EngrAppSci

3 units, Aut (Ward, S; Arrigo, K)

#### **OSPAUSTL 20. Coastal Resource Management—**

Problem solving, research, communication, teamwork, and social assessment skills in sustainable coastal zone management. Issues include: ecosystem functions and values at risk under the proposed development in case study; environmental outcomes most desirable for the local stakeholders and how those are defined; features of the human communities and their function as they relate to the management options; tools or mechanisms for a sustainable management outcome. Taught by multidisciplinary team that includes Australian and developing country experts. Two units only counted for the Biology major. GER:DB-EngrAppSci

3 units, Aut (Johnstone, R)

#### **OSPAUSTL 30. Coastal Forest Ecosystems—**

Prehistory of Australian rainforest and how rainforest structure and biodiversity change with altitude, latitude, and geology. Tropical coastal marine wetlands, mangrove forests, and the relationship between land- and sea-based biota. Biology and ecology of marine plants, mangroves, and tropical salt marsh. Introduction to specialized fields of marine plant biology and ecology including biogeography and evolution, aquatic plant ecophysiology, water quality and bioindicator techniques, pollution and eutrophication, and environmental control of marine plant distribution and productivity. Two units only counted for the Biology major. GER:DB-EngrAppSci

3 units, Aut (Baker, C; Lovelock, C)

#### **OSPAUSTL 40. Australian Studies—**

Introduction to Australian society, history, culture, politics, and identity. Social and cultural framework and working understanding of Australia in relationship to the focus on coastal environment in other program courses. Field trips. GER:DB-SocSci, EC-GlobalCom

3 units, Aut (Lilley, I)

#### **OSPAUSTL 50. Targeted Research Project—**

Prior to arriving in Australia, students establish a link with University of Queensland faculty to develop project ideas that combine personal interests and career goals with opportunities presented by the Australian Coastal Studies program, such as how mangrove roots find sediment rich zones of the shore, or the dynamics of ecotourism in southern and northern coastal Queensland. Project report and presentation in Australia.

4 units, Aut (Staff)

#### **OSPBARCL 101. Language and Culture in Catalonia—**

Preparation for students to function in the academic and social environment of Barcelona. Basic listening, reading, and comprehension in Catalan; review of Spanish with focus on writing academic papers and listening to lectures. Introduction to Barcelona with emphasis on contemporary history, culture, and politics. Bilingualism; multiculturalism; varieties of nationalism and globalization in context of Barcelona.

4 units, Aut (Staff)

## OVERSEAS STUDIES: BARCELONA (CASB) (OSPBARCL) COURSES

### UNDERGRADUATE COURSES IN OVERSEAS STUDIES: BARCELONA

#### **OSPBARCL 112. History of Spanish Cinema—**

Socio-political and cultural films as well as some major indigenous films. Meet with Catalan cinema professionals including a filmmaker, a director and a young veteran producer.

5 units, Aut (Staff)

#### **OSPBARCL 121. Unequal Experiences: Women's Lives in Spanish History—**

Analysis of Spanish women's life experiences in past 500 years. Relationship between gender, society, culture, politics and progress in the Spanish context; additionally current debates and perspectives. Use of individual biographies known as life



5 units, Aut (Staff)

**OSPBARCL 164C. Universitat Pompeu Fabra: Natural Science 3—**

Student selection from catalog of Universitat Pompeu Fabra.  
5 units, Aut (Staff)

**OSPBARCL 166A. Universitat Pompeu Fabra: Engineering 1—**

Student selection from catalog of Universitat Pompeu Fabra.  
5 units, Aut (Staff)

**OSPBARCL 166B. Universitat Pompeu Fabra: Engineering 2—**

Student selection from catalog of Universitat Pompeu Fabra.  
5 units, Aut (Staff)

**OSPBARCL 166C. Universitat Pompeu Fabra: Engineering 3—**

Student selection from catalog of Universitat Pompeu Fabra.  
5 units, Aut (Staff)

## OVERSEAS STUDIES: BEIJING (OSPBEIJ) COURSES

### UNDERGRADUATE COURSES IN OVERSEAS STUDIES: BEIJING

**OSPBEIJ 1C. First-Year Modern Chinese, First Quarter—**

Conversation, grammar, reading, elementary composition.  
5 units, Aut (Zhu, X)

**OSPBEIJ 3C. First-Year Modern Chinese, Third Quarter—**

5 units, Spr (Zhu, X)

**OSPBEIJ 6C. Beginning Conversational Chinese, First Quarter—**

Three quarter sequence. Basic language skills in Mandarin to function abroad.  
2 units, Aut (Staff, 1)

**OSPBEIJ 9. Chinese Language Tutorial—**

2 units, Aut (Wang, Y), Spr (Wang, Y)

**OSPBEIJ 10. Beijing Past and Present—**

Introduction to the history, culture, and people of Beijing via field trips to historical sites, old and new neighborhoods, art district and local museums, film and performance in and around Beijing.  
1 unit, Aut (Sun, C)

**OSPBEIJ 17. Chinese Film Studies—**

Stages of Chinese cinema from the establishment of P.R. China in 1949 to the present. State policies, filmmaking trends, representative filmmakers and films, and the state of the industry in the different periods, with close readings of some important films. Historical perspective and broad knowledge of Chinese cinema; academic approaches to film studies. GER:DB-Hum  
4 units, Aut (Qin, L)

**OSPBEIJ 20. Communication, Culture, and Society: The Chinese Way—**

How people communicate, what they achieve through their communications, and the social and cultural consequences of these communicative behaviors. Focus on the interactive relationship between communication, culture and society in China. How communication habits are influenced by the individual's culture and how communication acts help to change and transform the society in which we live. GER:DB-SocSci  
4 units, Spr (Gong, W)

**OSPBEIJ 21C. Second-Year Modern Chinese—**

5 units, Aut (Qian, H)

**OSPBEIJ 23C. Second-Year Modern Chinese—**

5 units, Spr (Chen, L)

**OSPBEIJ 28. Chinese Language, Culture, and Society—**

Introduction to fundamental aspects of Chinese language and culture. Socio-linguistic issues covered include: legends of origin; sound system of modern Standard Chinese; the making of the national standard; dialects; word-formation strategies; the writing

system; language contacts, and neologism. Develop awareness of diverse cultural underpinnings associated with various expressions of the language. Enhance ability to be a more effective learner of Chinese by learning to use the right language at the right time and avoid social awkwardness from saying the wrong thing at the wrong place/time. Prerequisite: CHINLANG 3. GER:DB-SocSci, EC-GlobalCom

4 units, Aut (Sun, C)

**OSPBEIJ 30. History of U.S.-China Relations—**

United States-China relations from the early 19th century to the recent past. Understand the relationship in actual time and circumstance while identifying enduring patterns and relevance for interpreting contemporary problems. Emphasis on the American side of the relationship, with Chinese perspectives included; special attention to the interaction of the two countries. Social and cultural dimensions emphasized to understand the mental context of high-level decision-making and politics. Appreciation of the importance of the human dimension, not just political or military events, in understanding the dynamics between the two countries. GER:DB-Hum

5 units, Spr (Chang, G)

**OSPBEIJ 32. Site, Memory, History: Beijing as Place—**

Examine specific sites in and around Beijing taking advantage of historical sites that offer a unique experience in understanding history. Relationship between sites, current memory, and historical understanding. Textual research and personal interview. Sites include the Foreign Legation quarter, the Marco Polo Bridge, the grave site of Edgar Snow, Tian'anmen Gate, the old and new Summer Palaces. GER:DB-Hum

5 units, Spr (Chang, G)

**OSPBEIJ 40. Research Projects in Chinese Language—**

In-depth sociolinguistic projects on topics, ranging from language change to language loss. Topics may also include an aspect of language policy, language contact, the sound system of a Chinese dialect, or an ethnic language, in-depth study of a certain linguistic construction, its writing system, or any topic of interest that can be sufficiently studied within a time span of three months. Enrollment in OSPBEIJ 28 encouraged. Prerequisite: CHINLANG 23.

3 units, Aut (Staff)

**OSPBEIJ 41. Chinese Society and Business Culture—**

Key features of Chinese society and their applications to Chinese business culture from a sociological perspective. Structural differences between Chinese and U.S. societies and their social, economic, and cultural implications. Emerging patterns in areas such as retailing and consumer behaviors, work relations and management, and business negotiation and collaboration. GER:DB-SocSci, EC-GlobalCom

4 units, Spr (Li, B)

**OSPBEIJ 42. Chinese Media Studies—**

Fundamental changes in Chinese media. Issues such as: how Chinese media emerge and evolve against the background of modern Chinese history; how they interact with government, sponsors, receivers, and other social institutions; and implications for Chinese social development. GER:DB-SocSci, EC-GlobalCom

4 units, Aut (Li, K)

**OSPBEIJ 48. Chinese Literature: Tradition in Transformation—**

Classical Chinese literature from the beginning (ca. 1000 BC) to the 14th century. Primary texts in translation with attention to the poetic works that feature Chinese literary tradition. Understanding of past experience of Chinese people living in another cultural space through observation, analysis, and reconstruction. GER:DB-Hum

4 units, Spr (Zhang, P)

**OSPBEIJ 55. Chinese Economy in Transition—**

From planned regime to market economy: political economy and institutional aspects of China's economic transition and open-door policy. How can China achieve economic success given disadvantages in natural resources, human capital stock, and institutional arrangements? Theoretical economic analysis, empirical data, and case studies. Emergence of China as an economic superpower; major challenges ahead. GER:DB-SocSci, EC-GlobalCom

5 units, Spr (Zhou, L)

**OSPBEIJ 66. Essentials of China's Criminal Justice System—** Criminal laws and cases. Topics include criminal legal thinking, liability, prosecution and defense in criminal litigation, death penalty debates, evidence and compulsory measures, and the Chinese prison system. Comparisons with other systems. Human rights protection. GER:DB-SocSci, EC-GlobalCom  
5 units, Aut (Wang, S)

**OSPBEIJ 67. China-Africa and Middle East Relations—** China's relations with the outside world, with a focus on Africa and the Middle East. Historically contextualized relations; evolution of relations within the international climate during different periods, especially in the present; impact of geopolitical and geoeconomic relations on the existing international order. GER:DB-SocSci, EC-GlobalCom  
4 units, Aut (Wang, S; Li, A)

**OSPBEIJ 101C. Third-Year Modern Chinese—**  
5 units, Aut (Zhu, X)

**OSPBEIJ 103C. Third-Year Modern Chinese—**  
5 units, Spr (Zhu, X)

**OSPBEIJ 199A. Directed Reading A—**  
1-4 units, Aut (Staff), Spr (Staff)

**OSPBEIJ 199B. Directed Reading B—**  
1-4 units, Aut (Staff), Spr (Staff)

**OSPBEIJ 211C. Advanced Modern Chinese—**  
5 units, Aut (Wang, Y)

## OVERSEAS STUDIES: BERLIN (OSPBER) COURSES

### UNDERGRADUATE COURSES IN OVERSEAS STUDIES: BERLIN

**OSPBER 1Z. Accelerated German: First and Second Quarters—**  
A jump start to the German language, enabling students with no prior German to study at the Berlin Center. Covers GERLANG 1 and 2 in one quarter.  
8 units, Aut (Wohlfeil, J), Win (Wohlfeil, J)

**OSPBER 2Z. Accelerated German, Second and Third Quarters—**  
Qualifies students for participation in an internship following the study quarter. Emphasis is on communicative patterns in everyday life and in the German work environment, including preparation for interviews.  
8 units, Spr (Wohlfeil, J)

**OSPBER 12. The Politics of Memory—**  
Politics of memorializing WW II focusing on Berlin. How the memory of WW II and its representation became constitutive to the self-consciousness of democratic culture in Germany. What constitutes the nature of collective memory; who has the authority to represent the war; the function of the memorial in public consciousness; and limits of representation of terror or genocide. Theoretical literature on politics of memory. Field trips to memorials. GER:DB-SocSci, EC-GlobalCom  
3 units, Aut (Fonrobert, C)

**OSPBER 13. Jewish and Muslim Berlin—**  
History of Jewish life in Berlin leading up to WW II, focusing on moments of literary and cultural creativity: the Jewish Enlightenment in Berlin; forms of protest against bourgeois German-Jewish culture; and literary, artistic, and political productivity of the interwar period. Cultural relationship between Germans and Jews. These historical dynamics as background to current discussion about the place of Islam and Muslim culture in contemporary Germany and Berlin. Site visits in Berlin. GER:DB-SocSci, EC-GlobalCom  
3 units, Aut (Fonrobert, C)

**OSPBER 14. Clausewitz and Sunzi—**  
Comparison of the basic ideas about warfare and the art of command in the western world with those in China through Clausewitz's *On War* and Sunzi's *Art of War*. Questions include:

how the two texts relate to the respective philosophical traditions from which they emerge; how the nature of both texts is influenced by their position within the long-term, historical development of writings about warfare in the West and the East; why the two texts take a very different approach to violence as an intellectual problem.

3-5 units, Spr (Lewis, M)

**OSPBER 15. Shifting Alliances? The European Union and the U.S.—**

The development of European integration, a model for global security and peace, and a possible replacement for the U.S. position as unilateral superpower. Competing arguments about the state of transatlantic relations. GER:DB-SocSci, EC-GlobalCom  
4-5 units, Spr (Brueckner, U)

**OSPBER 17. Split Images: A Century of Cinema—**  
20th-century German culture through film. The silent era, Weimar, and the instrumentalization of film in the Third Reich. The postwar era: ideological and aesthetic codes of DEFA, new German cinema, and post-Wende filmmaking including *Run Lola Run* and *Goodbye Lenin*. Aesthetic aspects of the films including image composition, camera and editing techniques, and relation between sound and image. GER:DB-Hum, EC-GlobalCom  
4 units, Aut (Kramer, K)

**OSPBER 20. German Film and the Berlin Film Festival—**  
German cinema from the silent era to *das neue Kino*. Weekly screenings with readings on the history of cinema, specific directors, and the larger social and political backdrop. Topics include: Ruttman's modernist look at Berlin; socialist/leftist perspectives of (early) Lang and Brecht; pro-Nazi documentaries of Riefenstahl; *das neue Kino* principals Shlöndorff, Herzog and Fassbinder. During the Berlin Film Festival, we will see over 20 films, focusing on documentaries dealing with global issues (environment, human rights, economic inequality, and liberation movements).  
3-5 units, Win (Rehm, R)

**OSPBER 21B. Intermediate German—**  
Grammar review, vocabulary building, writing, and discussion of German culture, literature, and film. Corequisite: OSPBER 100B.  
5 units, Aut (Biege, M), Win (Boebe, D), Spr (Boebe, D)

**OSPBER 23. Opera in Berlin—**  
Introduction to opera in Berlin. Lectures and discussion preceding opera attendance (at the Deutsche Oper, Staatsoper, and Komische Oper) place the operas in their musical, historical, and cultural contexts, and post-opera discussions deal with specifics of the production, performance, and interpretation in question. No previous knowledge of opera is required, nor must students read music. GER:DB-Hum  
3-5 units, Win (Rehm, R)

**OSPBER 30. Berlin vor Ort: A Field Trip Module—**  
The cultures of Berlin as preserved in museums, monuments, and architecture. Berlin's cityscape as a narrative of its history from baroque palaces to vestiges of E. German communism, from 19th-century industrialism to grim edifices of the Sachsenhausen concentration camp.  
1 unit, Aut (Jander, M), Win (Pabsch, M), Spr (Jander, M)

**OSPBER 40B. Introductory Electronics—**  
Electrical quantities and their measurement, including operation of the oscilloscope. Function of electronic components including resistor, capacitor, and inductor. Analog circuits including the operational amplifier and tuned circuits. Digital logic circuits and their functions. Lab assignments. Prerequisite: PHYSICS 43. GER:DB-EngrAppSci  
5 units, Aut (Howe, R), Win (Howe, R), Spr (Wong, S)

**OSPBER 50. Female Divinities in Europe & China—**  
Forms in which women figured in the spirit world in medieval and early modern Europe compared to the same period in China. The Virgin Mary and the bodhisattva Guanyin provide the primary point of comparison. Points of contrast include: motherhood as a divergent value; relations between the household and the broader social order; distinction between a bad death and martyrdom as a route to divinity; sex as a problem versus the concern with ritual pollution. GER:DB-Hum, EC-Gender  
3-5 units, Spr (Lewis, M)

**OSPBER 50B. Introductory Science of Materials—**

GER:DB-EngrAppSci

4 units, Aut (Staff, I)

**OSPBER 50M. Introductory Science of Materials—**

Topics include: the relationship between atomic structure and macroscopic properties of man-made and natural materials; mechanical and thermodynamic behavior of surgical implants including alloys, ceramics, and polymers; and materials selection for biotechnology applications such as contact lenses, artificial joints, and cardiovascular stents. No prerequisite.

4 units, Win (Staff), Spr (Staff)

**OSPBER 60. Cityscape as History: Architecture and Urban****Design in Berlin—**

Diversity of Berlin's architecture and urban design resulting from its historical background. Architect Ludwig Mies van der Rohe and his artistic ancestors. Role of the cultural exchange between Germany and the U.S. Changing nature of the city from the 19th century to the present. GER:DB-Hum

5 units, Aut (Pabsch, M)

**OSPBER 66. Theory from the Bleachers: Reading German Sports and Culture—**

German culture past and present through the lens of sports. Intellectual, societal, and historical-political contexts. Comparisons to Britain, France, and the U.S. The concepts of Körperkultur, Leistung, Show, Verein, and Haltung. Fair play, the relation of team and individual, production and deconstruction of sports heroes and heroines, and sports nationalism. Sources include sports narrations and images, attendance at sports events, and English and German texts. GER:DB-SocSci

3 units, Win (Junghanns, W)

**OSPBER 70. The Long Way to the West: German History from the 18th Century to the Present—**

Battles still current within Germany's collective memory. Sources include the narrative resources of museums, and experts on the German history in Berlin and Potsdam. Field trips. GER:DB-Hum, EC-GlobalCom

5 units, Win (Jander, M)

**OSPBER 100B. Berlin Heute—**

Required for students enrolled in OSPBER 21B; open to students in other German language classes. Active use of German, including vocabulary from a variety of fields and disciplines, and discussion of current issues.

2 units, Aut (Tat, C), Win (Tat, C), Spr (Tat, C)

**OSPBER 101A. Contemporary Theater—**

Texts of plays supplemented by theoretical texts or reviews. Weekly theater visits, a tour of backstage facilities, and discussions with actors, directors, or other theater professionals. In German. Prerequisite: completion of GERLANG 3 or equivalent. GER:DB-Hum

5 units, Spr (Kramer, K)

**OSPBER 101B. Advanced German—**

For intermediate and advanced students. Focus is on Berlin through film, literature, music, live performance, news media, and field trips. Essay writing, vocabulary building, and in-class presentations. Reading literature and news stories, essay writing, vocabulary building, and in-class presentations.

5 units, Aut (Biege, M), Win (Biege, M), Spr (Biege, M)

**OSPBER 115X. The German Economy: Past and Present—**

The history of the German economy in the Wilhelmine Empire, the Weimar Republic, the Third Reich, the postwar real socialism of the GDR, and the free market economy of the FRG. The processes of economic transition since unification and current challenges faced by united Germany. GER:DB-SocSci, DB-SocSci, EC-GlobalCom

4-5 units, Aut (Klein, I)

**OSPBER 126X. A People's Union? Money, Markets, and Identity in the EU—**

The institutional architecture of the EU and its current agenda. Weaknesses, strengths, and relations with partners and neighbors. Discussions with European students. Field trips; guest speakers. GER:DB-SocSci, DB-SocSci, EC-GlobalCom

4-5 units, Aut (Brueckner, U)

**OSPBER 161X. The German Economy in the Age of****Globalization—**

Germany's role in the world economy: trade, international financial markets, position within the European Union; economic relations with Eastern Europe, Russia, the Third World, and the U.S. International aspects of German economic and environmental policies. The globalization of the world's economy and Germany's competitiveness as a location for production, services, and R&D, focusing on the German car industry. GER:DB-SocSci, DB-SocSci, EC-GlobalCom

4-5 units, Win (Klein, I)

**OSPBER 174. Sports, Culture, and Gender in Comparative Perspective—**

Theory and history of mass spectator sports and their role in modern societies. Comparisons with U.S., Britain, and France; the peculiarities of sports in German culture. Body and competition cultures, with emphasis on the entry of women into sports, the modification of body ideals, and the formation and negotiation of gender identities in and through sports. The relationship between sports and politics, including the 1936 Berlin Olympic Games. GER:DB-SocSci, EC-Gender

5 units, Spr (Junghanns, W)

**OSPBER 177A. Culture and Politics in Modern Germany—**

Key paradigms of modern Germany: German romanticism, the belated state and national identity, National Socialism and the Holocaust, Germany divided and unified. Literary, analytical, and theoretical texts; newspaper articles; film and TV; oral history. GER:DB-SocSci, EC-Gender

4-5 units, Win (Kramer, K)

**OSPBER 198D. Humboldt Universität: Humanities 2—**

1-3 units, Aut (Staff), Win (Staff), Spr (Staff)

**OSPBER 198F. Humboldt Universität: Social Sciences 2—**

1-3 units, Aut (Staff), Win (Staff), Spr (Staff)

**OSPBER 198H. Freie Universität: Humanities 3—**

1-5 units, Spr (Staff)

**OSPBER 198K. Weissensee Art University 1—**

1-4 units, Spr (Staff)

**OSPBER 198L. Weissensee Art University 2—**

1-4 units, Spr (Staff)

**OSPBER 198M. Weissensee Art University 3—**

1-4 units, Spr (Staff)

**OSPBER 199A. Directed Reading A—**

2-4 units, Aut (Staff), Win (Staff), Spr (Staff)

**OSPBER 199B. Directed Reading B—**

2-3 units, Aut (Staff), Win (Staff), Spr (Staff)

**OSPBER 199D. Humboldt Universität: Humanities—**

1-3 units, Aut (Staff), Win (Staff), Spr (Staff)

**OSPBER 199F. Humboldt Universität: Social Sciences—**

1-3 units, Aut (Staff), Win (Staff), Spr (Staff)

**OSPBER 199G. Freie Universität: Social Sciences 1—**

1-3 units, Aut (Staff), Win (Staff), Spr (Staff)

**OSPBER 199H. Freie Universität: Humanities 1—**

1-3 units, Aut (Staff), Win (Staff), Spr (Staff)

**OSPBER 199J. Freie Universität: Natural Sciences 1—**

1-3 units, Aut (Staff), Win (Staff), Spr (Staff)

**OSPBER 199K. Freie Universität: Social Sciences 2—**

1-3 units, Aut (Staff), Win (Staff), Spr (Staff)

**OSPBER 199L. Freie Universität: Humanities 2—**

1-3 units, Aut (Staff), Win (Staff), Spr (Staff)

**OSPBER 199M. Freie Universität: Natural Sciences 2—**

1-3 units, Aut (Staff), Win (Staff), Spr (Staff)

## OVERSEAS STUDIES: CAPETOWN (OSPCPTWNL) COURSES

### UNDERGRADUATE COURSES IN OVERSEAS STUDIES: CAPETOWN

#### OSPCPTWN 10. Minding Opportunity Gaps: Educational & Social Policy in South Africa—

Focuses on economic and social relations in South Africa through an examination of research and policies to reduce inequality in contemporary South Africa. Examines an array of explanations and perspectives about various social, economic, and political outcomes as they reflect in the current status of communities, the economy, government, and schools in contemporary South Africa. GER:DB-SocSci

4 units, Win (Carter, P)

#### OSPCPTWN 11. Education & Schooling in Post-Apartheid South Africa—

Examines the evolution of South African education and schools since the advent of democracy in 1994. Focuses on key sociological paradigms and approaches to the study of education and its role in the modern world, applied to South African society. Identifies sources of educational change, the organizational context of schooling, the interplay between social stratification and schooling, and the factors attributable to differences in academic achievement outcomes among different social groups. Includes option of service-learning in a South African school. GER:DB-SocSci

4-5 units, Win (Carter, P)

#### OSPCPTWN 16. South Africa Sites of Memory—

Required Course. Relation between conventional histories and different kinds of individual and collective memory that are focused on places and spaces, testing the relation between grand narratives and more particularized pasts. Questions of cultural heritage, in particular its contestations among individual, familial, local, national, and international interests.

2 units, Win (Stanton, T)

#### OSPCPTWN 17. Western Cape Sites of Memory—

Required Course. Relation between conventional histories and different kinds of individual and collective memory that are focused on places and spaces, testing the relation between grand narratives and more particularized pasts. Questions of cultural heritage, in particular its contestations among individual, familial, local, national, and international interests.

1 unit, Spr (Stanton, T)

#### OSPCPTWN 18. Xhosa Language and Culture—

History of the Xhosa language; understanding Xhosa culture and way of life. Listening, speaking, reading and writing, combined with the social uses of the language in everyday conversations and interactions. Intercultural communication. Content drawn from the students' experiences in local communities through their service learning/volunteer activities to support the building of the relationships in these communities. How language shapes communication and interaction strategies.

2 units, Win (Tyam, N), Spr (Tyam, N)

#### OSPCPTWN 22. Preparation for Community-Based Research in Community Health and Development—

For students intending to engage in community-based research in South Africa in the summer following spring study quarter in Cape Town. Approaches and methods of collaborative, community-based research; qualitative data gathering and analysis methods in community-based research; effective collaboration with community partners and data sources; race and privilege in community-based research. Identifying research partners and sponsors; articulating potential research questions; and planning research projects.

3 units, Spr (Stanton, T)

#### OSPCPTWN 24A. Targeted Research Project in Community Health and Development—

Two-quarter sequence for students engaging in Cape Town-sponsored community based research. Introduction to approaches,

methods and critical issues of partnership-based, community-engaged research and to the community-based research partners. Qualitative data gathering and analysis methods in community-based research; effective collaboration with community partners and data sources; race and privilege in community-based research. Preparation of research proposals and plans for research carried out during spring quarter through OSPCPTWN 24B.

3 units, Win (Stanton, T)

#### OSPCPTWN 24B. Targeted Research Project in Community Health and Development—

Two-quarter sequence for students engaging in Cape Town-sponsored community-based research. Substantive community health or development investigations in collaboration with the Stanford Centre's community partners: Western Cape NGOs or government agencies, or community-based organizations or groups. Students' research supported through methods workshops, sharing of progress and problems, and data and findings presentations. Prerequisite: OSPCPTWN 24A.

5 units, Spr (Stanton, T)

#### OSPCPTWN 31. Theory and Politics of Foreign Aid—

Political economy approach to foreign aid. Context of debate on development: differences between developed and less developed countries, concept of poverty, how to measure development. History of foreign aid; main actors and characteristics of official development assistance. Theoretical and empirical impact of aid with regard to economic growth and governance. Benefits and problems associated with aid.

3 units, Spr (Klingebiel, S)

#### OSPCPTWN 32. Learning, Development, and Social Change: Service Learning in the Contemporary South African Context—

Adult learning and its role in community social action; development; service learning. Micro contexts of people's daily lives and experiences in the context of an emergent democracy; understanding possibilities of community action and mobilisation for social change. Service in a historically marginalised community near Cape Town to understand realities of everyday life in informal settlements, to engage with education in a developmental context, and to gain insight into sociopolitical factors that shape social action and learning. GER:DB-SocSci, EC-GlobalCom

3-5 units, Win (McMillan, J), Spr (McMillan, J)

#### OSPCPTWN 33. From Apartheid to Democracy: Namibia and South Africa—

Comparison of the transition from apartheid to democracy in Namibia and South Africa. Focus on peaceful process involving negotiated settlement in South Africa. Significance of democracy in Namibia post 1990 and in South Africa post 1994; South Africa's truth and reconciliation commission and post-1994 economic policy. GER:EC-GlobalCom

4 units, Win (Saunders, C)

#### OSPCPTWN 36. The Archaeology of Southern African Hunter Gatherers—

Archaeology, history and ethnography of the aboriginal hunter gatherers of southern Africa, the San people. Formative development of early modern humans and prehistory of hunters in southern Africa before the advent of herding societies; rock paintings and engravings of the subcontinent as situated in this history. Spread of pastoralism throughout Africa. Problems facing the descendants of recent hunter gatherers and herders in southern Africa, the Khoisan people. GER:DB-SocSci, EC-GlobalCom

4 units, Spr (Parkington, J)

#### OSPCPTWN 38. Genocide: The African Experience—

Genocide as a major social and historical phenomenon, contextualized within African history. Time frame ranging from the extermination of indigenous Canary Islanders in the fourteenth and fifteenth centuries to more recent mass killings in Rwanda and Darfur. Emphasis on southern African case studies such Cape San communities and the Herero people in Namibia. Themes include: roles of racism, colonialism and nationalism in the making of African genocides. Relevance of other social phenomena such as modernity, Social Darwinism, ethnicity, warfare and revolution. Comparative perspective to elucidate global dimensions. GER:DB-SocSci, EC-GlobalCom

3-5 units, Win (Adhikari, M)

**OSPCTWN 43. Public and Community Health in Sub-Saharan Africa—**

Introduction to concept of public health as compared with clinical medicine. Within a public health context, the broad distribution of health problems in sub-Saharan Africa as compared with U.S. and Europe. In light of South Africa's status as a new democracy, changes that have occurred in health legislation, policy, and service arenas in past 16 years. Topics include: sector health care delivery, current distribution of infectious and chronic diseases, and issues related to sexual and reproductive health in South Africa. Site visits to public sector health services and health related NGOs.

4 units, Win (Cooper, D), Spr (Cooper, D)

**OSPCTWN 44. Negotiating Home, Citizenship and the South African City—**

Material and socio-cultural dimensions of the multiple spaces making up South African cities. The gendered, placed, sexual, and racial character of homes, neighborhoods, and cities. Ways in which crises such as housing shortages and tenure insecurity are materially and socially embodied in economically impoverished families and communities; lives. Interplay of this body politic with economic and political contexts in which the meaning of citizenship is crafted. Urban fieldwork with the Valhalla Park United Civic Front, a community-based organization in Cape Town. GER:DB-SocSci, EC-GlobalCom

4 units, Win (Oldfield, S)

**OSPCTWN 68. Cities in the 21st Century: Urbanization, Globalization and Security—**

Cities in a globalizing world. Themes: challenges posed by globalization; general and specific responses of cities to these challenges; security issues created by globalization and urbanization. Concerns related to food security, resource availability, and threat of political instability. Policies recommended by World Bank. Case study method. GER:DB-SocSci

4 units, Spr (Simons, M)

**OSPCTWN 199A. Directed Reading A—**

2-4 units, Win (Staff), Spr (Staff)

**OSPCTWN 199B. Directed Reading B—**

1-5 units, Spr (Staff)

## OVERSEAS STUDIES: FLORENCE (OSPFLOR) COURSES

### UNDERGRADUATE COURSES IN OVERSEAS STUDIES: FLORENCE

**OSPFLOR 21F. Accelerated Second-Year Italian, Part A—**

Review of grammatical structures; grammar in its communicative context. Listening, speaking, reading, and writing skills practiced and developed through authentic material such as songs, newspaper articles, video clips, and literature. Insight into the Italian culture and crosscultural understanding.

5 units, Aut (Quercioli, F), Win (Quercioli, F), Spr (Quercioli, F)

**OSPFLOR 22F. Accelerated Second-Year Italian Part B,—**

Grammatical structures, listening, reading, writing, speaking skills, and insight into the Italian culture through authentic materials. Intermediate to advanced grammar. Content-based course, using songs, video, and literature, to provide cultural background for academic courses.

5 units, Aut (Quercioli, F), Win (Quercioli, F), Spr (Quercioli, F)

**OSPFLOR 31F. Advanced Oral Communication: Italian—**

Refine language skills and develop insight into Italian culture using authentic materials. Group work and individual meetings with instructor. Minimum enrollment required. Prerequisite: ITALLANG 22A, 23 or placement.

3 units, Aut (Quercioli, F), Win (Quercioli, F), Spr (Quercioli, F)

**OSPFLOR 34. The Woman in Florentine Art—**

Influence and position of women in the history of Florence as revealed in its art. Sculptural, pictorial, and architectural sources from a social, historical, and art historical point of view. Themes: the virgin mother (middle ages); the goddess of beauty (Botticelli to mannerism); the grand duchess (late Renaissance, Baroque); the lady, the woman (19th-20th centuries). GER:DB-Hum, EC-Gender

4 units, Aut (Verdon, T)

**OSPFLOR 35. European Economic and Monetary Integration—**

Historical overview of economic and monetary integration process in Western Europe. European Union institutions: the Commission, the Parliament, the European Council, the Council of Ministers, and the Court of Justice. Microeconomic theory of inter-industry and intra-industry trade and the case of EU. Microeconomics of integration: the costs and benefits, also applicable to NAFTA. The Lisbon Strategy as a European response to the challenges of globalization. The euro, the dollar and the international monetary system. Monetary and fiscal policies in EMU: the European Central Bank and the Stability and Growth Pact. Prerequisites: ECON 51, 52 or equivalent. GER:DB-SocSci, EC-GlobalCom

5 units, Spr (Della Posta, P)

**OSPFLOR 41. The Contemporary Art Scene in Tuscany: Theory and Practice—**

The ever-changing and multifaceted scene of contemporary art through visual and sensorial stimulation. How art is thought of and produced in Italy today. Hands-on experience. Sketching and exercises on-site at museums and exhibits, plus workshops on techniques. Limited enrollment.

3-5 units, Aut (Rossi, F)

**OSPFLOR 42. Academic Internship—**

Mentored internships in banking, education, the fine arts, health, media, not-for-profit organizations, publishing, and retail. May be repeated for credit.

1-5 units, Aut (Campani, E), Win (Campani, E), Spr (Campani, E)

**OSPFLOR 44. The Revolution in Science: Galileo and the Birth of Modern Scientific Thought—**

Galileo's life and scientific progress starting from his student years at the University of Pisa. Departure from traditional natural philosophy leading to radical reformation of cosmology and physics, emphasizing the science of motion. His innovative use of observation and measurement instruments, emphasizing the telescope. Cultural and social context. GER:DB-Hum

5 units, Win (Galluzzi, P)

**OSPFLOR 48. Sharing Beauty: Florence and the Western Museum Tradition—**

The city's art and theories of how art should be presented. The history and typology of world-class collections. Social, economic, political, and aesthetic issues in museum planning and management. Collections include the Medici, English and American collectors of the Victorian era, and modern corporate and public patrons. GER:DB-Hum

4 units, Win (Rossi, F; Verdon, T)

**OSPFLOR 49. The Cinema Goes to War: Fascism and World War II as Represented in Italian and European Cinema—**

Structural and ideological attributes of narrative cinema, and theories of visual and cinematic representation. How film directors have translated history into stories, and war journals into visual images. Topics: the role of fascism in the development of Italian cinema and its phenomenology in film texts; cinema as a way of producing and reproducing constructions of history; film narratives as fictive metaphors of Italian cultural identity; film image, ideology, and politics of style. GER:DB-Hum

5 units, Win (Campani, E)

**OSPFLOR 50F. Introductory Science of Materials—**

GER:DB-EngrAppSci

4 units, Aut (Staff, 1)

**OSPFLOR 50M. Introductory Science of Materials—**

Topics include: the relationship between atomic structure and macroscopic properties of man-made and natural materials; mechanical and thermodynamic behavior of surgical implants including alloys, ceramics, and polymers; and materials selection

for biotechnology applications such as contact lenses, artificial joints, and cardiovascular stents. No prerequisite.

4 units, Win (Staff)

**OSPFLOR 51. Italian Foreign Policy and the Global Players—** Reshaping of foreign policy and its governing principles with the new balance of power of the early 21st century. Strategies underlying a country's long-term foreign policy, especially with respect to diplomatic models. Role of need for energy resources in foreign policy. Geographical and historical boundaries behind a foreign policy vision. Effect of foreign policy stance on the outcome of elections. Foreign policy shaping in Italy and its relationship between the Mediterranean and the rest of Europe. GER:DB-SocSci

5 units, Aut (Pistelli, L)

**OSPFLOR 53. Law and the Use of Force: An Historical Appraisal—**

Efforts by individuals, groups, and governments to control the use of force in human history through legal rules. Review of current laws, looking at both the right to engage in armed conflict and the manner in which armed conflict may be conducted. The UN Charter, relevant Geneva Conventions, and developments in humanitarian law related to non-combatants. Appraisal of whether and in what ways current legal rules and regimes have been effective. GER:DB-SocSci

3 units, Aut (Sofaer, A)

**OSPFLOR 54. High Renaissance and Maniera—**

The development of 15th- and early 16th-century art in Florence and Rome. Epochal changes in the art of Michelangelo and Raphael in the service of Pope Julius II. The impact of Roman High Renaissance art on masters such as Fra' Bartolomeo and Andrea del Sarto. The tragic circumstances surrounding the early maniera: Pontormo and Rosso Fiorentino and the transformation of early Mannerism into the elegant style of the Medicean court. Contemporary developments in Venice. GER:DB-Hum

5 units, Spr (Verdon, T)

**OSPFLOR 55. Academy of Fine Arts: Studio Art—**

Courses through the Accademia delle Belle Arti. Details upon arrival. Minimum Autumn and Winter Quarter enrollment required; 1-3 units in Autumn. May be repeated for credit.

1-5 units, Aut (Staff, 1), Win (Staff, 1), Spr (Staff, 1)

**OSPFLOR 56. University of Florence Courses—**

1-5 units, Aut (Campani, E), Win (Campani, E), Spr (Campani, E)

**OSPFLOR 57. Global Change and Italian Ecosystems: Management and Conservation for Mitigation—**

Introduction to state of the art of global climate change science, with a focus on the effects of global change on ecosystem functions and services, and on Europe as a regional case study. Conservation and management issues related to vulnerable Italian ecosystems through both lectures and field trips. Conservation practices and specific management issues focused on Tuscany, with ecosystems, ranging from the Tyrrhenian shores, surrounded by the typical Mediterranean chaparral to the sub-alpine environments on the Apennine mountains. GER:DB-NatSci

4 units, Spr (Cannicci, S)

**OSPFLOR 58. Space as History: Urban Change and Social Vision in Florence 1059 to the Present—**

A thousand years of intentional change in Florence. Phases include programmatic enlargement of ecclesiastical structures begun in the 11th century; aggressive expansion of religious and civic space in the 13th and 14th centuries; aggrandizement of private and public buildings in the 15th century; transformation of Florence into a princely capital from the 16th through the 18th centuries; traumatic remaking of the city's historic core in the 19th century; and development of new residential areas on the outskirts and in neighboring towns in the 20th and 21st centuries. GER:DB-Hum

4 units, Spr (Rossi, F; Verdon, T)

**OSPFLOR 59. Comparative Analysis of Entrepreneurship and Innovation: Italy & Silicon Valley—**

How entrepreneurship in Italy compares to Silicon Valley and other similar innovation clusters around the globe. Link to weekly seminar series with expert guest speaker series. Independent research and analysis of historical, current, and future potential for high-growth entrepreneurship in Italy and surrounding region.

2 units, Aut (Byers, T)

**OSPFLOR 63. Technology Entrepreneurship—**

How do you create a successful start-up? What is entrepreneurial leadership in a large firm? What are the differences between an idea and true opportunity? How does an entrepreneur form a team and gather the resources necessary to create a great enterprise? Formation and growth of high-impact start-ups in areas such as information, green/clean, medical and consumer technologies as well as social venture. Illustrations from early stages of Silicon Valley technology firms and similar firms in Europe. GER:DB-SocSci

4 units, Aut (Byers, T)

**OSPFLOR 66. Da Vinci: Renaissance Understanding of Anatomy—**

Da Vinci's work from the perspectives of modern anatomy. How knowledge of anatomy gained during the Renaissance period compares with modern concepts. Human anatomy depicted in da Vinci's notebooks and art compared with advanced renderings and modern studies with advanced imaging methods. The human figure from both biological and artistic perspectives. Museum visits including Uffizi and il Museo della Specola.

5 units, Win (Gold, G)

**OSPFLOR 67. Women in Italian Cinema: Maternity, Sexuality, and the Image—**

Film in the social construction of gender through the representation of the feminine, the female, and women. Female subjects, gaze, and identity through a historical, technical, and narrative frame. Emphasis is on gender, identity, and sexuality with references to feminist film theory from the early 70s to current methodologies based on semiotics, psychoanalysis, and cultural studies. Advantages and limitations of methods for textual analysis and the theories which inform them. Primarily in Italian. GER:DB-Hum, EC-Gender

4 units, Spr (Campani, E)

**OSPFLOR 69. The You No One Knows: Self Expression through Abstract Art—**

Overview of the birth and evolution of abstract art with visual background necessary to produce works of art free of a realistic representation. Movements and trends in abstract art; experimentation with different media and techniques.

4 units, Win (Rossi, F)

**OSPFLOR 70. Investigating In/exclusion: Study of Embodiment and Consumption in Italy—**

How do social anthropologists study belonging and marginalization? An introduction to anthropological methods, this course explores means by which, in contemporary Italy, bodies and consumer consumption mediate participation in/exclusion from social life. For instance, over the quarter together, we may examine how in Florence people and industries manage social ties to (a) family through health-inducing goods, (b) friendship circles by way of sartorial adornment, (c) gender status via cigarette use, and (d) ethnicity through food and eating. GER:DB-SocSci

5 units, Spr (Kohrman, M)

**OSPFLOR 71. Becoming an Artist in Florence: Contemporary Art in Tuscany and New Tendencies in the Visual Future—**

Recent trends in art, current Italian artistic production, differences and the dialogue among visual arts. Events, schools, and movements of the 20th century. Theoretical background and practical training in various media. Work at the Stanford Center and on site at museums, exhibits, and out in the city armed with a sketchbook and camera. Emphasis is on drawing as the key to the visual arts. Workshops to master the techniques introduced. Limited enrollment.

3-5 units, Spr (Rossi, F)

**OSPFLOR 72. Independent Study Projects: Mini-ethnographies—**

Fieldwork based extension of OSPFLOR 70, Investigating In-/Exclusion. Mini ethnographies on themes from seminar conducted first in host household, then neighborhoods near residence and beyond in an expanding radius. Focus on belonging/exclusion and its relationship to market modulated forms of corporeality.

5 units, Spr (Staff)



**OSPFLOR 75. Florence in the Renaissance—**

Using a series of texts written by 14th and 15th century Florentines, look at the urban values of the city's citizens. Topics include: thinking about urban space; social relations; the values attached to politics, money, family, religion. How meanings of words such as *state*, *government*, and *family* might have changed over time. GER:DB-Hum

5 units, Spr (Molho, A)

**OSPFLOR 76. Da Vinci to Morgagni: Development of Modern Medicine and Pathology—**

Project-based exploration of the development of modern concepts of medicine and pathology. The Renaissance masters' understanding of medicine and pathology and how it evolved into modern concepts of pathology and disease. Visits to University of Florence Museum of Pathological Anatomy and La Specola.

3 units, Win (Gold, G)

**OSPFLOR 78. An Extraordinary Experiment: Politics and Policies of the New European Union—**

Institutional design of EU, forthcoming changes, and comparison of the old and new designs. Interactions between the EU, member states, organized interests, and public opinion. Major policies of the EU that affect economics such as competition or cohesion policies, market deregulation, and single currency. Consequences of the expansion eastwards. The role of institutions as a set of constraints and opportunities for the economic actors; relationships between political developments and economic change in the context of regional integration; lessons for other parts of the world. GER:DB-SocSci, EC-GlobalCom

5 units, Win (Morlino, L)

**OSPFLOR 79. Migrations and Migrants: The Sociology of a New Phenomenon—**

Interdisciplinary approach to the study of immigration. Typology of forms of migration through politics put into action by the EU and within single nations. Related cultural and religious questions which elicit symbolic borders, territorialization of cultural identities, and the often spatial differentiation of immigrants and locals. The politics of integration and the instruments necessary to manage it. GER:DB-SocSci, EC-GlobalCom

5 units, Win (Allam, L)

**OSPFLOR 111Y. From Giotto to Michelangelo: Introduction to the Renaissance in Florence—**

Lectures, site visits, and readings reconstruct the circumstances that favored the flowering of architecture, sculpture, and painting in Florence and Italy, late 13th to early 16th century. Emphasis is on the classical roots; the particular relationship with nature; the commitment to human expressiveness; and rootedness in the real-world experience, translated in sculpture and painting as powerful plasticity, perspective space, and interest in movement and emotion. GER:DB-Hum

4 units, Win (Verdon, T)

**OSPFLOR 115Y. The Duomo and Palazzo della Signoria: Symbols of a Civilization—**

The history, history of art, and symbolism of the two principal monuments of Florence: the cathedral and the town hall. Common meaning and ideological differences between the religious and civic symbols of Florence's history from the time of Giotto and the first Guelf republic to Bronzino and Giovanni da Bologna and the Grand Duchy. GER:DB-Hum

4 units, Aut (Verdon, T)

**OSPFLOR 134F. Modernist Italian Cinema—**

As the embodiment of modernity, cinema develops in the wake of modernism proper, but can be understood as one of its technological and aesthetic expressions. Topics: cinema's archaeology in futurist texts and theories with their nationalistic political flavor and their iconoclastic, radical, and interdisciplinary rethinking of the language and form of all the arts (Marinetti, Pirandello, D'Annunzio). GER:DB-Hum

5 units, Aut (Campani, E)

**OSPFLOR 199A. Directed Reading A—**

1-4 units, Aut (Staff), Win (Staff), Spr (Staff)

**OSPFLOR 199B. Directed Reading B—**

1-4 units, Aut (Staff), Win (Staff), Spr (Staff)

## OVERSEAS STUDIES: KYOTO-KCJS (OSPKYOCT) COURSES

### UNDERGRADUATE COURSES IN OVERSEAS STUDIES: KYOTO-KCJS

**OSPKYOCT 103A. Third-Year Japanese I—**

Preparation for function beyond basic level in a Japanese-speaking environment by developing and enhancing communicative competence through: review of basic grammar; new grammar; reading short essays and articles with help of dictionary; short writing and speaking assignments using formal style to describe, explain, and discuss sociocultural topics; enhancing listening comprehension.

12 units, Aut (Staff)

**OSPKYOCT 103B. Third-Year Japanese II—**

Preparation for function beyond basic level in a Japanese-speaking environment by developing and enhancing communicative competence through: review of basic grammar; new grammar; reading short essays and articles with help of dictionary; short writing and speaking assignments using formal style to describe, explain, and discuss sociocultural topics; enhancing listening comprehension.

12 units, Win (Staff)

**OSPKYOCT 104A. Fourth-Year Japanese I—**

Emphasis on applications of correct grammar and strengthening academic communication skills through: reading longer essays, articles, and novels with some dictionary work; reading and writing assignments in paragraph format using formal style to describe, explain and discuss sociocultural topics; developing listening comprehension.

12 units, Aut (Staff)

**OSPKYOCT 104B. Fourth-Year Japanese II—**

Emphasis on applications of correct grammar and strengthening academic communication skills through: reading longer essays, articles, and novels with some dictionary work; reading and writing assignments in paragraph format using formal style to describe, explain and discuss sociocultural topics; developing listening comprehension.

12 units, Win (Staff)

**OSPKYOCT 105A. Fifth-Year Japanese I—**

For students with advanced proficiency. Goals include advanced command of grammar, composition, and stylistics. Emphasis is on academic Japanese preparing students to audit classes at a Japanese university.

12 units, Aut (Staff)

**OSPKYOCT 105B. Fifth-Year Japanese II—**

For students with advanced proficiency. Goals include advanced command of grammar, composition, and stylistics. Emphasis is on academic Japanese preparing students to audit classes at a Japanese university.

12 units, Win (Staff)

**OSPKYOCT 107. Language Use in the Anime of Miyazaki****Hayao—**

Japanese language in action. How language usage can vary by situation such as relative social distance between participants, type of interaction or event, in/out group membership, and attitudinal stance on discussion topic. How linguistic behavior of a character contributes to overall portrayal and identity in a film. Film dubbings and subtitles. Multimedia projects.

6 units, Aut (Staff)

**OSPKYOCT 108. Lost in Translation—**

The art and practice of translating literary texts from a variety of periods and genres. Strategies for translation and essays on translation by literary translators and theorists. Notable translations of Japanese literature in connection with the original texts. Students develop individual translation projects.

6 units, Spr (Staff)

**OSPKYOCT 109. Exploring Language and Food in Kyoto—**

How local Kyoto food purveyors use language to market and present their wares and how they communicate with customers.

Readings on Japanese food culture from anthropology, history and literature as well as topics in linguistics. Students will also take notes on spoken language use by staff and customers and gather samples of written language from selected shops and restaurants.

6 units, Spr (Staff)

**OSPKYOCT 118. Politics and Political Economy of Japan—**

Post-World War II politics and political economy of Japan. Examine policymaking related to economic development, employment, and equal opportunity, as well as political institutions such as party politics and voting systems. Major theme is apparent disjuncture in policymaking performance before and after 1990.

6 units, Spr (Staff)

**OSPKYOCT 127. Outside the Mainstream: The Minority Experience in Japan—**

Historical analysis of how minority communities came into existence and struggled to maintain a distinctive lifestyle in Japan's homogeneous society. Japan's 1979 ratification of UN International Covenant on Civil and Political Rights.

6 units, Aut (Staff), Win (Staff)

**OSPKYOCT 128. Families and Work in Post-war Japan—**

Factors that promoted both change and continuity in the social division of labor between the interdependent spheres of work and family. How cultural strategies for organizing contemporary Japanese social life were conditioned 1) by rapid industrialization and growth and 2) by later economic stasis. Class, gender, and regional variations; role of social psychology in Japanese responses to work-family conflicts.

6 units, Aut (Staff), Win (Staff)

**OSPKYOCT 132. Japanese Growth and Business Development—**

History, structure, and operation of the Japanese economy and business. Emphasis is on structural and institutional factors in the maturity and decline of Japan's international competitiveness since the early 80s. Field trips and films complement lectures and student presentations.

6 units, Aut (Staff), Win (Staff)

**OSPKYOCT 154. History and Culture of Japan—**

Survey of cultural, political, and economic history of Japan. Fundamental values and aspirations of Japanese who lived in different historical periods; analysis of political, social, and economic systems developed to represent beliefs and ambitions of different eras. Impact on domestic events from inclusion in the East Asia cultural zone and from interactions with the West.

6 units, Aut (Staff), Win (Staff)

**OSPKYOCT 164. Kansai Area Arts—**

Kansai area, in particular the golden triangle formed by cities of Kyoto, Osaka, and Nara, as the center of Japanese art production from 4th century until the 17th century when patronage shifted to Tokyo. Focus is on painting and sculpture through readings, classroom discussion, and field trips.

6 units, Spr (Staff)

**OSPKYOCT 168. Japan in the Middle Ages—**

Topics central to Japan's medieval revolution: construction of new forms of political authority; emergence of fresh cultural norms; appearance of Zen and popular religious sects; intersection of innovative Zen arts with samurai government; new visibility of commoners and women in written and visual records; interactions with others in Asia.

6 units, Spr (Staff)

**OSPKYOCT 185. Noh and Kyogen—**

Noh drama as a mirror of Muromachi period culture. Broad literary heritage and Buddhist precepts reflected in plays. Performance traditions such as Shinto ritual, court dance, harvest festivals, exorcism rites, and narrative entertainment. Wider context of world drama and dramatic theories of the creators of Noh. Close reading of representative plays and first hand experience of performance.

6 units, Aut (Staff), Win (Staff)

**OSPKYOCT 197. Independent Studies—**

Focused research using the Japanese language and taking advantage of local Kyoto resources. Directed reading and research, weekly meetings with professor, and final research paper. For full-year students with language skills adequate for the proposed

research.

6 units, Spr (Staff)

**OSPKYOCT 198. Women's Issues in Japan—**

Women's issues as related to men's issues in Japan. The house system and the legalized prostitution system in modern Japan. Topics include marriage, gender division of labor, child bearing, contraception, and domestic violence. How the private sphere is influenced by the public sphere including politics, economy, and culture.

6 units, Spr (Staff)

## OVERSEAS STUDIES: KYOTO (OSPKYOTO) COURSES

### UNDERGRADUATE COURSES IN OVERSEAS STUDIES: KYOTO

**OSPKYOTO 9K. First-Year Japanese Language, Culture, and Communication B—**

5 units, Spr (Tanaka, K; Asami, N)

**OSPKYOTO 10. Gamelan to Kabuki: Musical Traditions of Far East Asia—**

Introduction to traditional musical cultures of the Far East with an emphasis on Japan. Listening, viewing and study of prominent musical examples. Survey of unique traditional instruments and ensembles in a range of performance contexts, from sacred rituals to secular dance and theater. Traditional genres and their impact on local and global musical culture of today. Development of critical listening skills. Live performances and encounters with local masters; early morning monastery chanting; visits to Bunraku and Kabuki theaters. GER:DB-Hum, EC-GlobalCom

4 units, Spr (Kapuscinski, J)

**OSPKYOTO 11. Experiencing Ma: Time & Space in Japanese Arts—**

The study, experience, and expression of Ma, a key concept in Japanese art, through field trips, meetings with artists, empirical research, presentations, and creative projects. Exploration and comparative examination of landscape gardens, architecture, calligraphy, ikebana, tea ceremony, poetry, theater, classical music, media art, installation art, dance, and cuisine. Visits to gardens, temples, museums, concerts, and events in Kyoto and nearby cities as catalysts for discussion of Japanese cultural identity and its distinctiveness within the global community. GER:DB-Hum

4 units, Spr (Kapuscinski, J)

**OSPKYOTO 17K. Second-Year Japanese Language, Culture, and Communication B—**

5 units, Spr (Fujiwara, T; Ueda, H)

**OSPKYOTO 17R. Religion and Japanese Culture—**

Major religious traditions of Japan. Topics include: relation between religion and culture; ancient Japanese religion and Shinto; Buddhist schools of Heian Japan; Zen Buddhism as it flourished in the Kamakura period; Confucianism, as originally conceived in ancient China and as transmitted to Japan in the Edo period in its neo-Confucian form; characteristic modern practices. Field trips to religious centers to observe current religious practices. GER:DB-Hum, EC-GlobalCom

4-5 units, Spr (Ludvik, C)

**OSPKYOTO 19K. Second-Year Japanese Language, Culture, and Communication B—**

5 units, Spr (Kawahara, Y; Tanaka, K)

**OSPKYOTO 33. Digital Systems II—**

The design of processor-based digital systems. Instruction sets, addressing modes, data types. Assembly language programming, low-level data structures, introduction to operating systems and compilers. Processor microarchitecture, microprogramming, pipelining. Memory systems and caches. Input/output, interrupts, buses and DMA. System design implementation alternatives, software/hardware tradeoffs. Labs involve the design of processor subsystems and processor-based embedded systems. Prerequisite: 108A, CS 106B. GER:DB-EngrAppSci

3-4 units, Spr (Kozyrakis, C)

**OSPKYOTO 40K. Introductory Electronics—**

Electrical quantities and their measurement, including operation of the oscilloscope. Function of electronic components including resistor, capacitor, and inductor. Analog circuits including the operational amplifier and tuned circuits. Digital logic circuits and their functions. Lab assignments. Prerequisite: PHYSICS 43. GER:DB-EngrAppSci

5 units, Spr (Wong, S)

**OSPKYOTO 62. Japan and America: A Historical Survey—**

How various segments of Japanese society view the war in Asia, where fault lines lie, and what attempts have been made to achieve reconciliation. Topics include: origins of the Asia-Pacific War; foreign and domestic images of Japan's wartime actions; American Occupation policy and the Tokyo war crimes trial; impact of peace movements and the Cold War; the emergence of conflicting postwar narratives about the war; Asian perceptions of postwar Japan; the institutionalization of public memory; attempts and failures at reconciliation with Japan's neighbors; comparisons with Europe. GER:DB-SocSci

4-5 units, Spr (Duus, P)

**OSPKYOTO 119K. Third-Year Japanese Language, Culture, and Communication—**

5 units, Spr (Tomiyama, Y)

**OSPKYOTO 199. Directed Reading—**

1-4 units, Spr (Staff)

**OSPKYOTO 210K. Advanced Japanese—**

5 units, Spr (Ueda, H)

**OSPKYOTO 215X. The Political Economy of Japan—**

Institutions and processes in the political organization of economic activity in modern Japan. The interaction of public and private sector institutions in the growth of Japan's postwar economy. The organization and workings of key economic ministries and agencies of the government, private sector business groupings, government interaction, and public policy making. The transformation of Japanese industrial policy from the rapid growth of heavy and chemical industries to the promotion of high technology and communications industries. The international, political, and economic ramifications of the structure and importance of Japanese capitalism. GER:DB-SocSci

4-5 units, Spr (Hayashi, T)

## OVERSEAS STUDIES: MADRID (OSPMADRD) COURSES

### UNDERGRADUATE COURSES IN OVERSEAS STUDIES: MADRID

**OSPMADRD 10. Research Methods in Social and Motivational Psychology—**

Stages of the empirical research process in social psychology. Concrete experience in hypothesis generation, experimental design, and scientific writing. Devise research study to explore how social psychological and motivational concepts map onto a culture or social or educational problem. Key objective: formalize students' curiosity about a culture or problem through translation into scientifically testable research hypotheses. Provides opportunity to supplement OSPMADRD 23, Social Psychology, Social Change and Culture.

1-4 units, Aut (Staff)

**OSPMADRD 11. Independent Study in Chemistry—**

Possible independent study topics include: 1. Plastics: Modern Marvels or A Curse? 2. Chemistry and Art. 3. Science in the News, Ethics and Responsibility in Science. Weekly meetings to review progress and discuss goals. Field trips to local laboratories and research institutes to provide the perspective of Spanish scientists on the role of Chemistry, Science and Technology.

2 units, Win (Staff)

**OSPMADRD 12M. Accelerated Second-Year Spanish I—**

Intensive sequence integrating language, culture, and

geo/sociopolitics of Spain. Emphasis is on achieving advanced proficiency in oral and written discourse, including formal and informal situations, presentational language, and appropriate forms in academic and professional contexts. Prerequisite: one year of college Spanish or 11 or 21B more than two quarters (six months) prior to arriving in Madrid.

5 units, Aut (Cambolor Portilla, M), Win (Cambolor Portilla, M), Spr (Cambolor Portilla, M)

**OSPMADRD 13M. Accelerated Second-Year Spanish II—**

Intensive sequence integrating language, culture, and geo/sociopolitics of Spain. Emphasis is on achieving advanced proficiency in oral and written discourse, including formal and informal situations, presentational language, and appropriate forms in academic and professional contexts. Prerequisite: 11 or 21B within two quarters (six months) of arriving in Madrid or 12 or 22B.

5 units, Aut (Cambolor Portilla, M), Win (Cambolor Portilla, M), Spr (Cambolor Portilla, M)

**OSPMADRD 14. Introduction to Spanish Culture—**

Required for Madrid students. Spain's historical, physical, and sociocultural diversity. Includes a weekend study trip and other cultural encounters. Linguistic skills and cultural knowledge through museum visits, readings, and writing a paper in Spanish. Study trips: Autumn Quarter to Cantabria-Léon and Basque country; Winter Quarter to Andalusia and Extremadura; Spring Quarter to Catalonia and Galacia.

1 unit, Aut (Tejerina-Canal, S), Win (Tejerina-Canal, S), Spr (Tejerina-Canal, S)

**OSPMADRD 15. Flamenco Dance—**

Practical instruction. The rhythms and styles of flamenco and the expression of feelings proper to this art form which synthesizes song, music, and dance. Zapateado (footwork), braceo (arm positions and movement technique), and choreographies, including Rumba flamenca and Sevillanas. Enrollment limited. May be repeated for credit.

1 unit, Aut (Murcia Canovas, L), Win (Murcia Canovas, L), Spr (Murcia Canovas, L)

**OSPMADRD 17. Molecules Matter—**

Using the themes of energy, the environment, and human health, gain an understanding of chemical reactivity, energy conversion and the molecular basis of life processes and disease. Supplementary reading, class-presentations and discussion forums to foster a conceptual understanding. Field trips to local laboratories and research institutes to provide a perspective on the role of Chemistry, Science and Technology in addressing critical societal challenges from the perspective of Spanish scientists. General science course for non-majors.

3 units, Win (Waymouth, R)

**OSPMADRD 23. Social Psychology, Intervention, and Culture—**

Major ideas, theories, and findings of social psychology and their relevance to social problems, ethnicity, and culture. Special attention to historical issues, classic studies, seminal theories, and the methodological traditions of experimental social psychology. Contemporary research also discussed. Focus on the three major intellectual contributions of social psychology; emphasis on situational rather than dispositional causes of behavior; recognition of the role of subjective construal in human affairs; appreciation of the complexity in social systems; and their importance in understanding human behavior, groups, culture, and inequality. GER:DB-SocSci

3-4 units, Aut (Cohen, G)

**OSPMADRD 33. Spanish Language Tutorial—**

May be repeated for credit. Prerequisite: three years of Spanish at Stanford or placement.

2 units, Aut (Cambolor Portilla, M), Win (Cambolor Portilla, M), Spr (Cambolor Portilla, M)

**OSPMADRD 41. Dissidence and Continuity: Spanish Theater, 1907 to the Present—**

Tradition, transformation, experimentation, rupture, renovation, and innovation in the theater in Spain as a reflection of the artistic, social and historical commotion that led to the Spanish Civil War, Franco, and the present democratic monarchy. Ortega y Gasset, Benavente, Grau, Valle-Inclán, García Lorca, Buero Vallejo,

Sastre, Arrabal, Fernán Gómez, Paloma Pedrero, Yolanda Pallín or other playwrights who may be staged in Madrid theaters. GER:DB-Hum

4-5 units, *Win (Tejerina-Canal, S)*

**OSPMADR 42. A European Model of Democracy: The Case of Spain—**

Current Spanish political system, its main judicial and political institutions, outstanding actors' and the political process of the last decade. Historic antecedents; immediate precedents; and the current political system and life. Relation between the elements that constitute a political system; results of the process of democratization; integration to the EU. GER:DB-SocSci

5 units, *Win (Bobillo de la Peña, F)*

**OSPMADR 43. The Jacobean Star Way and Europe: Society, Politics and Culture—**

The Saint James' Way as a tool to understand historic dynamics from a global perspective. Its effect on the structures that form a political and institutional system, and its society, economy, and ideology. GER:DB-Hum, EC-GlobalCom

5 units, *Spr (Larranaga Zulueta, M)*

**OSPMADR 45. Women in Art: Case Study in the Madrid Museums—**

Viewing the collections at the Prado Museum through study and analysis of the representations of women. Contemporary literary texts and images that situate paintings in the historical, social, and political conditions that produced the works. GER:DB-Hum, EC-Gender

4 units, *Win (Domenech Lopez, J)*

**OSPMADR 46. Drawing with Four Spanish Masters: Goya, Velázquez, Picasso and Dalí—**

Approaches, techniques, and processes in drawing. Visits to Madrid museums to study paintings and drawings by Goya, Velázquez, Picasso, and Dalí and to explore the experience of drawing. Subject matter: the figure, still life, interiors, landscape, and non-representational drawing. No previous experience required. Enrollment limited.

3 units, *Aut (Sanchez Fuster, O)*

**OSPMADR 47. Independent Studies in Modern Peninsular Spanish Literature—**

Introduction to dominant trends of twentieth-century Spanish poetry and a new mode of poetic composition that characterizes the first three decades of Peninsular Spanish poetry. Topics for independent study include: 1) Major works of Antonio Machado: *Soledades, galerías y otros poemas* and *Campos de Castilla*; 2) Cycle of interrelated symbolic poetry of Juan Ramón Jiménez, extending from *Sonetos espirituales* to *Piedra y cielo*; 3) Major poetic works of Federico García Lorca, including *Canciones, Romancero gitano*, and *Poeta en Nueva York*.

3-5 units, *Spr (Staff)*

**OSPMADR 50. Flirting with Spanish Metafiction: Cervantes, Velázquez, Fuentes, Almodóvar—**

Literary theory and critical analysis of peninsular and Latin American texts. Emphasis is on the origins and development of self-conscious fiction (metafiction). Works by Cervantes, Velázquez, Unamuno, Borges, Fuentes, Torrente Ballester, and Almodóvar. Attendance at music, art, cinema, and Spanish novelist events. In Spanish. GER:DB-Hum

4-5 units, *Spr (Tejerina-Canal, S)*

**OSPMADR 54. Contemporary Spanish Economy and the European Union—**

Concepts and methods for analysis of a country's economy with focus on Spain and the EU. Spain's growth and structural change; evolution of Spain's production sectors, agriculture, industry, and services; institutional factors such as the labor market and public sector; Spain's economic international relations, in particular, development of the EU, institutional framework, economic and monetary union, policies related to the European economic integration process, and U.S.-EU relationship. GER:DB-SocSci

5 units, *Aut (Bunuel, M)*

**OSPMADR 55. Dissidence and Nationalisms in Modern Iberian Literature—**

Modern Iberian literature from the 1830s to the 1930s. Topics: Romanticism and the Enlightenment; Realism; the Generation of

1898 and modernism; and the Generation of 1927 leading up to the Spanish Civil War. Themes: Spain within the democratic tradition of Iberian liberalism; origins of modern nationalisms and their cultural renaissance as expressed through major intellectual and literary figures: Rosalía de Castro, Valle-Inclán, Unamuno, Baroja, Verdaguier, Galdós, and A. Machado. GER:DB-Hum

3-5 units, *Spr (Predmore, M)*

**OSPMADR 57. Health Care: A Contrastive Analysis between Spain and the U.S.—**

History of health care and evolution of the concept of universal health care based on need not wealth. Contrast with system in U.S. Is there a right to health care and if so, what does it encompass? The Spanish health care system; its major successes and shortcomings. Issues and challenges from an interdisciplinary perspective combining scientific facts with moral, political, and legal philosophy. GER:DB-SocSci

5 units, *Spr (Perez Blanco, A)*

**OSPMADR 60. Integration into Spanish Society: Service Learning and Professional Opportunities—**

Engagement with the real world of Madrid through public service work with NGOs and public service professions such as teaching. Depending on availability, topics relevant to present-day Spain may include: the national health plan, educational system, immigration, prostitution, refugees, youth, and fair trade. Fieldwork, lectures, and research paper. Limited enrollment. May be repeated for credit. Prerequisite: two years of college level Spanish or equivalent.

5 units, *Aut (Klaiber, S), Win (Klaiber, S), Spr (Klaiber, S)*

**OSPMADR 61. Society and Cultural Change: The Case of Spain—**

Complexity of socio-cultural change in Spain during the last three decades. Topics include: cultural diversity in Iberian world; social structure; family in Mediterranean cultures; ages and generations; political parties and ideologies; communication and consumption; religion; and leisure activities. GER:DB-SocSci

5 units, *Aut (Munoz Carrion, A)*

**OSPMADR 62. Spanish California: Historical Issues—**

Spanish exploration and colonization of California from the 16th century to the end of the Spanish colonial period in 1821. Themes include: geographical explorations in the context of European colonial expansion; demographic evolution of Native American inhabitants and immigrant population; general social and economic development of the colony; controversies surrounding the mission system; role of the Pacific coasts of North America in the Spanish enlightenment and in strategies for imperial defense and development in the revolutionary era of the late 18th and early 19th centuries.

5 units, *Spr (Hilton, S)*

**OSPMADR 71. Sociology of Communication—**

Understanding the sociocultural diversity of communication in Spain with the help of theoretical and practical tools. How communication happens through language and other means; significance of images in today's world; vision of the world produced by media; problems of social communication from perspective of reception. Offered at the Universidad Complutense with an additional tutorial for Stanford students.

5 units, *Spr (Munoz Carrion, A)*

**OSPMADR 72. Issues in Bioethics Across Cultures—**

Ethical dilemmas concerning the autonomy and dignity of human beings and other living creatures; principles of justice that rule different realms of private and public life. Interdisciplinary approach to assessing these challenges, combining scientific facts, health care issues, and moral philosophy. Sources include landmark bioethics papers.

5 units, *Win (Perez Blanco, A)*

**OSPMADR 74. Islam in Spain and Europe: 1300 Years of Contact—**

Primary problems and conflicts in the contemporary Islamic world and its relations with the West, as well as the relationship between Spain and Islam throughout history. Special attention to the history of al-Andalus, an Islamic state in the Iberian Peninsula during the Middle Ages, evaluating the importance of its legacy in Europe and in contemporary Spain. Spain's leading role in relations between Europe and the Mediterranean Islamic states from the

Modern Era to the present day.

5 units, Aut (*Ariza Armada, A*)

**OSPMADR 75. Sefarad: The Jewish Community in Spain—**

The legacy of Sefarad, the Jewish community in Spain. Historical evolution of the Sephardic community, under both Muslim and Christian rule, including the culmination of Anti-Semitism in 1492 with the expulsion of the Jews. Cultural contribution of the Hebrew communities in their condition as a social minority, both in al-Andalus, the peninsular Islamic State, and in the peninsular Christian kingdoms.

5 units, Win (*Ariza Armada, A*)

**OSPMADR 102M. Composition and Writing Workshop for Students in Madrid—**

Advanced. Writing as craft and process, emphasizing brainstorming, planning, outlining, drafting, revising, style, diction, and editing. Students choose topics related to their studies. Prerequisite: 13, 23B, or equivalent placement.

3-5 units, Aut (*Camblor Portilla, M*), Win (*Camblor Portilla, M*), Spr (*Camblor Portilla, M*)

**OSPMADR 199A. Directed Reading—**

1-5 units, Aut (*Staff*), Win (*Staff*), Spr (*Staff*)

**OSPOXFRD 74. History and Architecture of Oxford—**

History of the city and university of Oxford through its physical fabric. Oxford's buildings within the context of British and European architectural history; growth and development of Oxford. Lectures paired with visits to buildings with additional discussion on site.

3-4 units, Spr (*Tyack, G*)

## OVERSEAS STUDIES: MOSCOW (OSPMOSC) COURSES

### UNDERGRADUATE COURSES IN OVERSEAS STUDIES: MOSCOW

**OSPMOSC 10M. Intensive First-Year Russian—**

8 units, Aut (*Boldyreva, T; Kurganova, L*)

**OSPMOSC 12. Moscow in 20th Century Russian Literature: Bulgakov's *The Master and Margarita* & Boris—**

Close reading of these two major Russian novels in which the theme of Moscow plays a most significant role. The place of both works in Soviet culture of Stalin's age. Contrast of artistic manners of the two authors in context of the different 19th century literary traditions they adhered to and their relation to the doctrine of Socialist realism imposed on Soviet writers during this epoch. The way historical events and conditions are addressed and reflected in these works.

3 units, Aut (*Fleishman, L*)

**OSPMOSC 15. Academic Internship—**

Placements in areas such as banking, finances, consulting, journalism, language teaching, and technology. Introduction to Russian society and work experience. Evaluation and analysis of experience in final academic paper.

2-3 units, Aut (*Abashkin, A*)

**OSPMOSC 18. Poetry, Painting and Music of the Russian Avant-garde—**

Interrelationships between poetry and other arts in Russia from 1905-1930; pursuit of synthesis of arts; modernist agenda of life-creation and immortality. Parallel developments in literature, painting and music. Works of Russian modernist poetry (Mayakovsky, Khlebnikov, Pasternak, Tsvetaeva and others) in the context of changes in the language of visual arts (Cubism, Futurism, Suprematism) and music (Scriabin, Stravinsky, Prokofiev). Role of women-poets and women-artists in avant-garde currents. Impact of scientific discoveries and technological inventions on character of artistic experimentation. Readings in English. GER:DB-Hum

3 units, Aut (*Fleishman, L*)

**OSPMOSC 51M. Second-Year Russian—**

5 units, Aut (*Sidyganova, A*)

**OSPMOSC 62. Economic Reform and Economic Policy in Modern Russia—**

Russian economic history in the 20th century. Reasons and logic for economic transformation, major components of postcommunist economic transformation doctrine, and results of practical implementation. Mechanisms of economic policy decision making in modern Russia, and patterns of and alternatives in economic development. GER:DB-SocSci, EC-GlobalCom

5 units, Aut (*Mau, V; Novikov, V*)

**OSPMOSC 67. Building Skolkovo: Designing an Innovation Ecosystem—**

Examine Skolkovo as the realization of the current generation of urban policy initiatives for innovation. Innovation ecosystem incentives and politics, science infrastructure and innovation investment, business interest, and sociological responses to these policy incentives. Symbolism of Skolkovo for development and the incentives and outcomes expected by various experts.

5 units, Aut (*Leonard, C*)

**OSPMOSC 72. Space, Politics, and Modernity in Russia—**

The idea of space as a key to understanding Russian politics and governance, economy, society, and culture. Phenomenology of Russian space: structure, topology, and features, including notions of enormity. Space in its relation to state power; how geography shaped Russian history and politics. Reification of space-state relationship on levels such as economy, politics and administration, security and social mobility, nationalism and imperialism, culture and language, and habits and ways. GER:DB-SocSci, EC-GlobalCom

5 units, Aut (*Medvedev, S*)

**OSPMOSC 74. Post-Soviet Eurasia and SCO: Society, Politics, Integration—**

Analysis of the opportunities and challenges for political, economic, and military cooperation within the Shanghai Cooperation Organization (SCO). Likelihood of SCO's aspirations being realized and the potential of its becoming a political and military counterbalance to the West. Issues related to national security and security perceptions of post-Soviet states and China, their economic and energy ambitions and needs, and the role of external players in the region. GER:DB-SocSci, EC-GlobalCom

5 units, Aut (*Bratersky, M*)

**OSPMOSC 78. Russian-American Relations: from the War of Independence to the War on Terror—**

Relations between Russia and the U.S. since the eighteenth century with an introduction covering the period prior to the American Revolution. GER:DB-SocSci

5 units, Aut (*Ivanian, E*)

**OSPMOSC 111M. Third-Year Russian—**

5 units, Aut (*Filatova, G*)

**OSPMOSC 177M. Fourth-Year Russian—**

5 units, Aut (*Rubailo, A*)

**OSPMOSC 199A. Directed Reading—**

2-5 units, Aut (*Staff*)

## OVERSEAS STUDIES: OXFORD (OSPOXFRD) COURSES

### UNDERGRADUATE COURSES IN OVERSEAS STUDIES: OXFORD

**OSPOXFRD 16. Cultural Studies, Media, Literacy—**

Background to British Cultural Studies and adaptation to contemporary British culture. Everyday life through the lens of the mid-twentieth century British cultural studies critique. Differences between everyday life of that time and today, looking at topics including the increased number of racial and religious minorities in Britain and the virtual world of today's culture. Is it possible to answer the question, What is British?

4-5 units, Aut (*Palumbo-Liu, D*)

**OSPOXFRD 17. Novels of Sensation: Gothic, Detective Story, Prohibition, and Transgression in Victorian Fiction—**

Literary and moral value of transgressive sub-genres of the novel; what they reveal about Victorian society's anxiety over prohibited elements in the domestic and public spheres. Sources include gothic and detective novels. GER:DB-Hum

5 units, Win (Plaskitt, E)

**OSPOXFRD 18. Making Public Policy: An Introduction to Political Philosophy, Politics, and Economics—**

UK and U.S. What should society look like? How should incomes be distributed? How should it be taxed? How much inequality is acceptable? The overlap of economics with practical politics through political philosophy behind the government decisions; how public policy ought to be formulated. Issues include poverty, environmental policy, trade and globalization, and transport. GER:DB-SocSci

4-5 units, Win (McMahon, R)

**OSPOXFRD 19. The Historical Novel - Fact, Fiction, and Writing—**

History and historical fiction. Contemporary historical fiction as a genre in which authors blend traditional styles with new ones to inquire into contemporary history. We will look at the ways national and global shifts in history have disrupted and reconfigured societies and cultures. Titles include Scott, Waverly, O'Brien, Master and Commander, Ishiguro, Remains of the Day, McEwan, Atonement, Carpentier, Kingdom of This World, Ghosh, The Shadow Lines.

4-5 units, Aut (Palumbo-Liu, D)

**OSPOXFRD 23. William Blake: Poet and Painter—**

In a stunning array of illuminated poetry William Blake taught the power of the human imagination to transform the world and the power of critical thinking. Students will study the work of this major Romantic figure in philosophical and cultural context, with an emphasis on gender and sexuality, class and race, and produce a creative or original critical research work of their own. Blake walking tour in London and visit to Tate Gallery. GER:DB-Hum

5 units, Win (Gigante, D)

**OSPOXFRD 24. British and American Constitutional Systems in Comparative Perspective—**

Introduction to the study of constitutions and constitutional systems of government. The workings of the British and American systems of government. Comparative study of the most important constitutional issues facing Britain and the U.S. such as how suspected terrorists should be treated in a time of war. How to think about fundamental constitutional questions. GER:DB-SocSci

4-5 units, Spr (McMahon, R)

**OSPOXFRD 35. Modern UK and European Government and Politics—**

Background of main political systems in Europe and recent developments in European politics. Topics: Blair's constitutional reforms; the consequences of the German reunification; Berlusconi's rise to power in Italy; the extreme right in France and elsewhere; the single currency; the enlargement of the EU; and proposals for a constitution and their recent rejection by the French and Dutch electorates. GER:DB-SocSci

4-5 units, Aut (Capocchia, G)

**OSPOXFRD 39. Romantic Poetry—**

Introduction to the major Romantic poets: William Wordsworth, Samuel Taylor Coleridge, William Blake, Percy Bysshe Shelley, Lord Byron, and John Keats. Emphasis on innovative use of verse form, from lyrical ballads to conversation poems to closet drama, and poetic theory. Visit to The Keats House, London and National Portrait Gallery, London. GER:DB-Hum

5 units, Win (Gigante, D)

**OSPOXFRD 41. Europe and US Foreign Policy—**

Relationship between the United States and Europe, with an emphasis on developments since 1990. Sources of conflict and cooperation in this relationship; how governments on both sides of the Atlantic manage contradictory tendencies of friendship and mistrust. Topics include: U.S.-European defense cooperation; influence of European states on American decisions to use force; origin and nature of special relationship between Britain and the United States; European responses to U.S. power; sources and consequences of anti-Americanism in European publics. GER:DB-

SocSci

5 units, Spr (Schultz, K)

**OSPOXFRD 43. Anthropology, Material Culture, and the Meanings of Space—**

Local and global consequences of the use of space. Effects of transition; experiences of individual and societal realms of perception and reception of material culture. Material culture found in museums and archive collections in Oxford, including objects, paintings, photographs and film footage, as well as the structures that house them. Notion of representation, how we interact with tangible and intangible spaces, and how we position ourselves in the process.

4 units, Win (Kahn, A)

**OSPOXFRD 45. British Economic Policy since World War II—**

Development of British economic policy making from 1945, focusing on political economy including: ideological motives of governments; political business cycle; and the influence of changing intellectual fashions. Policy areas: attitude to the pound; control of the business cycle; and the role of the state in the economy. Prerequisite: ECON 50. GER:DB-SocSci

5 units, Aut (Forder, J)

**OSPOXFRD 57. The Rise of the Woman Writer 1660-1860—**

Emergence and rise of the professional woman writer from playwright and Royalist spy Aphra Behn (1640-89) to novelist and proto-feminist Charlotte Bronte (1816-55). How women writers dealt with criticism for writing publicly, placing each author and text in its historical and literary context. Range of poets, playwrights, and novelists including Eliza Haywood, Frances Burney, and Mary Elizabeth Braddon. Topics: gender roles and proto-feminism, the public versus the private sphere, sexuality, courtship and marriage. GER:DB-Hum, EC-Gender

5 units, Spr (Plaskitt, E)

**OSPOXFRD 70. The History of London—**

London's physical growth, emphasizing characteristics which set it apart from other capitals, and its economic, social and political development, including the problems of poverty and the inner city, the provision of public services, and the growth of suburbs and public transport. Challenges facing London in modern times. Walking tours, especially less frequented areas. GER:DB-SocSci, EC-GlobalCom

4-5 units, Win (Tyack, G)

**OSPOXFRD 73. Atlantic Rivals: Britain and America, 1783-1914—**

Roles of the United States in British culture. Challenge of democracy and fears of `Americanisation'; imperial rivalries and military confrontations; influence of America on religious, racial and colonial thought in Britain. Impact of American politics on British radical groups; role played by U.S. in the Irish question; and the late-nineteenth century dream of a `Greater Britain across the seas'. Exploring travel literature and political commentary, diplomatic exchanges and social analyses, reassess the Atlantic World in the long nineteenth century, and the Victorian backdrop to the `Special Relationship'. GER:DB-SocSci

5 units, Spr (Saunders, R)

**OSPOXFRD 75. Islam in the Public Sphere: the Dialogue Between the Sacred and the Secular—**

Preparation for participation in the BOSP Autumn workshop in Spain: Islam in Europe 711-2011: 1300 Years of Contact & [Mis]Understanding. Case studies from different European countries addressing topics including success or failure of each country in responding to different religious traditions; influence of movements such as Sufism; debate over multi-culturalism.

3 units, Aut (Talib, M)

**OSPOXFRD 98. Creative Writing Workshop—**

Selection and combination; poetic language; metaphor and cohesion; setting and the pathetic fallacy; sentence variety; genres; dialogue; point of view; narrative positions; colors and senses; time management; plotting. Limited enrollment based on writing sample.

3 units, Spr (Kidd, H)

**OSPOXFRD 99. Independent Study Projects in European and US Foreign Policy—**

Independent study projects on subjects related to U.S. and European foreign policy. Possible topics include: public attitudes towards the United States and its policies; differences in U.S. and British media coverage of international events; effect of U.S. foreign policy on politics and elections in Britain and other European countries; effect of U.S. foreign policy on relations between European states, including Britain's relations with the EU, and the prospects of European defense cooperation.

3-5 units, *Spr (Staff)*

**OSPOXFRD 117W. Gender and Social Change in Modern Britain—**

Changes in the social institutions, attitudes, and values in Britain over the past 20 years with specific reference to shifts in gender relations. Demographic, economic and social factors; review of theoretical ideas. Men's and women's shifting roles in a fast-moving society. GER:DB-SocSci, DB-SocSci, EC-Gender

4-5 units, *Spr (Palmer, A)*

**OSPOXFRD 163X. Shakespeare: Critical Commentary—**

For English majors or minors only. Topics include the use of soliloquy, epilogues, alternation of prose and verse, rhetoric, meta-theatricality. Close reading technique. GER:DB-Hum

5 units, *Aut (Rowley, R)*

**OSPOXFRD 195A. Tutorial in Anthropology—**

6-7 units, *Aut (Staff), Win (Staff), Spr (Staff)*

**OSPOXFRD 195B. Tutorial in Biology—**

6-7 units, *Aut (Staff), Win (Staff), Spr (Staff)*

**OSPOXFRD 195C. Tutorial in Classics—**

6-7 units, *Aut (Staff), Win (Staff), Spr (Staff)*

**OSPOXFRD 195E. Tutorial in Drama—**

6-7 units, *Aut (Staff), Win (Staff), Spr (Staff)*

**OSPOXFRD 195F. Tutorial in Economics—**

6-7 units, *Aut (Staff), Win (Staff), Spr (Staff)*

**OSPOXFRD 195G. Tutorial in Economic History—**

6-7 units, *Aut (Staff), Win (Staff), Spr (Staff)*

**OSPOXFRD 195J. Tutorial in Jurisprudence—**

6-7 units, *Aut (Staff), Win (Staff), Spr (Staff)*

**OSPOXFRD 195L. Tutorial in Health Care—**

6-7 units, *Aut (Staff), Win (Staff), Spr (Staff)*

**OSPOXFRD 195M. Tutorial in History of Science—**

6-7 units, *Aut (Staff), Win (Staff), Spr (Staff)*

**OSPOXFRD 195N. Tutorial in Human Biology—**

6-7 units, *Aut (Staff), Win (Staff), Spr (Staff)*

**OSPOXFRD 195P. Tutorial: Interdisciplinary—**

6-7 units, *Aut (Staff), Win (Staff), Spr (Staff)*

**OSPOXFRD 195R. Tutorial in International Relations—**

6-7 units, *Aut (Staff), Win (Staff), Spr (Staff)*

**OSPOXFRD 195T. Tutorial in Literature—**

6-7 units, *Aut (Staff), Win (Staff), Spr (Staff)*

**OSPOXFRD 195U. Tutorial in Music—**

6-7 units, *Aut (Staff), Win (Staff), Spr (Staff)*

**OSPOXFRD 195V. Tutorial in Philosophy—**

6-7 units, *Aut (Staff), Win (Staff), Spr (Staff)*

**OSPOXFRD 195W. Tutorial in Physics—**

6-7 units, *Spr (Staff)*

**OSPOXFRD 195Z. Tutorial in Political Science—**

6-7 units, *Aut (Staff), Win (Staff), Spr (Staff)*

**OSPOXFRD 196A. Tutorial in Psychology—**

6-7 units, *Aut (Staff), Win (Staff), Spr (Staff)*

**OSPOXFRD 196B. Tutorial in Religion—**

6-7 units, *Aut (Staff), Win (Staff), Spr (Staff)*

**OSPOXFRD 196C. Tutorial in Sociology—**

6-7 units, *Aut (Staff), Win (Staff), Spr (Staff)*

**OSPOXFRD 196E. Tutorial in History—**

6-7 units, *Aut (Staff), Win (Staff), Spr (Staff)*

**OSPOXFRD 196F. Tutorial in History of Art—**

6-7 units, *Aut (Staff), Win (Staff), Spr (Staff)*

**OSPOXFRD 196G. Tutorial in Chemistry—**

6-7 units, *Aut (Staff), Spr (Staff)*

**OSPOXFRD 196K. Tutorial in Zoology—**

6-7 units, *Aut (Staff), Win (Staff), Spr (Staff)*

**OSPOXFRD 196M. Tutorial in Public Policy—**

6-7 units, *Aut (Staff), Win (Staff), Spr (Staff)*

**OSPOXFRD 196N. Tutorial in Mathematics—**

6-7 units, *Aut (Staff), Win (Staff), Spr (Staff)*

**OSPOXFRD 197A. Tutorial in Anthropology—**

6-7 units, *Aut (Staff), Win (Staff), Spr (Staff)*

**OSPOXFRD 197B. Tutorial in Biology—**

6-7 units, *Aut (Staff), Win (Staff), Spr (Staff)*

**OSPOXFRD 197C. Tutorial in Classics—**

6-7 units, *Aut (Staff), Win (Staff), Spr (Staff)*

**OSPOXFRD 197E. Tutorial in Drama—**

6-7 units, *Aut (Staff), Win (Staff), Spr (Staff)*

**OSPOXFRD 197F. Tutorial in Economics—**

6-7 units, *Aut (Staff), Win (Staff), Spr (Staff)*

**OSPOXFRD 197J. Tutorial in Jurisprudence—**

6-7 units, *Aut (Staff), Win (Staff), Spr (Staff)*

**OSPOXFRD 197L. Tutorial in Health Care—**

6-7 units, *Aut (Staff), Win (Staff), Spr (Staff)*

**OSPOXFRD 197M. Tutorial in History of Science—**

6-7 units, *Aut (Staff), Win (Staff), Spr (Staff)*

**OSPOXFRD 197N. Tutorial in Human Biology—**

6-7 units, *Aut (Staff), Win (Staff), Spr (Staff)*

**OSPOXFRD 197P. Tutorial: Interdisciplinary—**

6-7 units, *Aut (Staff), Win (Staff), Spr (Staff)*

**OSPOXFRD 197R. Tutorial in International Relations—**

6-7 units, *Aut (Staff), Win (Staff), Spr (Staff)*

**OSPOXFRD 197T. Tutorial in English Literature—**

6-7 units, *Aut (Staff), Win (Staff), Spr (Staff)*

**OSPOXFRD 197U. Tutorial in Music—**

6-7 units, *Aut (Staff), Win (Staff), Spr (Staff)*

**OSPOXFRD 197V. Tutorial in Philosophy—**

6-7 units, *Aut (Staff), Win (Staff), Spr (Staff)*

**OSPOXFRD 197Z. Tutorial in Political Science—**

6-7 units, *Aut (Staff), Win (Staff), Spr (Staff)*

**OSPOXFRD 198A. Tutorial in Psychology—**

6-7 units, *Aut (Staff), Win (Staff), Spr (Staff)*

**OSPOXFRD 198B. Tutorial in Religion—**

6-7 units, *Aut (Staff), Win (Staff), Spr (Staff)*

**OSPOXFRD 198C. Tutorial in Sociology—**

6-7 units, *Aut (Staff), Win (Staff), Spr (Staff)*

**OSPOXFRD 198E. Tutorial in History—**

6-7 units, *Aut (Staff), Win (Staff), Spr (Staff)*

**OSPOXFRD 198F. Tutorial in History of Art—**

6-7 units, *Aut (Staff), Win (Staff), Spr (Staff)*

**OSPOXFRD 198K. Tutorial in Zoology—**

6-7 units, *Aut (Staff), Win (Staff), Spr (Staff)*

**OSPOXFRD 198M. Tutorial in Public Policy—**

6-7 units, *Aut (Staff), Win (Staff), Spr (Staff)*

**OSPOXFRD 198N. Tutorial in Mathematics—**

6-7 units, *Aut (Staff), Win (Staff), Spr (Staff)*

**OSPOXFRD 199A. Directed Reading A—**

2-4 units, *Aut (Staff), Win (Staff), Spr (Staff)*

**OSPOXFRD 199B. Directed Reading B—**

2-5 units, *Aut (Staff), Win (Staff), Spr (Staff)*

**OSPOXFRD 199D. Directed Reading—**

1-3 units, *Win (Staff), Spr (Staff)*

**OSPOXFRD 221Y. Art and Society in Britain—**

Themes in 18th-, 19th-, and 20th-century British art. Painting, sculpture, and design. Comparisons between the British experience and that of continental Europe and the U.S. Readings address questions related to the role of art in modern society. Limited Enrollment. GER:DB-Hum



4-5 units, Aut (Tyack, G)

## OVERSEAS STUDIES: PARIS (OSPPARIS) COURSES

### UNDERGRADUATE COURSES IN OVERSEAS STUDIES: PARIS

#### OSPPARIS 10. Engineering Research Internship—

For Paris Program students with academic experience in electronics, telecommunications or signal and image processing. Under direct guidance of researchers at Institut Supérieur d'Electronique de Paris (ISEP), and where applicable, in collaboration with other French and international graduate students, contribute to the ISEP's ongoing research projects.

6 units, Aut (Staff, 1), Win (Staff, 1), Spr (Staff, 1)

#### OSPPARIS 11. Special Internship—

Often initiated by special contacts between students and professionals in France. Involvement may be based more on field work, and activity, rather than on fulfilling traditional academic requirements. Prerequisites: Written permission from the program director.

1-6 units, Aut (Staff, 1), Win (Staff, 1), Spr (Staff, 1)

#### OSPPARIS 12. Paris Photography Workshop—

Exploration of Paris through camera and lab techniques. Both theoretical and practical aspects of creative photography. Extensive field work. Enrollment limited.

3 units, Aut (Villegas-Paez, O)

#### OSPPARIS 12B. Music Workshop: Singing in French—

French culture through group singing. Collaborative project provides practice in pronunciation, exposure to subtleties of the language, and an introduction to French culture. French songs from the past one hundred years. Possible performance at the end.

3 units, Win (Morgand, J)

#### OSPPARIS 13. Biology Research Internship—

Laboratory of the National Museum of Natural History. Work with international research team on project elucidating the origin of the diversity of animal form. Modern techniques in functional genomics. Applied questions on human development in an environment where embryology, paleontology and medicine converge. Two days a week commitment required.

6 units, Aut (Levi, G), Win (Levi, G), Spr (Levi, G)

#### OSPPARIS 14. Media Internship—

Case studies and independent research as groundwork for comparative analysis of media on both sides of the Atlantic. Nature of media in the U.S and in France. Media as a means for understanding culture.

3 units, Aut (Staff, 1), Win (Staff, 1), Spr (Staff, 1)

#### OSPPARIS 15. Hospital Internship—

Observation of medical services in Paris hospitals. How hospital teams work in France; how medical decisions are made; how patients are treated by nurses and doctors.

3 units, Aut (Staff, 1), Win (Staff, 1), Spr (Staff, 1)

#### OSPPARIS 16A. French Schooling Internship—

Working with French schoolchildren in one of three settings: a public school in Paris; a neighborhood support association in the outskirts of Paris; an after-school support association in the city. Commitment for a minimum of three hours a week on site plus meetings with internship instructor and a final paper. Number of placements depends on the needs of the sponsoring institutions. Previous work with children advised.

2-3 units, Aut (Staff), Win (Staff), Spr (Staff)

#### OSPPARIS 18. French in the Working Environment—

Preparation for internships in Paris. Understanding cultural differences between the U.S. and France in the business world: formality/familiarity; written/spoken language; sense of time and space. Vocabulary and jargon specific to French business world. Official letter writing in French.

1 unit, Aut (Ricci, M), Win (Ricci, M)

#### OSPPARIS 19. Arranged Internship 1—

Two-quarter stay required. Internships can be arranged in a number of areas including the arts, architecture, politics, engineering, marketing and PR, media and journalism, health and psychological services, IT, NGO's, research, and hospitality administration.

3-6 units, Aut (Staff, 1), Win (Staff, 1), Spr (Staff, 1)

#### OSPPARIS 19B. Arranged Internship 2—

Two-quarter stay required. Internships can be arranged in a number of areas including the arts, architecture, politics, engineering, marketing and PR, media and journalism, health and psychological services, IT, NGO's, research, and hospitality administration.

3-6 units, Aut (Staff, 1), Win (Staff, 1), Spr (Staff, 1)

#### OSPPARIS 22P. Intermediate French I—

4 units, Aut (Reychman, P), Win (Molkou, E), Spr (Reychman, P)

#### OSPPARIS 23P. Intermediate French II—

4 units, Aut (Molkou, E), Win (Ricci, M), Spr (Gourevitch, S)

#### OSPPARIS 24. Introduction to French Society—

Required of Paris program participants. Engagement with French society through language immersion, volunteer work, projects with French students, encounters with prominent figures, and visits to French political and cultural institutions.

1 unit, Aut (Staff, 1), Win (Staff, 1), Spr (Staff, 1)

#### OSPPARIS 28. Performing in French—

Students participate in every aspect of theater presentation, including study of texts, scene work, stage management, and acting. Possible end-of quarter performance in a Parisian theater house. Objectives: explore French theater and texts through dramatic processes; improve French language skills and pronunciation; immersion in a collaborative and bicultural project with French students from other institutions in Paris. No experience required. In French. Minimum enrollment of five students.

3 units, Spr (Poirson, M)

#### OSPPARIS 29. Colonization, Decolonization and Immigration in France—

Social and historical phenomena of colonization and decolonization in France during the 20th century, and their relation to the migratory movements that took shape after the Second World War. Case study of Algeria. Topics include: phenomenon of colonization in its administrative, judicial, social, economic and political context; conflicts leading to independence of colonized territories; migration of population before and after decolonization.

GER:DB-SocSci, EC-GlobalCom

5 units, Spr (Hmed, C)

#### OSPPARIS 30. The Avant Garde in France through Literature, Art, and Theater—

Multiple artistic trends and esthetic theories from Baudelaire to the Nouveau Roman, from the Surrealists to Oulipo, from the theater of cruelty to the theater of the absurd, from the Impressionists to Yves Klein. Interdisciplinary approach to reflect on the meaning of avant garde and modernity in general, and on the question of why revolutionary artists in France remained in search of institutional recognition, nonetheless.

GER:DB-Hum

4 units, Aut (Karsenti, T)

#### OSPPARIS 32. Understanding French Politics—

Key aspects of French politics including the constitutional framework, institutions, political parties and ideology, elections, political cultures, religion and politics, political elites and public policy-making, grass-root citizen participation, decentralization and local politics, and the major issues that structure and inform public debate, including attitudes and policies vis-à-vis the U.S.

GER:DB-SocSci

4-5 units, Aut (Strudel, S)

#### OSPPARIS 33. The Economics of Climate Change: Policies in Theory and Practice in the EU and the U.S.—

Economic tools for tackling climate change. Analytical bases of existing cap-and-trade schemes. The European greenhouse gas Emission Trading Scheme within the frame of the Kyoto Protocol, and emerging regulatory or voluntary markets in the U.S. Carbon-pricing mechanisms with focus on power and gas markets.



Possibilities of linking carbon pricing mechanisms on both sides of the Atlantic and conditions for integrating these markets into an international post-Kyoto agreement. GER:DB-SocSci, EC-GlobalCom

5 units, Spr (Staff)

**OSPPARIS 36. French Writing Workshop—**

Offered upon request for students who have completed an Advanced French course. Focus on French writing style, enabling students to understand and master the subtleties of French writing.

3 units, Aut (Molkou, E), Win (Molkou, E), Spr (Molkou, E)

**OSPPARIS 40P. Introductory Electronics—**

Electrical quantities and their measurement, including operation of the oscilloscope. Function of electronic components including resistor, capacitor, and inductor. Analog circuits including the operational amplifier and tuned circuits. Digital logic circuits and their functions. Lab assignments. Prerequisite: PHYSICS 43. GER:DB-EngrAppSci

5 units, Aut (Howe, R), Spr (Wong, S)

**OSPPARIS 41. EAP: Perspective, Volume, and Design—**

May be repeated for credit.

2 units, Aut (Staff, 1), Win (Staff, 1), Spr (Staff, 1)

**OSPPARIS 42. EAP: Drawing with Live Models—**

May be repeated for credit.

2 units, Aut (Staff, 1), Win (Staff, 1), Spr (Staff, 1)

**OSPPARIS 43. EAP: Painting and Use of Color—**

May be repeated for credit.

2 units, Aut (Staff, 1), Win (Staff, 1), Spr (Staff, 1)

**OSPPARIS 44. EAP: Analytical Drawing and Graphic Art—**

May be repeated for credit.

2 units, Aut (Staff, 1), Win (Staff, 1), Spr (Staff, 1)

**OSPPARIS 46. The Baroque—**

Literary, cultural and political implications of the Baroque as a seventeenth-century phenomenon formed in response to the conditions of the sixteenth century (such as humanism, absolutism, and early capitalism) and dispersed throughout Europe, the Americas, and Asia. If the Baroque is a universal code of this period, how do its several vehicles—such as tragic drama, Ciceronian prose, and metaphysical poetry—converse with one another? Authors include Donne, Calderón, Corneille, Racine, Pascal, Vieira, and Sor Juana Inés de la Cruz. GER:DB-Hum

5 units, Spr (Greene, R)

**OSPPARIS 50M. Introductory Science of Materials—**

Topics include: the relationship between atomic structure and macroscopic properties of man-made and natural materials; mechanical and thermodynamic behavior of surgical implants including alloys, ceramics, and polymers; and materials selection for biotechnology applications such as contact lenses, artificial joints, and cardiovascular stents. No prerequisite.

4 units, Win (Staff), Spr (Staff)

**OSPPARIS 50P. Introductory Science of Materials—**

GER:DB-EngrAppSci

4 units, Aut (Staff, 1)

**OSPPARIS 54. The Artist's World: The Workshop, Patronage and Public in 19th and 20th Century France—**

Synergy between artists, their workshops, patrons, models and the public in 19th and 20th century France. Weekly sessions in museums, artists' studios, and special venues within and around Paris, attempting to understand the world of the artist, and how, in many cases, this world became not only a place of refuge, but a metaphor of the artistic creation itself. GER:DB-Hum

4 units, Win (Halevi, E)

**OSPPARIS 57. Human Rights in Comparative Perspective—**

Human rights arose from Enlightenment principles but their status in the American and French constitutions differ. Have European court decisions created a transatlantic human rights model giving more weight to Anglo-Saxon legal tradition? Philosophical, historical, and legal resources; recent case studies from both sides of the Atlantic. GER:DB-SocSci, EC-GlobalCom

4-5 units, Win (Boussaguet, L)

**OSPPARIS 60. Representations of Women in Christian Art: Boldness and Virtue—**

Representation of women as biblical heroes and saints in Christian

art. Codes of iconography and the attributes of women saints from the Renaissance to the 19th century; underlying social and moral force of these women figures throughout history. Class sessions in Paris museums. GER:DB-Hum, EC-Gender

4 units, Spr (Gallini, B)

**OSPPARIS 64. Afterlife of the Middle Ages—**

Works of literature and film that evoke a medieval past in contrast to a historical present, including criticism that treats aspects of the medieval or medievalism. The concept of medievalism emerging and evolving through the ages. The impact of the Enlightenment and Romanticism, the study of Gothic cathedrals, and the use of the term medieval in modern political discourse. Authors include Chrétien de Troyes, Mâle, Michelet, Chateaubriand, Hugo, Bataille, Holsinger. Field trips to museums and cathedrals in Paris. GER:DB-Hum

3-5 units, Spr (Galvez, M)

**OSPPARIS 65. Independent Study—**

Suggested Topics for Individual Study include: Historical Population Trends in France - growth, urbanization, immigration; Measuring French Public Opinion - design and analyses of opinion polls; Counting Parisians - learning to observe demographics on streets and Metro lines; Statistical Summaries of the Content of French Newspapers

2-3 units, Aut (Staff)

**OSPPARIS 68. Cultures of Graphic Literature—**

Study of graphic literature in and around Europe. European history, social science literature, and politics. Contemporary European graphic production by understanding historical and political context. Technologies of reproduction and distribution, Cold War politics, global and local political events, art historical movement, graphic and industrial design, racial and immigration politics, gender, and gender performance. Field trips to museums, bookshops, and the International Conference on Bande Dessinée in Angouleme, France. Visits from graphic novelists. Short, weekly responses and final group presentation. GER:DB-SocSci

3-5 units, Win (Jain, S)

**OSPPARIS 69. Science, Technology, and Culture of Medicine—**

Study of healthcare within societies, specifically within the USA and Europe. Case studies such as organ donation, surgery, randomized control trials and the historical context of evidence-based medicine, social movements, and mental illness to enable better understanding of issues of race, inequity, and medical practices. Comparative approach to understand the stakes in debates about healthcare in the USA and Europe. Students will develop a topic of their choice that focuses on a dimension of European healthcare. GER:DB-SocSci

3-5 units, Win (Jain, S)

**OSPPARIS 81. France During the Second World War: Between History and Memory—**

French politics and society from the causes of the collapse of the French Third Republic and the emergence of the French State at Vichy. The political and cultural measures of this regime in the shadow of Nazi Germany. Anti-Jewish laws and action; deportations by Vichy, the Germans, the French Fascists, and reactions to the fate of the Jews. Visions of the Resistance, the combat for liberation, and WW II in the collective memory of France. GER:DB-SocSci

5 units, Win (Virgili, F)

**OSPPARIS 85. Statistical Thinking—**

Fundamental ideas of reasoning under uncertainty using probabilities and statistical analyses. Origins of probabilistic reasoning in games of chance and its development in France during the 18th and 19th centuries. Topics include: debate between Fermat and Pascal on probabilities for games of chance, the rules of statistical inference of Laplace, and the probability models for rare events of Poisson. Original sources alongside modern interpretations, such as Laplace's non-technical *Essai sur les Probabilités*. GER:DB-Math

3 units, Aut (Switzer, P)

**OSPPARIS 91. Globalization and Its Effect on France and the European Union—**

Economic and political impact of globalization on France and the EU and influence of France and the EU on the process of

globalization. Issues of sovereignty and national identity for France; protection from versus integration into the network of globalization. GER:DB-SocSci, EC-GlobalCom

5 units, Win (*Le Cacheux, J; Laurent, E*)

**OSPPARIS 92. Building Paris: Its History, Architecture, and Urban Design—**

The development of Parisian building and architecture from the 17th century to the present. Interaction of tradition and innovation in its transformation and its historical, political, and cultural underpinnings. Visits and case studies throughout Paris illustrate the formation of the city landscape and its culture. GER:DB-Hum

4 units, Spr (*Halevi, E*)

**OSPPARIS 103A. French Lecture Series 1—**

1 unit, Aut (*Staff*), Win (*Staff*), Spr (*Staff*)

**OSPPARIS 104A. French Lecture Series 2—**

1 unit, Aut (*Halevi, E*), Win (*Halevi, E*), Spr (*Halevi, E*)

**OSPPARIS 105A. French Lecture Series 3—**

1 unit, Aut (*Staff*), Win (*Staff*), Spr (*Staff*)

**OSPPARIS 107Y. The Age of Cathedrals: Religious Art and Architecture in Medieval France—**

The major artistic and cultural movements that changed the face of France from the period of Suger in the 12th century through the reign of St. Louis in the 13th century. Monastic spirituality progressively gave way to an urban culture focused on man and secular knowledge, which developed daring and sophisticated building techniques. The years 1150-1250 represented a period of architectural renaissance and l'Île-de-France was its birthplace. GER:DB-Hum

4 units, Aut (*Deremble, C; Deremble, J*)

**OSPPARIS 122X. Challenges of Integration in the European Union—**

European integration is now an economic, social, and political reality. This integration has a history of mutation and a transformation of its very foundation. Topics: the evolution of welfare states, elites, political parties, and systems in Europe; lobbies, trade unions, voluntary associations, social movements, popular protest, citizenship, democracy. GER:DB-SocSci

4-5 units, Spr (*Strudel, S*)

**OSPPARIS 124P. Advanced French I—**

4 units, Aut (*Ricci, M*)

**OSPPARIS 124X. Building the European Economy: Economic Policies and Challenges Ahead—**

Issues and challenges of European economic construction. The European Economic Union at the end of the 50s; European industrial, agricultural, social, and monetary economic policies. Topics: wider definitions of Europe, its relations with industrial and developing countries, and its challenges in confronting global economic crises. GER:DB-SocSci

5 units, Aut (*Le Cacheux, J; Laurent, E*)

**OSPPARIS 125P. Advanced French II—**

4 units, Win (*Guedon, P*), Spr (*Mercier, F*)

**OSPPARIS 153X. Health Systems and Health Insurance:**

**France and the U.S., a Comparison across Space and Time—**

Should health systems be organized or left to the free market? What is the role of the state in the delivery of health care? The evolution of the health profession, health policy, and reform in France and the U.S.; measures restraining professional autonomy such as prescription guidelines in the French Medical Convention. Is the solution to the increase of health expenditures and reduced access to health care the end of autonomy for the medical profession? GER:DB-SocSci, EC-GlobalCom

4-5 units, Aut (*Fessler, J*)

**OSPPARIS 180. Paris Special Topics—**

1-6 units, Aut (*Staff*), Win (*Staff*), Spr (*Staff*)

**OSPPARIS 186F. Contemporary African Literature in French—**

Focus is on African writers and those of the diaspora, bound together by a common history of slave trade, bondage, colonization, and racism. Their works belong to the past, seeking to save an oral heritage of proverbs, story tales, and epics, but they are also contemporary. GER:DB-Hum, EC-GlobalCom

4 units, Win (*Mercier, F*)

**OSPPARIS 195C. Paris University: Health and Science 1—**  
1-6 units, Aut (*Staff*), Win (*Staff*), Spr (*Staff*)

**OSPPARIS 195D. Paris University: Health and Science 2—**  
1-6 units, Aut (*Staff*), Win (*Staff*), Spr (*Staff*)

**OSPPARIS 196C. Paris University: Humanities 1—**  
1-6 units, Aut (*Staff*), Win (*Staff*), Spr (*Staff*)

**OSPPARIS 196D. Paris University: Humanities 2—**  
1-6 units, Aut (*Staff*), Win (*Staff*), Spr (*Staff*)

**OSPPARIS 196E. Paris University: Humanities 3—**  
1-6 units, Aut (*Staff*), Win (*Staff*), Spr (*Staff*)

**OSPPARIS 197C. Paris University: Social Science 1—**  
1-6 units, Aut (*Staff*), Win (*Staff*), Spr (*Staff*)

**OSPPARIS 197D. Paris University: Social Science 2—**  
1-6 units, Aut (*Staff*), Win (*Staff*), Spr (*Staff*)

**OSPPARIS 198C. Paris University: Engineering 1—**  
1-6 units, Aut (*Staff*), Win (*Staff*), Spr (*Staff*)

**OSPPARIS 198D. Paris University: Engineering 2—**  
1-6 units, Aut (*Staff*), Win (*Staff*), Spr (*Staff*)

## OVERSEAS STUDIES: SANTIAGO (OSPSANTG) COURSES

### UNDERGRADUATE COURSES IN OVERSEAS STUDIES: SANTIAGO

**OSPSANTG 10. Borges and Argentina—**

His work and readings of other key figures of Argentine literature during the period. Close reading technique. Readings in the context of the main developments in Argentine history, and in relationship to the major literary and philosophical trends of the 20th century. Topics include Borges' rejection of the novel, storytelling as a reaction against romanticism, philosophical concerns, paradoxical plot devices, humor, and influence in Latin America. Readings include short stories such as *The Library of Babel* and *The Aleph*, poems and essays, and texts by key Argentine writers of the period including Arlt, Bioy Casares, Silvina Ocampo, and Cortázar. GER:DB-Hum

4-5 units, Spr (*Missana, S*)

**OSPSANTG 11. Dance and Culture in Latin America—**

Selected dance forms of Latin America viewed as aspects of human behavior. Emphasis on cultural influences (e.g., European, African, and indigenous), which have shaped ritual and social dance forms of Mexico, Cuba, Brazil, Argentina, Peru, Chile, and Puerto Rico. The key issue to be explored is how Latino cultures use dance to reflect cultural values and belief systems.

4 units, Win (*Cashion, S*)

**OSPSANTG 12S. Accelerated Second-Year Spanish, Part I: Chilean Emphasis—**

Intensive sequence integrating language, culture, and sociopolitics of Chile. Emphasis is on achieving advanced proficiency in oral and written discourse including formal and informal situations, presentational language, and appropriate forms in academic and professional contexts. Prerequisite: one year of college Spanish, or 11 or 21B if taken more than two quarters prior to arriving in Santiago.

5 units, Aut (*Abad, M*), Win (*Abad, M*), Spr (*Abad, M*)

**OSPSANTG 13S. Accelerated Second-Year Spanish, Part II: Chilean Emphasis—**

Intensive sequence integrating language, culture, and sociopolitics of Chile. Emphasis is on achieving advanced proficiency in oral and written discourse including formal and informal situations, presentational language, and appropriate forms in academic and professional contexts. Prerequisite: 11 or 21B within two quarters of arriving in Santiago, or 12 or 22B.

5 units, Aut (*Abad, M*), Win (*Abad, M*), Spr (*Abad, M*)

**OSPSANTG 14. Women Writers of Latin America in the 20th Century—**

Key figures in poetry, narrative fiction, theater, and testimonio, such as Mistral, Garro, Lispector, Poniatowska, Valenzuela, Eltit

and Menchú. Close reading technique. Issues raised in literary texts that reflect the evolution of the condition of women in Latin America during the period. Topics include gender differences and relationships, tradition versus transgression, relationship between changes in the status of women and other egalitarian transformations, and women writers and the configuration of literary canons. GER:DB-Hum, EC-Gender

4-5 units, Aut (*Missana, S*), Win (*Missana, S*)

**OSPSANTG 15. Dances of Latin America—**

Movement class on Latin American dance. Social dances, such as Salsa, Tejano, Banda, Samba, Cumbia, Argentine Tango, and Chilean Cueca. Dance etiquette and gender roles prescribed by the cultural context. Field trips to Santiago nightclub and/or a festival site.

2 units, Win (*Cashion, S*)

**OSPSANTG 33. Spanish Language Tutorial—**

Prerequisite: two years of college Spanish or equivalent placement.

2 units, Aut (*Toledo, G*), Win (*Rivano, P*), Spr (*Toledo, G*)

**OSPSANTG 40. Academic Internship—**

2-3 units, Aut (*Jaksic, I*), Win (*Jaksic, I*), Spr (*Staff, I*)

**OSPSANTG 58. Living Chile: A Land of Extremes—**

Physical, ecological, and human geography of Chile. Perceptions of the Chilean territory and technologies of study. Flora, fauna, and human adaptations to regional environments. Guest lectures; field trips; workshops. GER:DB-EngrAppSci

5 units, Aut (*Reid, S*), Win (*Reid, S*)

**OSPSANTG 62. Topics in Chilean History—**

Independent study topic concerning any aspect of Chilean history such as independence and nation building, social and economic development, ideas and culture, dictatorship and democracy. Research paper based on primary and secondary sources. GER:DB-Hum

4-5 units, Win (*Staff*)

**OSPSANTG 68. The Emergence of Nations in Latin America—**

Major themes of 19th-century Latin American history, including independence from Spain, the emergence of nation states, and the development of a new social, political, and economic order. GER:DB-SocSci

4-5 units, Aut (*Jaksic, I*), Spr (*Jaksic, I*)

**OSPSANTG 71. Santiago: Urban Planning, Public Policy, and the Built Environment—**

Santiago's growth and development over time and in comparison to other mega cities in the world; impact of urban highways on the built environment; shopping malls and the development of new urban sub-centers. Topics: brief history of the city, from 1541 to 1940; urban development since 1940; the 1960 Inter-communal Urban Plan; planning and the configuration of modern Santiago; housing policy as an instrument to combat poverty; social housing policy and Santiago's built environment.

4-5 units, Spr (*Galetovic Potsch, A*)

**OSPSANTG 85. Marine Ecology of Chile and the South Pacific—**

Relationships among physical processes in the ocean, biological productivity, and the exploitation of resources by high-trophic-level predators including human beings. Characterization of ecological patterns; identification of processes operating on marine systems. Open ocean ecosystems, intertidal and benthic regions of the world's oceans, and ecological research developed along coastal regions, focusing on Chile's 4,000 km coastline. GER:DB-NatSci

5 units, Spr (*Palma, A*)

**OSPSANTG 102S. Composition and Writing Workshop for Students in Santiago—**

Advanced. Writing as craft and process: brainstorming, planning, outlining, drafting, revising, style, diction, and editing. Non-Spanish majors or minors may choose topics related to their studies. Prerequisite: SPANLANG 13C, 13R, 13S, 23B, or equivalent.

3-5 units, Aut (*Bobbert, A*), Win (*Rivano, P*), Spr (*Bobbert, A*)

**OSPSANTG 104X. Modernization and Culture in Latin America—**

Intellectual and cultural expressions of Latin America against the

background of modernization viewed as a constant tension between rationalization and subjectification, change and identity preservation, and the logic of development or economic expansion and the logic of the culture. Readings include Morande, *Cultura y modernización en América Latina* and Sarlo, *Una modernidad periférica*. GER:DB-SocSci, EC-GlobalCom

5 units, Aut (*Subercaseaux, B*)

**OSPSANTG 116X. Modernization and its Discontents: Chilean Politics at the Turn of the Century—**

Chile's strides towards becoming a developed country have engendered high levels of alienation and disaffection among significant sectors of the population. The roots of this apparent paradox of modernization, focusing on newly emerging actors in the Chilean political scene: Mapuche organizations, women's groups, the environmental movement, and new features of the established ones like trade unions and human rights activists.

GER:DB-SocSci

5 units, Spr (*Correa, G*)

**OSPSANTG 118X. Artistic Expression in Latin America—**

Elite, mass-media, and popular cultural changes in Chile under conditions of economic and political liberalization. The reception of cultural meanings from the center of the world social system (U.S., EU, and Japan), reformulation to respond to local conditions, and export in the shape of cultural artifacts. Innovative elements rooted in the regional and local culture. GER:DB-SocSci, EC-GlobalCom

5 units, Win (*Albornoz, C*)

**OSPSANTG 119X. The Chilean Economy: History, International Relations, and Development Strategies—**

The Chilean economy in five stages, taking into account: the international economic position of Chile; internal economic structures closely related to the inherited historical conditions and to the changing international economic position of the country; and the economic strategies prevalent during the period and the concrete development policies conducted by government authorities. GER:DB-SocSci

5 units, Spr (*Staff, I*)

**OSPSANTG 129X. Latin America in the International System—**

Latin America's role in world politics, with emphasis on the history of and models for explaining U.S.-Latin American relations. Latin America's evolving relationship in the international system. GER:DB-SocSci

4-5 units, Win (*Fuentes, C*)

**OSPSANTG 130X. The Chilean Economy in Comparative Perspective—**

Introduction to the main debates and approaches developed to understand and analyze the economies of Latin America. Recent processes of transition to market economies. Common characteristics among countries of the region; the differences and special traits of individual countries. Historical, analytical, and empirical perspectives on topics at the center of controversies and specific policy problems over several decades. Recommended: ECON 1, 51, and 52. GER:DB-SocSci

5 units, Aut (*Luders, R*), Win (*Staff, I*)

**OSPSANTG 221X. Political Transition and Democratic Consolidation: Chile in Comparative Perspective—**

The dynamics of the Chilean transition. Topics: challenges faced by democratic governments in the 90s framed by the legacy of military rule, 1973-90; political culture; institutional traditions of democracy; and the Chilean process within the broader context of Latin American political development. GER:DB-SocSci

5 units, Aut (*Micco, S*)

## PATHOLOGY (PATH) COURSES

### UNDERGRADUATE COURSES IN PATHOLOGY

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**PATH 101. Cancer Biology**

(Same as C BIO 101) Experimental approaches to understanding the origins, diagnosis, and treatment of cancer. Focus on key experiments and discoveries with emphasis on genetics, molecular biology, and cell biology. Topics include carcinogens, tumor virology, oncogenes, tumor suppressor genes, cell cycle regulation, angiogenesis, invasion and metastasis, cancer genomics, cancer epidemiology, and cancer therapies. Discussion sections based on primary research articles that describe key experiments in the field. Satisfies Central Menu Areas 1 or 2 for Bio majors. Prerequisite: Biology or Human Biology core or equivalent, or consent of instructor.

4 units, Win (Lipsick, J)

**PATH 103Q. Lymphocyte Migration**

(F,Dial) Stanford Introductory Dialogue. Preference to sophomores. Lymphocytes migrate from blood vessels into tissues to participate in immune surveillance and the development of inflammation. The lymphocyte and blood vessel endothelia molecules that control lymphocyte migration, and are implicated in the development of human diseases such as asthma, type 1 diabetes, and multiple sclerosis are discussed.

1 unit, Aut (Michie, S)

**PATH 105Q. Final Analysis: The Autopsy as a Tool of Medical Inquiry**

Preference to sophomores. Based on review of patient medical histories and examination of formalin-fixed and unfixed tissues from autopsy. Student-directed problem-solving; students develop learning objectives for each case, and present findings. The effect of disease on normal structure and function, ethics of patient care, allocation of medical resources, efficiency of therapy, and medical error. Prerequisite: hepatitis-B vaccination; free vaccinations during the winter for accepted students.

3 units, not given this year

**PATH 199. Undergraduate Research**

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**GRADUATE COURSES IN PATHOLOGY**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**PATH 206. Epigenetics**

(Same as BIO 156, BIO 256, GENE 206) For graduate students in the Biosciences and upper level Biology undergraduates. Mechanisms by which phenotypes not determined by the DNA sequence are stably inherited in successive cell divisions. From the discovery of position-effect variegation in *Drosophila* in the 1920s to present-day studies of covalent modifications of histones and DNA methylation. Topics include: position effect, gene silencing, heterochromatin, centromere identity, genomic imprinting, histone code, variant histones, and the role of epigenetics in cancer. Prerequisite: BIO41 and BIO42, or GENE 203, or consent of instructor.

2 units, alternate years, not given this year

**PATH 210. Stem Cells in Development and Disease**

Molecular and cellular mechanisms underlying the basic self-renewal and differentiation properties of stem cells in multiple tissues and organisms. How abnormal stem cell behavior may contribute to diseases such as cancer. How to manipulate stem cell behavior in vitro or in vivo for therapeutic purposes. Classical papers and recent literatures in the field of stem cell biology. Open to graduate, medical, and advanced undergraduate students. Prerequisite: consent of instructor.

1-2 units, Aut (Lu, B)

**PATH 213. Gross Autopsy Pathology Laboratory**

Examine/discuss unfixed dissected organs from current autopsies and correlate morphologic findings with the clinical history. Students view postmortem examinations and may participate (in a small group) in one postmortem examination with the assistance of residents and staff, and present the case to the class. Class scheduling is flexible. Additional unit for participation in a postmortem examination. Class may not be repeated. Prerequisite: HHD221.

2-3 units, Aut (Regula, D), Win (Regula, D)

**PATH 218. Computational Analysis of Biological Images**

(Same as GENE 218) Physical and computational tools for acquisition, processing, interpretation, and archiving of biological images. Emphasis is on digital microscopy.

2 units, not given this year

**PATH 233. The Biology of Small Modulatory RNAs**

(Same as GENE 233, MI 233) Open to graduate and medical students. Explores recent progress and unsolved questions in the field of RNA interference and microRNA biology. Students are required to read assigned primary literature before each class and actively participate in guided discussions on related technical and conceptual issues during class meetings. Assignments include critiques of assigned papers and developing a novel research proposal.

2 units, alternate years, not given this year

**PATH 234. Fundamentals of RNA Biology**

(Same as GENE 234, MI 234) For graduate or medical students and (if space allows) to active participants from other segments of the Stanford Community (e.g., TGR students); undergraduates by instructor consent. Fundamental issues of RNA biology, with the goal of setting a foundation for students to explore the expanding world of RNA-based regulation. Each week a topic is covered by a faculty lecture and journal club presentations by students.

2 units, Aut (Fire, A; Chen, C)

**PATH 240. Clinical Studies in Pathology I**

A broad exposure to the practice of pathology in an academic medical center. Students are assigned a faculty mentor and work closely with pathology residents, fellows and faculty. Two months are spent in surgical pathology where students help examine surgical resection specimens and biopsies and participate in making a final diagnosis. One month is spent in autopsy pathology where students perform autopsy prosections and formulate final anatomic diagnoses under the supervision of faculty. This course must be combined with Clinical Studies in Pathology II, and two additional quarters of PATH 399, Directed Research, to fulfill a 12 month Post-Sophomore year Fellowship in Pathology. Prerequisite: MD candidate; instructor consent.

3-9 units, Aut (Connolly, A; Higgins, J), Win (Connolly, A; Higgins, J), Spr (Higgins, J; Connolly, A), Sum (Natkunam, Y; Higgins, J)

**PATH 241. Clinical Studies in Pathology II**

An in-depth exposure to the practice of pathology for students who have completed Clinical Studies in Pathology I. Students are assigned a faculty mentor and work closely with pathology residents, fellows and faculty. Two months are spent in surgical pathology where students help examine surgical resection specimens and biopsies and participate in making a final diagnosis. One month is spent in sub-specialty areas of pathology that include dermatopathology, neuropathology, renal pathology, lymph node pathology or cytology. This course must be combined with Clinical Studies in Pathology I and two additional quarters of PATH 399, Directed Research, to fulfill a 12-month Post-Sophomore year Fellowship in Pathology. Prerequisite: consent of instructor and successful completion of Clinical Studies in Pathology I (PATH 240).

3-9 units, Aut (Connolly, A; Higgins, J), Win (Connolly, A; Higgins, J), Spr (Higgins, J; Connolly, A), Sum (Higgins, J; Natkunam, Y)

**PATH 280. Early Clinical Experience in Pathology**

Provides an observational experience as determined by the instructor and student. Prerequisite: consent of instructor.

1-2 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**PATH 299. Directed Reading in Pathology**

Prerequisite: consent of instructor.

1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**PATH 370. Medical Scholars Research**

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

4-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**PATH 399. Graduate Research**

Students undertake investigations sponsored by individual faculty members. Opportunities at the molecular, cellular, and

clinicopathologic levels. Prerequisite: consent of instructor.  
*1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

## PEDIATRICS (PEDS) COURSES

### UNDERGRADUATE COURSES IN PEDIATRICS

Primarily for undergraduates; graduate students may enroll with consent of adviser.

#### **PEDS 65N. Understanding Children's Health Disparities**

(F,Sem) Stanford Introductory Seminar. The social and economic factors that affect children and their health status. The principal sources of disparities in the health of children in the U.S. are not biologic, but social and economic. Topics include ethnic, cultural, and behavioral factors that affect children's health, both directly and indirectly; lack of health insurance; and current proposals for health care reform, focusing specifically on how they will impact existing health disparities among children.

*3 units, Win (Barr, D)*

#### **PEDS 65Q. Understanding Children's Health Disparities**

(S,Sem) Stanford Introductory Seminar. The social and economic factors that affect children and their health status. The principal sources of disparities in the health of children in the U.S. are not biologic, but social and economic. Topics include ethnic, cultural, and behavioral factors that affect children's health, both directly and indirectly; lack of health insurance; and current proposals for health care reform, focusing specifically on how they will impact existing health disparities among children. Includes instruction addressing written assignments and required oral presentations.

*3 units, Aut (Barr, D)*

#### **PEDS 105. Health Promotion and the Campus Culture**

(Same as PEDS 215) Multidisciplinary perspectives of public health and health psychology. The prevalence of health risk behaviors on the contemporary college campus and the challenges of risk reduction. Students apply theoretical frameworks to peer health promotion campus projects. Limited enrollment. Prerequisite: consent of instructor following first meeting.

*4 units, Spr (Pertofsky, C; Friedman, I)*

#### **PEDS 106. Pursuit of Happiness and Health**

(Same as PEDS 206) Evidence-based correlations between health and quality of life measures: core theoretical concepts and research findings. Topics include cognitive neuroscience and positive emotion, genetics and set point theory, psychological research and subjective well-being. Emphasis on issues relevant to high-achieving adolescents and young adults.

*3 units, Win (Friedman, I; Pertofsky, C; Luskin, F)*

#### **PEDS 111Q. Issues of Race and Ethnicity in the Health of Children**

Preference to sophomores. Medicine and pediatrics from a public-health, evidence-based perspective. How research methods unmask health issues for at-risk racial and ethnic groups of children. Determinants of health with regard to race and ethnicity and ideas for changes in public policy. Students identify an area of interest and proposed intervention.

*3-4 units, not given this year*

#### **PEDS 116. Alcohol Issues and the Campus Culture**

Multidisciplinary perspectives of public health, health psychology, and sociology. The prevalence and scope of alcohol-related problems; challenges of risk reduction and intervention strategies. Students apply theoretical frameworks to alcohol-related research topics and projects. Limited enrollment. Prerequisite: consent of instructor following first meeting.

*4 units, not given this year*

#### **PEDS 199. Undergraduate Directed Reading/Research**

Prerequisite: consent of instructor.

*1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

### GRADUATE COURSES IN PEDIATRICS

Primarily for graduate students; undergraduates may enroll with consent of instructor.

#### **PEDS 201. Medical Leadership Development**

A condensed leadership curriculum for medical students. Concepts and practices of leadership development. Topics include: defining leadership, modeling the way, the value of teams, communication and emotional intelligence, diversity, and conflict management.

*1 unit, not given this year*

#### **PEDS 206. Pursuit of Happiness and Health**

(Same as PEDS 106) Evidence-based correlations between health and quality of life measures: core theoretical concepts and research findings. Topics include cognitive neuroscience and positive emotion, genetics and set point theory, psychological research and subjective well-being. Emphasis on issues relevant to high-achieving adolescents and young adults.

*3 units, Win (Friedman, I; Pertofsky, C; Luskin, F)*

#### **PEDS 211. Medical-Legal Issues in Children's Health**

(Same as LAW 643) Explores the link between poverty and children's health and how the medical and legal fields can work together to improve health outcomes for low income children. Weekly class meetings covering medical legal issues such as asthma immigration, health insurance; intake interviews with patient families and analysis of their medical legal issues; group project focused on a medical legal policy issue; final paper cowritten by law and medical students. May be taken for 2 units (weekly 2.5 hour seminar meetings only), 3 units (participation in either intake interviews or policy work) or 4 units (full participation in all course components). Prerequisite: instructor consent. Preference to students committed to full participation.

*2-4 units, Spr (Staff)*

#### **PEDS 212. Challenges of Human Migration: Health and Health Care of Migrants and Autochthonous Populations**

(Same as HUMBIO 122M) An emerging area of inquiry. Topics include: global migration trends, health Issues/aspects of migration, healthcare and the needs of immigrants in the US, and migrants as healthcare providers: a new area of inquiry in the US. Class is structured to include: lectures lead by the instructor and possible guest speakers; seminar, discussion and case study sessions led by students.

*3 units, Spr (Rodriguez, E)*

#### **PEDS 214. Introduction to Pediatrics Lecture Series**

Introduction to the various aspects of pediatrics, directed at pre-clinical MD students, undergraduates, or graduate students. Course composed of interactive lectures conducted by pediatric faculty on subjects ranging from normal development to topics in different pediatric subspecialties. current issues in the field, and opportunities for students considering this specialty. Speakers also touch on their career paths and choices and are available to answer questions about their areas of interest. By special arrangement students may have the opportunity to shadow general pediatricians or pediatric specialists. Intended to stimulate interest in pediatrics and to inform students about the breadth of the field.

*1 unit, Win (Heninger, C)*

#### **PEDS 215. Health Promotion and the Campus Culture**

(Same as PEDS 105) Multidisciplinary perspectives of public health and health psychology. The prevalence of health risk behaviors on the contemporary college campus and the challenges of risk reduction. Students apply theoretical frameworks to peer health promotion campus projects. Limited enrollment. Prerequisite: consent of instructor following first meeting.

*4 units, Spr (Pertofsky, C; Friedman, I)*

#### **PEDS 222. Beyond Health Care: Seeking Health in Society**

(Same as HUMBIO 122) Available evidence at the national and cross-country level linking social welfare interventions and health outcomes. If and how non-health programs and policies could have an impact on positive health outcomes. Evaluation of social programs and policies that buffer the negative health impact of economic instability and unemployment among adult workers and their children. Examination of safety nets, including public health insurance, income maintenance programs, and disability insurance. Prerequisites: HUMBIO 4B or equivalent, and background in research methods and statistics.

*3 units, Aut (Rodriguez, E)*

#### **PEDS 223. Human Rights and Global Health**

Open to medical students, graduate students, and advanced undergraduates. A survey of the field of human rights and global

health issues, with an emphasis on issues relevant to health professionals. Topics include the basic international conventions of human rights law, the origins and evolution of the legal notion of health as a human right, the role of health professionals in documenting the health consequences of conflict and human rights violations, health and women's human rights, health and children's human rights, the health status of refugees and displaced persons, torture, bioethics and human rights, and the worldwide availability of medicinal drugs.

3 units, Spr (Patenaude, B; Magnus, D)

**PEDS 224. Genocide and Humanitarian Intervention**

Open to medical students, graduate students, and undergraduate students. Traces the history of genocide in the 20th century and the question of humanitarian intervention to stop it, a topic that has been especially controversial since the end of the Cold War. The pre-1990s discussion begins with the Armenian genocide during the First World War and includes the Holocaust and Cambodia under the Khmer Rouge in the 1970s. Coverage of genocide and humanitarian intervention since the 1990s includes the wars in Bosnia, Rwanda, Kosovo, the Congo and Sudan.

3 units, Win (Magnus, D; Patenaude, B)

**PEDS 230. Pediatrics Journal Club**

Each session focuses on a current article in pediatric medicine. Discussions led by faculty experts in the area covered that session. Topics may range widely, depending on the available literature and students' interests. Students are expected to review the chosen article before class and participate in discussion. Discussion includes methodology and statistical analysis of each study and its relevance to pediatric practice.

1 unit, Spr (Staff)

**PEDS 231. Medicine for Innovators and Entrepreneurs**

(Same as IMMUNOL 231) Interdisciplinary, project-based course in which bioscience, bioinformatics, biodesign, bioengineering students learn concepts and principles to understand human disease and work together to propose solutions to medical problems. Diabetes mellitus is used as a paradigm for understanding human disease. Guest medical school and outside faculty. Field trips to Stanford clinics and biotechnology companies. Prerequisite: college level biology.

3-4 units, not given this year

**PEDS 240. The Use of Race in Clinical Decision-Making**

Addresses the question of when it is appropriate for a physician to use a patient's race as a factor in making medical decisions. With growing frequency, published clinical guidelines and approved indications of pharmaceuticals define different approaches to treatment for patients of different races. Covers the scientific basis of using race as a biologic category and the scientific evidence on which clinical guidelines and pharmaceutical indications have been developed.

1 unit, not given this year

**PEDS 246. Developmental Disabilities: From Biology to Policy**

(Same as HUMBIO 146D) Changes in science and societal attitudes have resulted in an increased prevalence of individuals with disabilities in our communities. This course focuses on Down syndrome, cerebral palsy, Fragile X, and autism. Topics include medical and social definitions of disability; the impact of attitudes, beliefs, and values; advances in biological sciences that may lead to novel therapies to improve functioning; and federal policies, laws, and regulations such as IDEA that increase opportunities for community participation. A field experience complements classroom discussion. Prerequisite: HUMBIO core or equivalent, and consent of instructor.

3 units, Win (Feldman, H)

**PEDS 250. Social and Environmental Determinants of Health**

How race/ethnicity and SES contribute to health disparities, how vulnerable populations are uniquely at health risk, and how the built environment relates to health and wellness. Topics include: gender, age, race/ethnicity, language, education, individual SES and neighborhood SES as related to health; individual and structural race bias; health needs of vulnerable populations (e.g., the homeless, the incarcerated, immigrant populations, children, and uninsured/underinsured); and environmental forces (e.g., urban design/planning, traffic/car culture, green space, housing, food access/culture, law enforcement, and media).

3 units, Aut (Chamberlain, L)

**PEDS 251A. Medical Ethics I**

Required for Scholarly Concentration in Biomedical Ethics and Medical Humanities. The field of bioethics, including theoretical approaches to bioethical problems. Contemporary controversies and clinical cases. Values that arise in different situations and clinical encounters. Issues include: genetics and stem cell research, rationing, ethical issues in care at the end of life, organ transplantation issues.

2 units, Win (Magnus, D)

**PEDS 251B. Medical Ethics II**

The integration of ethical theory with applications of theory or conceptual issues in medicine, health care, and the life and social sciences. Topic varies by year. Possible topics include: ethical issues in stem cell research; death and dying; genetics and ethics; concepts of health and disease; the ethics of international research; and ethical implications of new reproductive technology.

2 units, Aut (Magnus, D)

**PEDS 252. Partnering with Community-based Organizations and Coalitions to Reach Underserved Populations**

Principles of community engagement for improving community health, including appreciation of complexities. Discussion by experienced health professionals about incorporating community engagement activities into careers in medicine. Work in small groups to partner with a local community-based organization, coalition, clinic, or school to develop and conduct a community health assessment project. Development of skills in formative research to inform design of health assessment tool. Completion of project assessment plan and assessment tool, including strategies for data collection and analysis. Data collection and analysis of community health assessment project. Following analysis, completion of a summary report/product that best meets needs of community partner. Dissemination of findings to relevant community groups/coalitions per request of community partner. Preparation of oral presentation to academic colleagues and faculty leaders. Completion of one of the following: an individual

2 units, not given this year

**PEDS 253. Applied Grant-Writing Skills for Community and Clinical Research**

Skill-building in writing scientific research proposals. Topics include: grant proposal preparation; scientific literature review; developing research aims; decision-making on study design & methodology; planning statistical analyses; determining research compliances, timelines and resources. Students develop drafts of potential projects, peer-review and critique writing samples, and receive detailed feedback from instructor on all aspects of research projects.

2 units, not given this year

**PEDS 254. Pediatric Physical Findings Rounds**

Pediatric patients with specific physical findings and hospitalized at LPOCH are identified and introduced to students. Students in small groups examine patients at the bedside to note the physical finding and discuss it within the context of the patient's clinical problem. Emphasis is on basic science discussion to understand the cause of the finding.

1 unit, Aut (Prober, C), Win (Prober, C), Spr (Prober, C)

**PEDS 280. Early Clinical Experience**

Provides students an opportunity to see patients and correlate clinical findings with preclinical coursework. Students spend a half day or a full day in a pediatric subspecialty clinic (e.g., infectious diseases, endocrine, gastroenterology), participate in conferences and accompany attending physicians. Students have directed reading and meet with faculty for one hour per week to discuss their reading.

2-4 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**PEDS 281. Childhood Chronic Illness: Impact on Family Development**

The Pals Program is a volunteer activity serving Lucile Packard Children's Hospital chronically ill patients and their siblings. Modeled after the Big Brother/Big Sister Program, Pals matches first- and second-year medical students with pediatric patients or their siblings. The patients and/or their siblings enjoy the support and companionship of their Pals, and the medical students learn firsthand about the emotional and social aspects of chronic illness

during childhood. Pals meet regularly throughout the year to participate in fun activities such as movies, ball games, museums, and picnics. The activities and personal relationships are overseen by the LPCH Pals social worker. Bimonthly class meetings introduce the students to pediatric diseases such as leukemia, hemophilia and cancer. The class brings in physicians to give the medical perspective, but also pediatric patients to get their perspective as well. Prerequisite: approval of the LPCH social worker for Pals.

*1 unit, Aut (Berquist, W; Madhok, J), Win (Berquist, W), Spr (Staff)*

### **PEDS 282. Pregnancy, Birth, and Infancy**

(Same as OBGYN 282) Comprehensive clinical experience where pre-clinical medical students follow pregnant women receiving care at Stanford hospitals to attend prenatal visits, delivery, and postnatal visits. Continuity clinic format, combined with didactic lessons and discussion seminars. Students are exposed to clinical activities in a meaningful context, bolstering classroom studies in anatomy, physiology, embryology and human development, and emphasizing social, economic, and personal issues related to medicine. This program spans one quarter, covering topics related to pregnancy, labor and delivery and newborn care. In addition to clinic experiences, students are expected to spend 1-2 hours/week in lectures and to complete a reflection of their experiences in the course. Prerequisite: pre-clinical medical student.

*3 units, Spr (Staff)*

### **PEDS 299. Directed Reading in Pediatrics**

Prerequisite: consent of instructor.

*1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

### **PEDS 370. Medical Scholars Research**

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

*4-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

### **PEDS 399. Graduate Research**

Students undertake investigations sponsored by individual faculty members.

*1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

## PHILOSOPHY (PHIL) COURSES

### UNDERGRADUATE COURSES IN PHILOSOPHY

Primarily for undergraduates; graduate students may enroll with consent of adviser.

#### **PHIL 1. Introduction to Philosophy**

Is there one truth or many? Does science tell us everything there is to know? Can our minds be purely physical? Do we have free will? Is faith rational? Should we always be rational? What is the meaning of life? Are there moral truths? What are truth, reality, rationality, and knowledge? How can such questions be answered? Intensive introduction to theories and techniques in philosophy from various contemporary traditions. GER:DB-Hum

*5 units, Aut (Hussain, N)*

#### **PHIL 2. Introduction to Moral Philosophy**

(Same as ETHICSOC 20) What is the basis of moral judgment? What makes right actions right and wrong actions wrong? What makes a state of affairs good or worth promoting? What is it to have a good or virtuous character? Answers to classic questions in ethics through the works of traditional and contemporary authors. Fulfills the Philosophy ethical reasoning requirement. GER:DB-Hum, EC-EthicReas

*5 units, Win (Dannenberg, J)*

#### **PHIL 7N. What is Truth**

(F,Sem) Stanford Introductory Seminar. This question can be answered precisely in some important cases. We begin with the language of propositional logic where truth is defined by simple tables. This is already sufficient for description of many important problems and leads to a famous (\$1 000 000) problem  $P=NP$ . We use Sudoku puzzles for illustration. Close connection between

propositional truth and proof is established by the resolution method forming a basis of most automated theorem provers. The language of predicate logic covers much more and illustrates the notion of completeness. Register machines provide connection with computations and lead to a fundamental classification of problems of truth with respect to decidability. The language of arithmetic exhibits a new phenomenon of incompleteness that changed significant part of philosophy in 20-th century. GER:DB-Hum

*3 units, Spr (Mints, G)*

#### **PHIL 8N. Free Will and Responsibility**

In what sense are we, or might we be free agents? Is our freedom compatible with our being fully a part of the same natural, causal order that includes other physical and biological systems? What assumptions about freedom do we make when we hold people accountable morally and/or legally? When we hold people accountable, and so responsible, can we also see them as part of the natural, causal order? Or is there a deep incompatibility between these two ways of understanding ourselves? What assumptions about our freedom do we make when we deliberate about what to do? Are these assumptions in conflict with seeing ourselves as part of the natural, causal order? We will explore these and related questions primarily by way of careful study of recent and contemporary philosophical research on these matters. GER:DB-Hum

*4 units, not given this year*

#### **PHIL 9N. Philosophical Classics of the 20th Century**

Last century's best and most influential philosophical writings. Topics include ethics (what is the nature of right and wrong?), language (how do meaning, reference, and truth arise in the natural world?), science (can science claim objectively accurate descriptions of reality?), existence (are there things that don't exist?), and the mind (could robots ever be conscious?). Authors include Bertrand Russell, Ludwig Wittgenstein, Rudolf Carnap, Willard Quine, Thomas Kuhn, John Rawls, and Saul Kripke. The lay of the land in contemporary philosophy. GER:DB-Hum

*4 units, not given this year*

#### **PHIL 10N. Traveling Through Time**

Is time travel possible? Yes. We do it every day, at the rate of one minute per minute. Relativity theory even suggests a sense in which we could travel to the distant future. But could we travel to the past? If so, why aren't there any time travelers around? If not, is that because of some law of physics or because the very idea of time travel is incoherent? Suppose I were to go back in time and try to save JFK. Would I be bound to fail? What would stop me? Couldn't I just try again? If I eventually succeeded, would I thereby create a new branch in time? Or can we make sense of the idea of changing the past? What would happen if I tried to prevent my parents from having kids? What went on in the last season of *Lost*? We'll try to answer questions like these by looking at classic and contemporary work in the physics and philosophy of time, as well as pertinent case studies in fiction and film. Special guest speakers from the future are hereby invited.

*3 units, not given this year*

#### **PHIL 11N. Skepticism**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Historical and contemporary philosophical perspectives on the limits of human knowledge of a mind-independent world and causal laws of nature. The nature and possibility of a priori knowledge. GER:DB-Hum

*3 units, Win (De Pierris, G)*

#### **PHIL 15N. Freedom, Community, and Morality**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Does the freedom of the individual conflict with the demands of human community and morality? Or, as some philosophers have maintained, does the freedom of the individual find its highest expression in a moral community of other human beings? Readings include Camus, Mill, Rousseau, and Kant. GER:DB-Hum, EC-EthicReas

*3 units, Aut (Friedman, M)*

#### **PHIL 20S. Introduction to Moral Philosophy**

What makes right actions right and wrong actions wrong? Must right actions promote some further good? What is the role of consequences in the evaluation of actions as right or good? Focus



is on traditional attempts to account for what determines which actions are right, what is worth promoting, and what kind of person one ought to be. Readings from primarily historical figures such as Aristotle, Hume, Kant, Mill, and others.

*3 units, not given this year*

### PHIL 22. Ethics in Theory and Practice

(Same as ETHICSOC 10) Weekly talks by Stanford faculty on important questions of ethics that arise in private and public life. These questions arise in all disciplines and are central to many of the main problems confronting humanity today. Such questions include: what is our obligation to future generations? are there any human rights? what is the appropriate role of religion in politics? is capital punishment ever justified? what are the ethical obligations of a researcher? should the university teach moral values? what principles of justice should govern the distribution of K-12 education? Class meets Fridays from noon to 1:05. Format is an informal talk of about 35- 40 minutes, followed by discussion.

*1 unit, Aut (Sockness, B), Win (Sockness, B), Spr (Sockness, B)*

### PHIL 23C. Counterfactuals

Reasoning about counterfactual conditionals plays an important role in contemporary philosophy. Not only have counterfactual analyses been proposed for central philosophical notions, including causation, laws of nature, free will, and knowledge, but also counterfactuals have become objects of interest in their own right, both in the philosophy of language and in logic. This tutorial will introduce the standard approaches to the semantics of counterfactuals, focusing on the work of David Lewis and Robert Stalnaker. Prerequisite: one logic course (e.g., 50, 150, or 151) or consent of instructor.

*2 units, not given this year*

### PHIL 23E. Embodied Cognition

Where does the mind stop and the world begin? A standard assumption is that thinking is somehow local to the central nervous system; that is, cognition just amounts to brain activity. A wave of recent work in philosophy and cognitive science has questioned this assumption, insisting that the mind cannot be understood outside the context of a living body interacting dynamically with an environment. To put it more dramatically, the mind extends out into the world. We shall read some of the main proponents of this move toward embodied and embedded cognition, and try to assess the extent to which it seriously calls into question more traditional views about how mind, brain, body, and world fit together.

*2 units, not given this year*

### PHIL 23F. Forgive and Punish

Are we ever justified in forgiving those who wrong us? Do we have more reason to seek revenge and/or punishment than we do to forgive? Does it matter if wrongdoers apologize and repent for their offenses? Are there some acts and/or persons that shouldn't be forgiven? This tutorial will take up these questions by examining (mostly recent) philosophical writings about: forgiveness, retribution, the reactive attitudes (such as resentment and hatred), and, more generally, how humans should (and shouldn't) respond to wrongdoing.

*2 units, not given this year*

### PHIL 23G. Psychological Pessimism and Human Nature

In different ways, Thucydides, Hobbes, Rousseau, Kant, and Schopenhauer all take themselves to be emphasizing a just so, descriptive pessimism about human nature in order to highlight the more pressing question concerning what humankind can make itself to be. In other words, for these thinkers pessimism represents a sort of intellectual honesty about human nature, but these insights invariably underscore a profound optimism in spite of their pessimism. Our guiding question will be to explore whether and how each of these thinkers reconciles their philosophical optimism with their psychological pessimism about human nature.

*2 units, Aut (McLuckie, A)*

### PHIL 23H. Perfectionism: The Idea of the Perfect in Nature, Ethics, and Politics

Perfection is the full realization of what is best or most excellent. In this tutorial course we will explore philosophical thought on perfection in three different contexts: natural teleology, individual ethical life, and utopian and anti-utopian social thought. Throughout the course, we will ask the following questions: What is a perfect being? Why is perfection per se good or desirable? Do

evaluative comparisons presuppose some absolute standard of perfection? Does it make sense to aim at perfection in ethical and political life? What are the virtues of imperfection? What are the hazards of pursuing perfection in the political realm? Is perfectionism compatible with pluralism about values? Is perfectionism compatible with government based on popular will? The primary emphasis is on close reading and discussion of classic texts in ethical theory, including selections from Plato, Aristotle, Aquinas, Rousseau, Kant, and Tocqueville, accompanied by contemporary selections.

*2 units, Win (Staff)*

### PHIL 23J. Respect

The notion of respect plays a crucial role in a variety of human contexts. We respect many different things and we respect them in many different ways: from parents and elders, to public institutions and the law, and other people's dignity, feelings and rights. Many, in fact, claim that all people deserve respect some way or another. Public conversations lately have been plagued with calls to respect the environment, life in all of its forms, citizens, sexual orientation, etc. Additionally, it is also urged that public debates should take place under conditions of mutual respect: that above and beyond our differences and our interests, we should respect each other as persons. In particular, philosophers working in moral and political theory focus on what respect for persons might mean including oneself and possibly other entities. Such a notion is frequently issued inter alia in discussions about justice and legitimacy, equality and exploitation, multiculturalism and pluralism, etc.

*2 units, Win (Jimenez de la Gama, P)*

### PHIL 23K. Race and Gender

Are race and gender interesting biological categories, or are they in some way socially constructed? How are race and gender similar and different? Are legal restrictions on racist or sexist speech morally acceptable? What about racial profiling? This tutorial will explore theoretical questions about race and gender drawn from metaphysics and the philosophy of science, as well as the pressing moral and political questions these topics raise. Readings will consist of recent articles by prominent philosophers, including Elizabeth Anderson, Sally Haslanger, Tommie Shelby, Rae Langton, and Laurence Thomas.

*2 units, Spr (Asarnow, S; Persad, G)*

### PHIL 23L. Love and Friendship

People as different as Jesus Christ and Justin Timberlake think that love is crucial to living the good life. But what is love? What part should it play in our lives? Is it just one value among many? This course will consider questions about the nature of love, the role it plays in moral philosophy, and its effect on individual autonomy. Readings will be from both contemporary and historical sources.

*2 units, not given this year*

### PHIL 23N. Neuroscience and the Self

The Self: Fiction or reality? Bundle of perceptions? Pragmatic role-concept? Fleeting moment of consciousness? Social invention? Narrative construct? Various philosophical conceptions of the self will be explored with a particular focus on the notion of the 'narrative self.' Literature from neuroscience, psychology and philosophy will be considered.

*2 units, not given this year*

### PHIL 23T. Intellectual trust in oneself and others

Most people have many false beliefs. Yet, one routinely relies on one's own beliefs and on the views of others. Does that mean that one takes oneself to be exceptionally good at forming true beliefs, and exceptionally good at detecting false beliefs in others? When is it justified to place intellectual trust in oneself and in others?

*2 units, not given this year*

### PHIL 25SI. The Animal-Human Relationship: Interdisciplinary Perspectives

The ethical, scientific, and spiritual problems that arise from the interaction between humans and other animals. Can animals have empathy? What does it mean for an animal to feel pain? How did humans come to dominate other animals? What moral obligations do humans have towards animals? Where do animals fit in religious thought? Is animal research ethical, and is it effective? What role does meat consumption play in modern society? How can the environmental impacts of livestock production be



mitigated? Guest lecturers from philosophy, literature, biology, neuroscience, religious studies, psychology, anthropology, and environmental science.

1 unit

**PHIL 30S. Justifying justice at home and abroad**

Is the war against Osama bin Laden just or justifiable? Does America have the right to intervene in Libya or Afghanistan? Are Wall Street regulations justified based on the good consequences that result for society? Is health care reform warranted? The goal of this course is to provide the student with a framework with which to approach, argue about, justify and/or condemn things that take place in the contemporary socio-political arena. Main topics in socio-political philosophy. Rights. Are rights justified based on the good consequences that result for a society that has them; or by virtue of being a rational being one has certain rights. Property. According to the Lockean school of thought, property consists in a direct, metaphysical relation between an object (owned) and a person (owner); according to the Kantian school of thought, property consists in an agreement among members of a community to the effect that an individual (owner) has the right to exclusive use of an object

3 units, Sum (Staff)

**PHIL 41Q. Truth**

Preference to sophomores. Central issues animating current work in the philosophy of truth. What is truth? What is it about a statement or judgment that makes it true rather than false? Are there any propositions that are neither true nor false? Could truth be relative to individuals or communities? Do people have different notions of truth for different enterprises such as mathematics and ethics? Might truth be a matter of degree? Sources include the instructor's book manuscript and other contemporary writers. GER:DB-Hum

3 units, not given this year

**PHIL 42. Philosophy through Theater: Choice and Chance**

Dramatic literature as a window into philosophical work on freedom of the will and indeterminism. Students participate in the production of original one-act plays. GER:DB-Hum

4 units, not given this year

**PHIL 43S. Happiness: Positive Psychology and Philosophy**

The connection between research in positive psychology to determine what happiness is and the conditions under which human beings are happy with issues in moral philosophy regarding whether we should aim at happiness or think of it as a good. The assumptions about happiness made by positive psychologists. The philosophical insight into the question of how people should live that is gained by looking at the empirical results provided by psychologists.

3 units, not given this year

**PHIL 45S. Is it always good to 'be yourself'? Issues in Ethics and Moral Psychology**

It may seem obvious that it is good to 'be yourself,' to be 'who you really are,' or to do what you 'really' want to do 'but is it? Some believe that we are our true, or real, selves when we act on our values, what we love, or what we care most about. But if that is true, then is it still good to be yourself when what you value and care most about involves a commitment to acts of terrorism, torturing others, or a life of pain and boredom? We will look at contemporary philosophical attempts to make sense of the idea of 'being yourself,' and what the nature of the value of this authenticity is. Authors include Bratman, Frankfurt, Korsgaard, Millgram and Williams.

3 units, Sum (Staff)

**PHIL 50. Introductory Logic**

Propositional and predicate logic; emphasis is on translating English sentences into logical symbols and constructing derivations of valid arguments. GER:DB-Math

4 units, Aut (Duarte, S), Spr (Wishon, D)

**PHIL 50S. Introductory Logic**

Propositional and predicate logic. Themes include: translations of English sentences into logical symbols; semantics of and proof rules for propositional and predicate logic. Emphasis is on evaluating arguments with the syntax and semantics of contemporary logic. Special attention to the properties of the languages studied.

3 units, not given this year

**PHIL 60. Introduction to Philosophy of Science**

(Same as HPS 60) 20th-century views on the nature of scientific knowledge. Logical positivism and Popper; the problem of induction; Kuhn, Feyerabend, and radical philosophies of science; subsequent attempts to rebuild moderate empiricist and realist positions. GER:DB-Hum

5 units, Win (Ryckman, T)

**PHIL 61. Science, Religion, and the Birth of Modern Philosophy**

(Same as HPS 61) Galileo's defense of the Copernican world-system that initiated the scientific revolution of the 17th century, led to conflict between science and religion, and influenced the development of modern philosophy. Readings focus on Galileo and Descartes. GER:DB-Hum

5 units, not given this year

**PHIL 63S. Introduction to Bioethics**

If I am at least partly at fault for my own illness, should I lose priority for treatment? Is there a moral difference between killing and letting die? Focus is on understanding recent issues in applied ethics that arise from the biological and medical sciences. Readings are centralized around human life. Topics may include pre-birth, cloning, killing and letting die, and organ markets.

3 units, Sum (Staff)

**PHIL 71H. Philosophy and the Real World**

Introduction to the humanities as an applied discipline; how literary and philosophical ideas illuminate and change how people live their lives as individuals and members of society. Focus is on short texts that illustrate how literary and philosophical ideas arise from social problems and attempt to confront those problems. Methods and approaches: how to read such texts; how to make arguments about them; how such texts shed light on contemporary situations.

2 units, not given this year

**PHIL 72. Contemporary Moral Problems**

(Same as ETHICSOC 185M) As individuals and as members of societies, we make choices that can be assessed from the moral point of view. What choices should we make, and how should we make them? Is it ok to buy iThings when others lack basic nutrition? Does a preference for the taste of meat justify killing animals? When is deceptive seduction seriously wrong and when is it just sketchy? Topics include exploitation, poverty, sexual and reproductive autonomy, commercialization, homelessness, citizenship, education, stereotypes, affirmative action, and social responsibility. GER:EC-EthicReas

4 units, Aut (Dougherty, T)

**PHIL 76. Introduction to Global Justice**

(Same as ETHICSOC 136R, INTNLREL 136R, POLISCI 136R, POLISCI 336) Recent work in political theory on global justice. Topics include global poverty, human rights, fair trade, immigration, climate change. Do developed countries have a duty to aid developing countries? Do rich countries have the right to close their borders to economic immigrants? When is humanitarian intervention justified? Readings include Charles Beitz, Thomas Pogge, John Rawls.

5 units, Spr (Satz, D)

**PHIL 77S. Philosophy of Religion**

Key philosophical questions concerning the nature of the divine and the religious through a close reading of some classic philosophical texts, while aiming to develop critical thinking about these issues. Topics include: the existence and nature of God, the problem of evil, the justification of religious belief, the nature of and relationship between faith and reason, and the function(s) of religion. Key texts will include Plato, St. Anselm, Hume, and Nietzsche.

3 units, Sum (Staff)

**PHIL 80. Mind, Matter, and Meaning**

Central topics in philosophy emphasizing development of analytical writing skills. What are human beings? Are human beings free? How do human minds and bodies interact? What does it all mean? Prerequisite: introductory philosophy course. GER:DB-Hum, WIM

5 units, Aut (Lawlor, K), Spr (Crimmins, M)

**PHIL 81. Philosophy and Literature**

(Same as CLASSGEN 81, COMPLIT 181, ENGLISH 81, FRENCH 181, ITALGEN 181, GERGEN 181) Required gateway course for Philosophical and Literary Thought; crosslisted in departments sponsoring the Philosophy and Literature track: majors should register in their home department; non-majors may register in any sponsoring department. Introduction to major problems at the intersection of philosophy and literature. Issues may include authorship, selfhood, truth and fiction, the importance of literary form to philosophical works, and the ethical significance of literary works. Texts include philosophical analyses of literature, works of imaginative literature, and works of both philosophical and literary significance. Authors may include Plato, Montaigne, Nietzsche, Borges, Beckett, Barthes, Foucault, Nussbaum, Walton, Nehamas, Pavel, and Pippin. GER:DB-Hum  
4-5 units, Win (Staff)

**PHIL 90A. The Philosophy of John Perry**

John Perry is among the most influential philosophers of the last several decades, making important contributions to the philosophy of language, metaphysics, and the philosophy of mind. Focus on Perry's work on indexicality, belief reports, reference, pragmatics, identity, personal identity, modality, and consciousness. Perry's work in these areas will be studied in conjunction with that of some key figures in the surrounding literatures, including Kaplan, Lewis, Stalnaker, Kripke, and Chalmers.  
4 units, not given this year

**PHIL 90B. The Ethics of War**

(Same as ETHICSOC 175M) Issues both in contemporary just war theory and political philosophy. Relevant questions include: Can conscription ever be justified? If not, is there anything wrong with targeting poor people as part of efforts to recruit a 'volunteer' military? If, during war itself, combatants act in ways prohibited by the moral requirements governing war's conduct, then does it make any moral difference whether they were acting as ordered? And how do we identify these moral requirements in the first place? For example, what distinguishes a legitimate target from an illegitimate one? What determines whether military action is disproportionate? What, if anything, is morally distinctive about terrorism? Explores the complexities behind these questions and others, with a view to evaluating the potential answers to them.  
4 units, not given this year

**PHIL 90C. Predicting the Future: Puzzles of Induction**

Can we know that the future is likely to resemble the past? Do we have reason to believe that the Sun is even remotely likely to rise again tomorrow? Are we rationally justified in accepting the confident predictions of science and commonsense, based on well-observed regularities? Consider several paradoxes of induction (that is, extrapolation from observed to unobserved), including those raised by Hume, Hempel, and Goodman, the Doomsday and Sleeping Beauty paradoxes, as well as some attempts to solve or cope with them.  
4 units, not given this year

**PHIL 90D. What do Philosophers do?**

4 units, Win (Lewin, M)

**PHIL 90E. Introduction to Business Ethics**

Business strives to make a profit. Ethics counsels that people should avoid acting in ways that are greedy, deceptive, or unjust. But some greedy, deceptive, or unjust business practices are quite profitable. This dilemma is the foundation of the discipline known as business ethics. The course investigates four relationships relevant to concerns about greed, deception, injustice, and profit--between businesses and society, businesses and their shareholders, businesses and their employees, and businesses and their customers--with the aim of clarifying the foundational dilemma.  
4 units, Aut (Scharding, T)

**PHIL 90F. Consciousness and Reference**

Many philosophers see conscious experience as playing an important role in our thought and talk about things. But just what role does it play in reference and cognition? Does it provide us with a capacity to think and talk about things directly? Or does it simply provide us with descriptive conceptions through which we can think and talk about things in some less direct manner? And what about our thought and talk about conscious experience itself? Is it different in kind from our thought and talk about other sorts of

objects? Does consciousness actually play an important role in thought and talk? We will begin by reading seminal works by Frege and Russell on the role of conscious experience in reference and cognition. Then we will turn to contemporary work by Kaplan, Evans, Perry, Taylor, Campbell, Recanati, Jeshion, and Chalmers on the subject. Lastly, we will consider how these various views bear on recent debates about the so-called 'phenomenal concepts; we use to think and talk abo

4 units, Aut (Wishon, D)

**PHIL 90G. Native American Philosophy**

Examine traditional philosophical questions like How do we know? What exists? What is a person? and What is the good life? from the perspectives of classical and contemporary Native American thinkers. We will look at Native American beliefs about respect for persons and places; reactions to colonial doctrines of conversion, treaties, and removal; and the importance of the themes of circularity and performance in classical and contemporary Native philosophical thought. Also of importance will be to contrast some Native American approaches to philosophical questions against Western attempts to answer these same questions. How are the approaches the same? How are they different? What assumptions about the natures of reality or humanity account for the similarities or differences?  
4 units, Spr (Burns, S)

**PHIL 100. Greek Philosophy**

Greek philosophical thought, covering Socrates, Plato, Aristotle, and the Hellenistic schools (the Epicureans, the Stoics, and the Skeptics). Topics: the nature of the soul, virtue and happiness, knowledge, and reality. (Bobonich) GER:DB-Hum  
4 units, Win (Duarte, S)

**PHIL 101. Introduction to Medieval Philosophy**

(Same as PHIL 201) Classics of Western philosophy by Augustine, Boethius, Anselm, Abelard, Aquinas, and Ockham. Explore the puzzles facing someone seeking to lead a good life and to understand herself and her world. A theory of will and human motivation, a theory of ethics based on the agent's intention, and a theory of divine omniscience and omnipotence consistent with divine goodness and human freedom. Works include On Free Choice, The Consolation of Philosophy, Ethics, Summa theologiae, and the Connection of the Virtues. GER:DB-Hum, EC-EthicReas  
4 units, Spr (Duarte, S)

**PHIL 101A. Medieval Religious Philosophy**

(Same as RELIGST 167) (Same as PHIL 101A.) Survey of medieval philosophy, focusing on God, world and words. A pervasive assumption about the structure of the world, that it reflected the categories of God's mind and emerged from an act of divine speech, gave impetus to the interest in the nature of language and its relation to the world. Scripture served as one kind of divine communication to human beings, and The Book of the World as another. The problem of universals, the question of how words relate to God, epistemology, theories of reference, semiotics, are some of the topics discussed. Readings from Augustine, Anselm, Aquinas, Scotus, and Ockham, etc. GER:DB-Hum  
4 units, not given this year

**PHIL 102. Modern Philosophy, Descartes to Kant**

Major figures in early modern philosophy in epistemology, metaphysics, and philosophy of mind. Writings by Descartes, Locke, Leibniz, Berkeley, Hume, and Kant. GER:DB-Hum  
4 units, Aut (Duarte, S)

**PHIL 103. 19th-Century Philosophy**

Focus is on ethics and the philosophy of history. Works include Mill's Utilitarianism, Hegel's The Philosophy of World History, Marx's Economic and Philosophic Manuscripts, Kierkegaard's The Sickness Unto Death, and Nietzsche's On the Genealogy of Morals. GER:DB-Hum  
4 units, not given this year

**PHIL 104. Philosophy of Religion**

Key issues in the philosophy of religion. Topics include the relationship between faith and reason, the concept of God, proofs of God's existence, the meaning of religious language, arguments for and against divine command theory in ethics and the role of religious belief in a liberal society. GER:DB-Hum

4 units, Win (Staff)

**PHIL 106. Ancient Skepticism**

(Same as PHIL 206) The ancient Pyrrhonian skeptics who think that for any claim there is no more reason to assert it than deny it and that a life without any beliefs is the best route to happiness. Some ancient opponents of the Pyrrhonian skeptics and some relations between ancient and modern skepticism. GER:DB-Hum

4 units, not given this year

**PHIL 107. Plato's Metaphysics and Epistemology**

(Same as PHIL 207) Examine Plato's views on the nature of reality and knowledge by reading the relevant parts of dialogues such as the Parmenides, the Phaedo, the Philebus, and the Republic. GER:DB-Hum

4 units, not given this year

**PHIL 108. Topics in Aristotle: Aristotle's Ethics and Contemporary Moral Theory**

(Same as PHIL 208) Examine the fundamentals of Aristotle's psychological views and read the De Anima (On the Soul) and some of his other psychological works. GER:DB-Hum

4 units, Win (Bobonich, C)

**PHIL 109. Topics in Ancient Philosophy: Plato and Aristotle on Art and Rhetoric**

(Same as PHIL 209) Plato's and Aristotle's views on the nature of art and rhetoric and their connections with the emotions, reason and the good life. Readings include Plato's Gorgias, Ion and parts of the Republic and the Laws and Aristotle's Poetics and Rhetoric. GER:DB-Hum

4 units, Aut (Bobonich, C)

**PHIL 110. Plato**

(Same as PHIL 210) Plato's Republic. GER:DB-Hum

4 units, not given this year

**PHIL 111. Aristotle and Contemporary Ethics**

(Same as PHIL 211) Aristotle's Nicomachean Ethics, focusing on virtue, happiness, pleasure, practical reasoning, and particularism. Sources include the Eudemian Ethics, contemporary philosophers who have taken many of these topics up again, and contemporary material such as that by Anscombe, Foot, Hursthouse, Korsgaard, and McDowell. GER:DB-Hum

4 units, not given this year

**PHIL 113. Hellenistic Philosophy**

(Same as PHIL 213) Epicureans, skeptics, and stoics on epistemology, ethics, metaphysics, and psychology. GER:DB-Hum

4 units, not given this year

**PHIL 115. Problems in Medieval Philosophy: Islamic Aristotelianism and Western Scholasticism**

(Same as PHIL 215) The western world adopted Aristotle's metaphysics and natural philosophy as the foundation of its educational system and scholarly life between 1210 and 1255. Christian Europe was thereby following the example set by Islam in Spain and the Near East. Today some people believe that this development was independent, and others think that the scholastics copied even their methods from Arabic philosophers. Historical evaluation of those claims. GER:DB-Hum

3-5 units, not given this year

**PHIL 117. Descartes**

(Same as PHIL 217) (Formerly 121/221.) Descartes's philosophical writings on rules for the direction of the mind, method, innate ideas and ideas of the senses, mind, God, eternal truths, and the material world. GER:DB-Hum

4 units, not given this year

**PHIL 118. British Empiricism, 1660s-1730s**

(Same as PHIL 218) GER:DB-Hum

4 units, not given this year

**PHIL 118A. Origins of Empiricism: Gassendi, Locke, and Berkeley**

(Same as PHIL 218A) Particular light is shed on both the strengths and weaknesses of empiricism by studying it as it first arose during the 17th century revolution in philosophy and the sciences initiated by Descartes. Three philosophers of that period helped to advance empiricism: Pierre Gassendi (1592-1655), John Locke (1632-1704), and George Berkeley (1685-1753). Focus on Locke's theory of ideas, mind, language, reality, and natural philosophy

expounded in his An Essay concerning Human Understanding (Fourth Edition, 1689). Study Gassendi's early influence on, and Berkeley's later reaction to Locke.

4 units, not given this year

**PHIL 119. Rationalists**

(Same as PHIL 219) (Formerly 143/243.) Developments in 17th-century continental philosophy. Descartes's views on mind, necessity, and knowledge. Spinoza and Leibniz emphasizing their own doctrines and their criticism of their predecessors. Prerequisite: 102. GER:DB-Hum

4 units, not given this year

**PHIL 120A. The Leibniz-Clarke Correspondence**

(Same as PHIL 220A) Correspondence on metaphysics, theology, and science. GER:DB-Hum

4 units, not given this year

**PHIL 122. Hume**

(Same as PHIL 222) (Formerly 120/220; graduate students enroll in 222.) Hume's theoretical philosophy, in particular, skepticism and naturalism, the theory of ideas and belief, space and time, causation and necessity, induction and laws of nature, miracles, a priori reasoning, the external world, and the identity of the self. GER:DB-Hum

4 units, not given this year

**PHIL 124. Topics in Early Modern Philosophy**

Philosophical views of the highly influential rationalist philosophers Benedict (or Baruch) Spinoza (1632-1677) and G. W. Leibniz (1646-1716). Topics to be treated include: the nature of God and the question of his providential care for human beings, the concept of substance and its extension, the ontological relation of finite beings to God, the mental and its relation to the corporeal, and the nature of human freedom. GER:DB-Hum

4 units, not given this year

**PHIL 125. Kant's First Critique**

(Same as PHIL 225) (Graduate students register for 225.) The founding work of Kant's critical philosophy emphasizing his contributions to metaphysics and epistemology. His attempts to limit metaphysics to the objects of experience. Prerequisite: course dealing with systematic issues in metaphysics or epistemology, or with the history of modern philosophy. GER:DB-Hum

4 units, Aut (De Pierris, G)

**PHIL 126B. Kant's Ethical Theory**

(Same as PHIL 226B) (Graduate students register for 226B.) Kant's moral philosophy based primarily on the Groundwork of Metaphysics of Morals, Critique of Practical Reason, and The Metaphysics of Morals. GER:DB-Hum

2-4 units, not given this year

**PHIL 127A. Kant's Value Theory**

(Same as PHIL 227A) (Graduate students register for 227A.) The role of autonomy, principled rational self-governance, in Kant's account of the norms to which human beings are answerable as moral agents, citizens, empirical inquirers, and religious believers. Relations between moral values (goodness, rightness) and aesthetic values (beauty, sublimity). GER:DB-Hum

4 units, Spr (Hills, D)

**PHIL 127B. Kant's Anthropology and Philosophy of History**

(Same as PHIL 227B) Kant's conception of anthropology or human nature, based on his philosophy of history, which influenced and anticipated 18th- and 19th-century philosophers of history such as Herder, Fichte, Hegel, and Marx. Texts include Idea for a Universal History, Conjectural Beginning of Human History, and Anthropology from a Pragmatic Point of View. Topics include: Kant's pragmatic approach to the study of human nature; the difficulty of human self knowledge; the role of regulative and teleological principles in studying human history; and Kant's theory of race.

4 units, not given this year

**PHIL 128. Fichte's Ethics**

(Same as PHIL 228) (Graduate students register for 228.) The founder of the German Idealist movement who adopted but revised Kant's project of transcendental philosophy basing it on the principle of awareness of free self-activity. The awareness of other selves and of ethical relations to them as a necessary condition for self-awareness. His writings from 1793-98 emphasizing the place

of intersubjectivity in his theory of experience. GER:DB-Hum  
4 units, not given this year

**PHIL 130. Hegel**

(Same as PHIL 230) (Formerly 122/222; graduate students register for 230.) Introduction to Hegel's philosophy, emphasizing his moral and political philosophy, through study of his last major work (1821). May be repeated for credit. Prerequisite: course in the history of modern philosophy. GER:DB-Hum  
4 units, not given this year

**PHIL 134. Phenomenology and Intersubjectivity**

(Same as PHIL 234) (Graduate students register for 234.) Readings from Husserl, Stein, Heidegger, Sartre, and Merleau-Ponty on subjects related to awareness of others. Topics include solipsism, collective experience, empathy, and objectification of the other. GER:DB-Hum

4 units, not given this year

**PHIL 135. Existentialism**

(Same as PHIL 235) (Formerly 132/232.) Focus is on the existentialist preoccupation with human freedom. What constitutes authentic individuality? What is one's relation to the divine? How can one live a meaningful life? What is the significance of death? A rethinking of the traditional problem of freedom and determinism in readings from Rousseau, Kierkegaard, and Nietzsche, and the extension of these ideas by Sartre, Beauvoir, and Camus, including their social and political consequences in light of 20th-century fascism and feminism. GER:DB-Hum

4 units, Aut (Anderson, L)

**PHIL 136. History of Analytic Philosophy**

(Same as PHIL 236) (Formerly 147/247; graduate students register for 236.) Theories of knowledge in Frege, Carnap, and Quine. Emphasis is on conceptions of analyticity and treatment of logic and mathematics. Prerequisite: 50 and one course numbered 150-165 or 181-90. GER:DB-Hum

4 units, not given this year

**PHIL 137. Wittgenstein**

(Same as PHIL 237) (Graduate students register for 237.) The main themes and claims in Wittgenstein's later work concentrating on his views about meaning, mind, knowledge, the nature of philosophical perplexity, and the nature of philosophical progress in his Philosophical Investigations. Emphasis is on the relationship between the novel arguments of the Investigations and its ways of writing up the results of philosophical questioning. GER:DB-Hum

4 units, not given this year

**PHIL 138. Recent European Philosophy: Between Nature and History**

(Same as PHIL 238) A critical introduction to the novel understandings of time, language, and cultural power developed by 20th-century continental thinkers, with close attention to work by Heidegger, Saussure, Benjamin, and Foucault. GER:DB-Hum

4 units, not given this year

**PHIL 143. Quine**

(Same as PHIL 243) (Formerly 183/283; graduate students register for 243.) The philosophy of Quine: meaning and communication; analyticity, modality, reference, and ontology; theory and evidence; naturalism; mind and the mental. GER:DB-Hum

4 units, not given this year

**PHIL 150. Basic Concepts in Mathematical Logic**

(Same as PHIL 250) (Formerly 159.) The concepts and techniques used in mathematical logic, primarily through the study of the language of first order logic. Topics: formalization, proof, propositional logic, quantifiers, sets, mathematical induction, and enumerability. GER:DB-Math

4 units, Aut (Wasow, T)

**PHIL 150X. Basic Concepts in Mathematical Logic**

Equivalent to the second half of 150. Students attend the first meeting of 150 and rejoin the class on October 30. Prerequisite: CS 103A or X, or PHIL 50.

2 units, Aut (Wasow, T)

**PHIL 151. First-Order Logic**

(Same as PHIL 251) (Formerly 160A.) The syntax and semantics of sentential and first-order logic. Concepts of model theory. Gödel's completeness theorem and its consequences: the Löwenheim-Skolem theorem and the compactness theorem.

Prerequisite: 150 or consent of instructor. GER:DB-Math  
4 units, Win (Sommer, R)

**PHIL 152. Computability and Logic**

(Same as PHIL 252) Approaches to effective computation: recursive functions, register machines, and programming styles. Proof of their equivalence, discussion of Church's thesis. Elementary recursion theory. These techniques used to prove Gödel's incompleteness theorem for arithmetic, whose technical and philosophical repercussions are surveyed. Prerequisite: 151. GER:DB-Math

4 units, Spr (Casanovas, E)

**PHIL 153. Feminist Theories and Methods Across the Disciplines**

(Same as FEMST 103, FEMST 203, PHIL 253) The interdisciplinary foundations of feminist thought. The nature of disciplines and of interdisciplinary work. Challenges of feminism for scholarship and research. GER:EC-Gender

4-5 units, Win (Longino, H)

**PHIL 154. Modal Logic**

(Same as PHIL 254) (Graduate students register for 254.) Syntax and semantics of modal logic, and technical results like completeness and correspondence theory. Applications to philosophy and computer science. Prerequisite: 150 or preferably 151. GER:DB-Math

4 units, Spr (van Benthem, J)

**PHIL 155. General Interest Topics in Mathematical Logic**

Introduction to formalization using language of logic and to problems of philosophical logic and computer science that can be handled this way. Propositional calculus, Sudoku puzzles, resolution rule, problem  $P=NP$ . Possible worlds, modal logic with emphasis on individuation problems. May be repeated for credit.

4 units, not given this year

**PHIL 157. Topics in Philosophy of Logic**

(Same as PHIL 257) (Graduate students register for 257.) Disputed foundational issues in logic; the question of what the subject matter and boundaries of logic are, such as whether what is called second-order logic should be counted as logic. What is the proper notion of logical consequence? May be repeated for credit. Pre- or corequisite: 151, or consent of instructor.

3 units, not given this year

**PHIL 160A. Newtonian Revolution**

(Same as PHIL 260A) (Graduate students register for 260A.) 17th-century efforts in science including by Kepler, Galileo, Descartes, and Huygens, that formed the background for and posed the problems addressed in Newton's Principia. GER:DB-Hum

4 units, not given this year

**PHIL 160B. Newtonian Revolution**

(Same as PHIL 260B) (Graduate students register for 260B.) Newton's Principia in its historical context, emphasizing how it produced a revolution in the conduct of empirical research and in standards of evidence in science. GER:DB-Hum

4 units, not given this year

**PHIL 162. Philosophy of Mathematics**

(Same as MATH 162, PHIL 262) (Graduate students register for PHIL 262.) 20th-century approaches to the foundations and philosophy of mathematics. The background in mathematics, set theory, and logic. Schools and programs of logicism, predicativism, platonism, formalism, and constructivism. Readings from leading thinkers. Prerequisite: PHIL151 or consent of instructor. GER:DB-Math

4 units, Spr (Mumma, J)

**PHIL 163. Significant Figures in Philosophy of Science**

(Same as PHIL 263) (Graduate students register for 263.) Directed study of two or more thinkers, past or present, who have made a lasting impact on contemporary philosophy of science. Subjects last year were Henri Poincaré, Pierre Duhem, and Gaston Bachelard. GER:DB-Hum

4 units, not given this year

**PHIL 163H. The History of Scientific Methods, Pythagoras to Popper**

(Same as HPS 154) History of scientific methods and associated science from ancient Greece to the 20th century. Case studies include Pythagoras, Plato, and Euclid; Aristotle; medieval science;

scientific Renaissance of the 1540s; methodological clashes involving the Church, Galileo, Bacon, and Descartes; Newton; Faraday; Darwin; rise of statistical methods; beginnings of modern physics; Popper. The mutual influences of method and practice. What does and does not qualify as science. Recommended: background in history, philosophy, or a technical field such as mathematics, science, or engineering. GER:DB-Hum

*4 units, Spr (McCaskey, J)*

**PHIL 164. Central Topics in the Philosophy of Science: Theory and Evidence**

(Same as PHIL 264) (Graduate students register for 264.) The relation of theory to evidence and prediction, problems of induction, empirical under-determination of theory by evidence, and theory choice. Hypothetico-deductive, Bayesian, pragmatic, and inference to the best explanation models of explanation. The semantic approach to theories. GER:DB-Hum

*4 units, not given this year*

**PHIL 164A. Central Topics in Philosophy of Science: Causation**

(Same as PHIL 264A) (Graduate Students register for 264A.) Establishing causes in science, engineering, and medicine versus establishing them in Anglo-American law, considered in the context of Hume and Mill on causation. May be repeated for credit.

*4 units, not given this year*

**PHIL 165. Philosophy of Physics**

(Same as PHIL 265) (Graduate students register for 265.) Central topic alternates annually between space-time theories and philosophical issues in quantum mechanics. Topics last year: absolute and relational theories of space, time, and motion. Newton's critique of Descartes and debate with Leibniz. The principle of relativity and space-time formulations of Aristotelian, Galilean, and relativity physics. Mach's principle and the theory of general relativity. Einstein's struggles with the principle of general covariance. Space-time substantivalism, and the meaning of background independence. May be repeated for credit if content is different. GER:DB-Hum

*4 units, Spr (Ryckman, T)*

**PHIL 166. Probability: Ten Great Ideas About Chance**

(Same as PHIL 266, STATS 167, STATS 267) Foundational approaches to thinking about chance in matters such as gambling, the law, and everyday affairs. Topics include: chance and decisions; the mathematics of chance; frequencies, symmetry, and chance; Bayes great idea; chance and psychology; misuses of chance; and harnessing chance. Emphasis is on the philosophical underpinnings and problems. Prerequisite: exposure to probability or a first course in statistics at the level of STATS 60 or 116. GER:DB-Math

*4 units, Spr (Diaconis, P; Skyrms, B)*

**PHIL 167A. Philosophy of Biology**

(Same as PHIL 267A) (Graduate students register for 267A.) Evolutionary theory and in particular, on characterizing natural selection and how it operates. We examine debates about fitness, whether selection is a cause or force, the levels at which selection operates, and whether cultural evolution is a Darwinian process. GER:DB-Hum

*2-4 units, not given this year*

**PHIL 167B. Philosophy, Biology, and Behavior**

(Same as PHIL 267B) (Graduate students register for 267B.) Continuation of 167A/267A. Further philosophical study of key theoretical ideas in biology, focusing on problems involving explanation of behavior. Topics: evolutionary versus proximate causal explanations of behavior; genetic and other determinisms; and classification and measurement of behavior. Prerequisites: 167A; or one PHIL course and either one BIO course or Human Biology core; or equivalent with consent of instructor. GER:DB-Hum

*4 units, Aut (Longino, H)*

**PHIL 167C. Associative Theories of Mind and Brain**

(Same as PHIL 267C) After a historical survey of associative theories from Hume to William James, current versions will be analyzed including the important early ideas of Karl Lashley. Emphasis will be on the computational power of associative networks and their realization in the brain. GER:DB-Hum

*4 units, not given this year*

**PHIL 168. Theories of Truth**

(Same as PHIL 268) (Graduate students register for 268.) The correspondence, coherence, pragmatist and deflationary theories of truth. Tarski's semantic conception of truth and hierarchical truth definitions. The problems posed by the liar paradox for non-hierarchical theories. Formal theories of truth proposed since the 70s to deal with these problems.

*4 units, not given this year*

**PHIL 169. Evolution of the Social Contract**

(Same as PHIL 269) Explore naturalizing the social contract. Classroom presentations and term papers. Texts: Binmore - Natural Justice Skyrms - Evolution of the Social Contract. GER:DB-Hum

*4 units, not given this year*

**PHIL 170. Ethical Theory**

(Same as ETHICSOC 170, PHIL 270) Major strands in contemporary ethical theory. Readings include Bentham, Mill, Kant, and contemporary authors. GER:DB-Hum, EC-EthicReas

*4 units, Spr (Dannenberg, J)*

**PHIL 170B. Metaphor**

(Same as PHIL 270B) Think and talk about two things at once: two different subject matters are mingled to rich and unpredictable effect. Close critical study of the main modern accounts of metaphors nature and interest, drawing on the work of writers, linguists, philosophers, and literary critics. Attention to how understanding, appreciation, and pleasure connect with one another in the experience of metaphor. Consideration of the possibility that metaphor or something very like it can occur in nonverbal media: gesture, dance, painting, music. GER:DB-Hum

*4 units, not given this year*

**PHIL 170E. Sexual Ethics**

(Same as PHIL 270E) What is sex? What are the implications of different conceptions of sex for sexual ethics? Are there any distinctively sexual ethical principles or virtues or are principles and virtues that govern the sexual domain specific instances of principles and virtues that govern human activity more generally? Readings will range from historical to contemporary sources. GER:DB-Hum

*4 units, Spr (Staff)*

**PHIL 171. Justice**

(Same as ETHICSOC 171, IPS 208, PHIL 271, POLISCI 3P, POLISCI 136S) Focus is on the ideal of a just society, and the place of liberty and equality in it, in light of contemporary theories of justice and political controversies. Topics include protecting religious liberty, financing schools and elections, regulating markets, assuring access to health care, and providing affirmative action and group rights. Issues of global justice including human rights and global inequality. GER:DB-Hum, EC-EthicReas

*4-5 units, Aut (Dougherty, T)*

**PHIL 172. History of Modern Ethics**

(Same as PHIL 272) Major strands in the history of modern, pre-Kantian moral philosophy. Emphasis is on the dialogue between empiricists and rationalists on the subject of the relationship between the natural and the normative. Authors include Frances Hutcheson, David Hume, Adam Smith, Samuel Clarke, and Richard Price. GER:DB-Hum

*4 units, not given this year*

**PHIL 172B. Recent Ethical Theory**

(Same as PHIL 272B) Study the works of several prominent contemporary moral philosophers. Possible authors include: Scanlon, Darwall, Nagel, Williams, Blackburn, Gibbard, Korsgaard. Prerequisite: students should have taken an introduction to moral philosophy (Phil. 20, Phil. 170 or equivalent). GER:DB-Hum

*4 units, not given this year*

**PHIL 173A. Aesthetics: Metaphor across the Arts**

What if a metaphor is an instructively compact work of art, or if finding a metaphor apt is an instructively simple case of finding something aesthetically valuable? What does this reveal about the nature of art and language? Introduction to the philosophical study of art and aesthetic value, organized around metaphor. Contemporary accounts of metaphor as a verbal device. Arguments

for the existence of nonverbal metaphor in nonliterary arts. The power and appeal of metaphors drawn from art, art criticism, theoretical inquiry, and everyday life. GER:DB-Hum

*4 units, not given this year*

**PHIL 173B. Metaethics**

(Same as PHIL 273B) (Graduate students register for 273B.) Can moral and ethical values be justified or is it just a matter of opinion? Is there a difference between facts and values? Are there any moral truths? Does it matter if there are not? Focus is not on which things or actions are valuable or morally right, but what is value or rightness itself. Contemporary metaethics. Prerequisites: 80, 181, and an ethics course. GER:DB-Hum

*4 units, Aut (Hussain, N)*

**PHIL 174. Freedom and the Practical Standpoint**

(Same as PHIL 274) (Graduate students register for 274.) Confronted with the question of how to act, people think of themselves as freely determining their own conduct. Natural science poses a challenge to this by explaining all events, including human actions, in terms of causal processes. Are people justified in thinking of themselves as free? Major philosophical approaches to this question: incompatibilism, compatibilism, and the two-standpoint view. GER:DB-Hum

*4 units, not given this year*

**PHIL 174A. Moral Limits of the Market**

(Same as ETHICSOC 174A, PHIL 274A) Morally controversial uses of markets and market reasoning in areas such as organ sales, procreation, education, and child labor. Would a market for organ donation make saving lives more efficient; if it did, would it thereby be justified? Should a nation be permitted to buy the right to pollute? Readings include Walzer, Arrow, Rawls, Sen, Frey, Titmuss, and empirical cases. GER:DB-Hum

*4 units, not given this year*

**PHIL 174L. Betrayal and Loyalty, Treason and Trust**

(Same as ETHICSOC 174L, ETHICSOC 274L, PHIL 274L) The main topic of the seminar is Betrayal: its meaning as well as its moral, legal and political implications. We shall discuss various notions of betrayal: Political (military) betrayal such as treason, Religious betrayal with Judas as its emblem, but also apostasy (converting one's religion) which is regarded both as a basic human right and also as an act of betrayal, social betrayal - betraying class solidarity as well as Ideological betrayal - betraying a cause. On top of political betrayal we shall deal with personal betrayal, especially in the form of infidelity and in the form of financial betrayal of the kind performed by Madoff. The contrasting notions to betrayal, especially loyalty and trust, will get special consideration so as to shed light or cast shadow, as the case may be, on the idea of betrayal. The seminar will focus not only on the normative aspect of betrayal - moral or legal, but also on the psychological motivations for betraying others. The seminar will revolve

*2 units, Win (Staff)*

**PHIL 175. Philosophy of Law**

(Same as PHIL 275) Philosophical foundations of law and the legal system. The justifiability of patterns of assigning legal responsibility within criminal law. Prerequisite: PHIL 80 and one additional PHIL course. GER:DB-Hum

*4 units, not given this year*

**PHIL 175A. Ethics and Politics of Public Service**

(Same as CSRE 178, ETHICSOC 133, HUMBIO 178, PHIL 275A, POLISCI 133) Ethical and political questions in public service work, including volunteering, service learning, humanitarian assistance, and public service professions such as medicine and teaching. Motives and outcomes in service work. Connections between service work and justice. Is mandatory service an oxymoron? History of public service in the U.S. Issues in crosscultural service work. Integration with the Haas Center for Public Service to connect service activities and public service aspirations with academic experiences at Stanford. GER:DB-SocSci

*5 units, Win (Mitchell, T)*

**PHIL 175M. Two Ethical Theories and Being a Person**

(Same as PHIL 275M) The distinction between the ethics of being a person and the ethics of rules as opposed to the distinction between Kantian ethics and utilitarianism or consequentialism

consequentialism. Comparison of these two types of ethics with respect to their relationship to agency and being a good person. Relations between Western ethics and those of other continents. GER:DB-Hum

*4 units, not given this year*

**PHIL 176. Political Philosophy: The Social Contract Tradition**

(Same as PHIL 276) (Graduate students register for 276.) Why and under what conditions do human beings need political institutions? What makes them legitimate or illegitimate? What is the nature, source, and extent of the obligation to obey the legitimate ones, and how should people alter or overthrow the others? Answers by political theorists of the early modern period: Hobbes, Locke, Rousseau, and Kant. GER:DB-Hum

*4 units, Win (Hills, D)*

**PHIL 176A. Classical Seminar: Origins of Political Thought**

(Same as CLASSHIS 133, CLASSHIS 333, PHIL 276A, POLISCI 230A, POLISCI 330A) Political philosophy in classical antiquity, focusing on canonical works of Thucydides, Plato, Aristotle, and Cicero. Historical background. Topics include: political obligation, citizenship, and leadership; origins and development of democracy; and law, civic strife, and constitutional change. GER:DB-Hum

*4-5 units, Win (Ober, J)*

**PHIL 176B. The Economic Individual in the Behavioral Sciences**

(Same as PHIL 276B) (Graduate students register for 276B.)

*4 units, not given this year*

**PHIL 177M. Human Rights and Moral Question**

(Same as ETHICSOC 177M, ETHICSOC 277M, PHIL 277M) The proliferation of human rights in the discourse of international justice has raised a number of important questions in both moral and legal theory. What are human rights? How should they be conceptualized? Who ought to bear the duties associated with them? Can their protection justify military interventions into sovereign states? This course will cover topics in moral and legal theory surrounding human rights. The course has three main focuses. The first concerns the question of what these rights are. The second focus is on the various substantive moral justifications for the protection of human rights. The third is on the moral issues raised by the dominance of human rights in international law and relations: can any rights be universal? How are these rights to be framed in the light of cross-cultural values and claims about cultural dominance? A theme throughout will be the connections between these questions. The way we answer the question of what human rights are, and how they c GER:EC-EthicReas

*4-5 units, Spr (Thomas, J)*

**PHIL 178. Ethics in Society Honors Seminar**

(Same as ETHICSOC 190) For students planning honors in Ethics in Society. Methods of research. Students present issues of public and personal morality; topics chosen with advice of instructor.

*3 units, Win (Sockness, B)*

**PHIL 178A. The Ethics of Environmental Choices**

(Same as EARTHSYS 178, EARTHSYS 278, PHIL 278A) (Formerly PHIL 278/378.) The institutional and individual dimensions of environmental choices. On the institutional side, examine externalities, the tragedy of the commons, sustainable development and environmental policy. On the individual side, discuss individual responsibility, intrinsic value, and moral pluralism. Focus is on decision making including the role of risk analysis, the rate of discount for effects on future generations, cost-benefit analysis, and scientific epistemology. GER:DB-Hum

*4 units, not given this year*

**PHIL 178M. Justice and the Environment**

(Same as ETHICSOC 178M, ETHICSOC 278M, PHIL 278M, POLISCI 134L) Explores the normative questions that arise in environmental policy debates, including arguments over pollution permit markets, conservation regulations, and global warming mitigation efforts. What are the morally relevant ways in which the environment is different from other economic resources? How should the environment be valued? What are our obligations to conserve for future generations? How should the burdens of conservation be distributed? Engages with a variety of philosophical traditions including utilitarianism, deep ecology, liberalism, and communitarianism. GER:EC-EthicReas

5 units, Win (Mazor, J)

**PHIL 179S. Moral Psychology, Reasons for Action, and Moral Theory**

(Same as PHIL 279S) What sorts of considerations does an ethical agent take to be good reasons for action? Work in moral psychology to illuminate the theory of practical reasons, and the theory of practical reasons to test the prospects for systematic moral theory. Can any systematic moral theory be reconciled with the moral psychology of ordinary, morally respectable agents? Reading include Bernard Williams, Rosalind Hursthouse, Peter Railton, T.M. Scanlon, and Barbara Herman.

4 units, not given this year

**PHIL 180. Metaphysics**

(Same as PHIL 280) Does God exist? If not, then what are we even talking about when we debate his/her/its existence? What does it take for a thought, existential or otherwise, to be true? It's true that this sentence is too long, but does that entail that there's a property (or feature or attribute) that this sentence has, namely: being too long? If so, what are such properties like? Are they located where and when the objects that have them are located? Are objects just bundles of properties? How exactly are they related to the molecules that make them up? How can objects persist through time, if they're constantly changing their parts and properties? Do human beings persist in the same way? Does time really flow, or is it just another "static" dimension alongside the spatial ones? If it's the latter, does that mean everything that will ever happen is already determined now? Is determinism compatible with free will? What does it even mean to say that something could have happened differently? GER:DB-Hum

4 units, Spr (Malmgren, A)

**PHIL 180A. Realism, Anti-Realism, Irrealism, Quasi-Realism**

(Same as PHIL 280A) Realism and its opponents as options across a variety of different domains: natural science, mathematics, ethics, and aesthetics. Clarify the various conceptions that fall under these terms and outline the reasons for and against adopting realism for the various domains. Highlight the general issues involved. Prerequisites: 80, 181 GER:DB-Hum

4 units, Win (Hussain, N)

**PHIL 181. Philosophy of Language**

(Same as PHIL 281) The study of conceptual questions about language as a focus of contemporary philosophy for its inherent interest and because philosophers see questions about language as behind perennial questions in other areas of philosophy including epistemology, philosophy of science, metaphysics, and ethics. Key concepts and debates about the notions of meaning, truth, reference, and language use, with relations to psycholinguistics and formal semantics. Readings from philosophers such as Frege, Russell, Wittgenstein, Grice, and Kripke. Prerequisites: 80 and background in logic. GER:DB-Hum

4 units, Aut (Crimmins, M)

**PHIL 181B. Philosophy of Language: Contemporary Debates**

(Same as PHIL 281B) This course builds on the material of 181/281, focusing on debates and developments in the pragmatics of conversation, the semantics/pragmatics distinction, the contextuality of meaning, the nature of truth and its connection to meaning, and the workings of particular linguistic constructions of special philosophical relevance. Students who have not taken 181/281 should seek the instructor's advice as to whether they have sufficient background.

4 units, Win (Crimmins, M)

**PHIL 182. Truth**

(Same as PHIL 282) Philosophical debates about the place in human lives and the value to human beings of truth and its pursuit. The nature and significance of truth-involving virtues such as accuracy, sincerity, and candor. GER:DB-Hum

4 units, Aut (Hills, D)

**PHIL 184. Theory of Knowledge**

(Same as PHIL 284) Competing theories of epistemic justification (foundationalism, coherentism, and externalism) against the background of radical scepticism. Readings from contemporary sources. Prerequisite: 80 or consent of instructor. GER:DB-Hum

4 units, Spr (Malmgren, A)

**PHIL 184B. Philosophy of the Body**

How essential is the body to people's conception of themselves as

individuals and as human beings? What role does embodiment play in shaping cognitive capacities? How much or what kind of somatic awareness is required for agency? Embodiment theories of cognition. Readings from Plato, Descartes, Nietzsche, Merleau-Ponty, Parfit, novelist Michel Houellebecq, and contemporary philosophy of mind and cognitive science. GER:DB-Hum

4 units, not given this year

**PHIL 184C. Epistemology of Testimony**

(Same as PHIL 284C) Many of our beliefs come from others, and not from direct experience. Is testimony a source of fundamental reasons? reasons that do not have to be supported or validated by other sources like perception or inference? What sort of responsibility does one have to one's hearers, when one gives testimony?

4 units, Win (Lawlor, K)

**PHIL 184F. Feminist Theories of Knowledge**

(Same as FEMST 166, PHIL 284F) Feminist critique of traditional approaches in epistemology and alternative feminist approaches to such topics as reason and rationality, objectivity, experience, truth, the knowing subject, knowledge and values, knowledge and power. GER:DB-Hum, EC-Gender

4 units, not given this year

**PHIL 184P. Probability and Epistemology**

Confirmation theory and various ways of trying to understand the concept of evidence. Discuss a series of issues in epistemology including probabilism (the view that you should assign degrees of belief to various propositions), conditionalization, confirmational holism, reliabilism and justification, and disagreement. GER:DB-Hum

4 units, not given this year

**PHIL 185. Memory**

Structure, content, functional role, and epistemic authority of human memories. Sources include philosophical and psychological literature from different schools and historical periods. GER:DB-Hum

4 units, not given this year

**PHIL 185B. Philosophy of Perception**

(Same as PHIL 285B) The nature of perceptual experience and the role it plays in securing empirical knowledge. Focus will be on what is sometimes called the problem of perception: the question of how perception could provide us with direct awareness of the surrounding environment given the possibility of illusions or hallucinations. Topics, include the relationship between perception and belief, the nature of perceptual phenomenology, whether or not perceptual experiences are representational states, and the philosophical relevance of empirical research on perception. GER:DB-Hum

4 units, Win (Genone, J)

**PHIL 186. Philosophy of Mind**

(Same as PHIL 286) (Graduate students register for 286.) Debates concerning the nature of mental states, their relation to physical states of the human body, how they acquire their content, how people come to know about them in themselves and others, and the roles they play in the explanation of human conduct. GER:DB-Hum

4 units, Spr (Taylor, K)

**PHIL 187. Philosophy of Action**

(Same as PHIL 287) (Graduate students register for 287.) Contemporary research in the philosophy of action. Topics include: What is it to be an agent? Is there a philosophically defensible contrast between being an agent and being a locus of causal forces to which one is subject? What is it to act purposively? What is intention? What is the relation between intention and belief? What is it to act intentionally? What is it to act for a reason? What is the relation between explaining why someone acted by citing the reasons for which she acted and causal explanation of her action? What is the relation between theoretical and practical rationality? What is the nature of our knowledge of our own intentional activity? What is it to act autonomously? What is shared cooperative activity? Prerequisite: 80.. GER:DB-Hum

4 units, Spr (Bratman, M)

**PHIL 188. Personal Identity**

(Same as PHIL 288) Do you persist through time the way that a skyscraper persists through space, by having different parts at



different locations? Or are you wholly present at every moment of your life, in something more like the way that an elevator is present in each place as it travels up to the top floor? What criteria determine whether you now are the very same person as some unique person located at some time in the past? Is the continuity of your memories or other mental states sufficient for your survival? Can you survive the loss or destruction of your body? Do you really exist for more than just the present moment? How do different answers to these questions bear on your moral, personal, and professional obligations? What kinds of considerations could possibly help us to answer these questions? This course explores these and related issues. Readings include a mix of introductory survey, historical, and contemporary material. GER:DB-Hum  
4 units, not given this year

**PHIL 189. Examples of Free Will**

(Same as PHIL 289) Examples drawn from three domains: choice, computation, and conflict of norms. Conceptually, a distinction is made between examples that are predictable and those that are not, but skepticism about making a sharp distinction between determinism and indeterminism is defended. GER:DB-Hum  
4 units, not given this year

**PHIL 190. Introduction to Cognitive and Information Sciences**

(Same as LINGUIST 144, PSYCH 132, SYMSYS 100) The history, foundations, and accomplishments of the cognitive sciences, including presentations by leading Stanford researchers in artificial intelligence, linguistics, philosophy, and psychology. Overview of the issues addressed in the Symbolic Systems major. GER:DB-SocSci  
4 units, Spr (Goodman, N)

**PHIL 193H. The Art of the Movies: Story, Drama, and Image**

A philosophical study of how movies coordinate and transform elements they borrow from older arts of literary narrative, live theater, and graphic illustration. Examples from the career of Alfred Hitchcock. GER:DB-Hum  
4 units, not given this year

**PHIL 193W. Nietzsche, Dostoevsky, and Sartre**

Literary works in which philosophical ideas and issues are put forward, such as prose poems, novels, and plays. Ideas and issues and the dramatic or narrative structures through which they are presented. Texts include: Nietzsche, Thus Spoke Zarathustra; Dostoevsky, The Brothers Karamazov; and Sartre, Nausea and No Exit. GER:DB-Hum  
4 units, not given this year

**PHIL 194A. Empiricism and the Philosophy of Mind**

Priority to majors. 20th-century analytic and early modern philosophy of mind and epistemology. Main text is Wilfrid Sellars's Empiricism and the Philosophy of Mind; source materials and commentary. Enrollment limited to 12.  
4 units, not given this year

**PHIL 194B. The Ethics of Belief**

Priority to majors. Are beliefs subject to moral evaluation? Can it be right or wrong to believe or disbelieve something? Are people morally required to believe only that for which there is sufficient evidence; or can the good consequences of believing something justify the belief, irrespective of the evidence? Contemporary and historical sources. Enrollment limited to 12.  
4 units, not given this year

**PHIL 194C. Time and Free Will**

Classic and contemporary reading on free will, with special attention to the consequence argument for incompatibilism, and issues involving causation and time. GER:DB-Hum  
4 units, not given this year

**PHIL 194E. Beauty and Other Forms of Value**

The nature and importance of beauty and of our capacity to discern it and respond to it, as discussed by philosophers and artists from various traditions and historical periods. Attempts to think out the relations between beauty and ethical values (such as goodness) on the one hand and cognitive values (such as truth) on the other. Fulfills capstone seminar requirement for the Philosophy and Literature tracks. GER:DB-Hum  
4 units, not given this year

**PHIL 194L. Montaigne**

Preference to Philosophy seniors. Philosophical and literary

aspects of Montaigne's Essays including the nature of the self and self-fashioning, skepticism, fideism, and the nature of Montaigne's philosophical project. Montaigne's development of the essay as a literary genre. GER:DB-Hum

4 units, Win (Anderson, L; Landy, J)

**PHIL 194N. Philosophical Issues in Cognitive Science**

Philosophers generally do not perform systematic empirical observations or construct computational models. But philosophy remains important to cognitive science because it deals with fundamental issues that underlie the experimental and computational approach to mind. Abstract questions such as the nature of representation and computation. Relation of mind and body and methodological questions such as the nature of explanations found in cognitive science. Normative questions about how people should think as well as with descriptive ones about how they do. In addition to the theoretical goal of understanding human thinking, cognitive science can have the practical goal of improving it, which requires normative reflection on what we want thinking to be. Philosophy of mind does not have a distinct method, but should share with the best theoretical work in other fields a concern with empirical results. GER:DB-Hum

4 units, not given this year

**PHIL 194P. Naming and Necessity**

Saul Kripke's lectures on reference, modal metaphysics, and the mind/body problem. GER:DB-Hum

4 units, not given this year

**PHIL 194R. Epistemic Paradoxes**

Paradoxes that arise from concepts of knowledge and rational belief, such as the skeptical paradox, the preface paradox, and Moore's paradox. Can one lose knowledge without forgetting anything? Can one change one's mind in a reasonable way without gaining new evidence? GER:DB-Hum

4 units, not given this year

**PHIL 194S. Skepticism**

Modern arguments for skepticism are hard to combat, but also curiously inert in ordinary life. We will look at a variety of contemporary attempts to come to terms with skepticism about the external world, each of which seeks to exploit the curious inertness of skeptical hypotheses.

4 units, Spr (Lawlor, K)

**PHIL 194T. Practical Reason**

Contemporary research on practical reason, practical rationality, and reasons for action. Enrollment limited to 12. Priority given to undergraduate Philosophy majors.

4 units, Aut (Bratman, M)

**PHIL 195A. Unity of Science**

Primarily for seniors.

4-5 units, not given this year

**PHIL 195B. Donor Seminar: Practical Reasoning**

Primarily for seniors. Relationships among action, deliberation, reasons, and rationality. On what basis do people decide what to do? What norms or rules structure reasoning? What constitutes rationality?

4 units, not given this year

**PHIL 196. Tutorial, Senior Year**

(Staff)

5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**PHIL 197. Individual Work, Undergraduate**

May be repeated for credit.

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**PHIL 198. The Dualist**

Weekly meeting of the editorial board of The Dualist, a national journal of undergraduate work in philosophy. Open to all undergraduates. May be taken 1-3 quarters. (AU) (Potochnik, Yap)  
1 unit, Aut (Miller, B; Asarnow, S), Win (Asarnow, S; Miller, B), Spr (Miller, B; Asarnow, S)

**PHIL 199. Seminar for Prospective Honors Students**

Open to juniors intending to do honors in philosophy. Methods of research in philosophy. Topics and strategies for completing honors project. May be repeated for credit.

2 units, Spr (Darmalingum, M)



**PHIL 249. Evidence and Evolution**

(Same as PHIL 349) The logic behind the science. The concept of evidence and how it is used in science with regards to testing claims in evolutionary biology and using tools from probability theory, Bayesian, likelihoodist, and frequentist ideas. Questions about evidence that arise in connection with evolutionary theory. Creationism and intelligent design. Questions that arise in connection with testing hypotheses about adaptation and natural selection and hypotheses about phylogenetic relationships.

3-5 units, not given this year

**PHIL 265C. Philosophy of Physics: Probability and Relativity**

Conceptual puzzles in formulating probability concepts to be invariant in the sense of the Lorentz transformation of special relativity. Problems arise in both classical and quantum physics.

4 units, not given this year

**GRADUATE COURSES IN PHILOSOPHY**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**PHIL 201. Introduction to Medieval Philosophy**

(Same as PHIL 101) Classics of Western philosophy by Augustine, Boethius, Anselm, Abelard, Aquinas, and Ockham. Explore the puzzles facing someone seeking to lead a good life and to understand herself and her world. A theory of will and human motivation, a theory of ethics based on the agent's intention, and a theory of divine omniscience and omnipotence consistent with divine goodness and human freedom. Works include *On Free Choice*, *The Consolation of Philosophy*, *Ethics*, *Summa theologiae*, and *The Connection of the Virtues*.

4 units, Spr (Duarte, S)

**PHIL 206. Ancient Skepticism**

(Same as PHIL 106) The ancient Pyrrhonian skeptics who think that for any claim there is no more reason to assert it than deny it and that a life without any beliefs is the best route to happiness. Some ancient opponents of the Pyrrhonian skeptics and some relations between ancient and modern skepticism.

4 units, not given this year

**PHIL 207. Plato's Metaphysics and Epistemology**

(Same as PHIL 107) Examine Plato's views on the nature of reality and knowledge by reading the relevant parts of dialogues such as the *Parmenides*, the *Phaedo*, the *Philebus*, and the *Republic*.

4 units, not given this year

**PHIL 208. Topics in Aristotle: Aristotle's Ethics and****Contemporary Moral Theory**

(Same as PHIL 108) Examine the fundamentals of Aristotle's psychological views and read the *De Anima* (*On the Soul*) and some of his other psychological works.

4 units, Win (Bobonich, C)

**PHIL 209. Topics in Ancient Philosophy: Plato and Aristotle on Art and Rhetoric**

(Same as PHIL 109) Plato's and Aristotle's views on the nature of art and rhetoric and their connections with the emotions, reason and the good life. Readings include Plato's *Gorgias*, *Ion* and parts of the *Republic* and the *Laws* and Aristotle's *Poetics* and *Rhetoric*.

4 units, Aut (Bobonich, C)

**PHIL 210. Plato**

(Same as PHIL 110) Plato's *Republic*.

4 units, not given this year

**PHIL 211. Aristotle and Contemporary Ethics**

(Same as PHIL 111) Aristotle's *Nicomachean Ethics*, focusing on virtue, happiness, pleasure, practical reasoning, and particularism. Sources include the *Eudemian Ethics*, contemporary philosophers who have taken many of these topics up again, and contemporary material such as that by Anscombe, Foot, Hursthouse, Korsgaard, and McDowell.

4 units, not given this year

**PHIL 213. Hellenistic Philosophy**

(Same as PHIL 113) Epicureans, skeptics, and stoics on epistemology, ethics, metaphysics, and psychology.

4 units, not given this year

**PHIL 215. Problems in Medieval Philosophy: Islamic Aristotelianism and Western Scholasticism**

(Same as PHIL 115) The western world adopted Aristotle's metaphysics and natural philosophy as the foundation of its educational system and scholarly life between 1210 and 1255. Christian Europe was thereby following the example set by Islam in Spain and the Near East. Today some people believe that this development was independent, and others think that the scholastics copied even their methods from Arabic philosophers. Historical evaluation of those claims.

3-5 units, not given this year

**PHIL 217. Descartes**

(Same as PHIL 117) (Formerly 121/221.) Descartes's philosophical writings on rules for the direction of the mind, method, innate ideas and ideas of the senses, mind, God, eternal truths, and the material world.

4 units, not given this year

**PHIL 218. British Empiricism, 1660s-1730s**

(Same as PHIL 118)

4 units, not given this year

**PHIL 218A. Origins of Empiricism: Gassendi, Locke, and Berkeley**

(Same as PHIL 118A) Particular light is shed on both the strengths and weaknesses of empiricism by studying it as it first arose during the 17th century revolution in philosophy and the sciences initiated by Descartes. Three philosophers of that period helped to advance empiricism: Pierre Gassendi (1592-1655), John Locke (1632-1704), and George Berkeley (1685-1753). Focus on Locke's theory of ideas, mind, language, reality, and natural philosophy expounded in his *An Essay concerning Human Understanding* (Fourth Edition, 1689). Study Gassendi's early influence on, and Berkeley's later reaction to Locke.

4 units, not given this year

**PHIL 219. Rationalists**

(Same as PHIL 119) (Formerly 143/243.) Developments in 17th-century continental philosophy. Descartes's views on mind, necessity, and knowledge. Spinoza and Leibniz emphasizing their own doctrines and their criticism of their predecessors. Prerequisite: 102.

4 units, not given this year

**PHIL 220A. The Leibniz-Clarke Correspondence**

(Same as PHIL 120A) Correspondence on metaphysics, theology, and science.

4 units, not given this year

**PHIL 222. Hume**

(Same as PHIL 122) (Formerly 120/220; graduate students enroll in 222.) Hume's theoretical philosophy, in particular, skepticism and naturalism, the theory of ideas and belief, space and time, causation and necessity, induction and laws of nature, miracles, a priori reasoning, the external world, and the identity of the self.

4 units, not given this year

**PHIL 224. Kant's Philosophy of Physical Science**

Kant's *Metaphysical Foundations of Natural Science* (1786), published between the first (1781) and second (1787) editions of the *Critique of Pure Reason*, in the scientific and philosophical context provided by Newtonian natural philosophy and the Leibnizian tradition. The place of this work in the development of Kant's thought. Prerequisite: acquaintance with either Kant's theoretical philosophy or the contemporaneous scientific context, principally Newton, Leibniz, and Euler.

4 units, Win (Friedman, M)

**PHIL 224A. Mathematics in Kant's Philosophy**

Recent work in Kant's philosophy of mathematics, examined with a view to the role of mathematics, both pure and applied, within Kant's philosophy more generally. Particular attention to the Schematism chapter of the *Critique of Pure Reason*. Prerequisite: prior acquaintance with Kant's theoretical philosophy and the *Critique of Pure Reason*.

4 units, not given this year

**PHIL 225. Kant's First Critique**

(Same as PHIL 125) (Graduate students register for 225.) The founding work of Kant's critical philosophy emphasizing his contributions to metaphysics and epistemology. His attempts to

limit metaphysics to the objects of experience. Prerequisite: course dealing with systematic issues in metaphysics or epistemology, or with the history of modern philosophy.

4 units, Aut (*De Pierris, G*)

**PHIL 226B. Kant's Ethical Theory**

(Same as PHIL 126B) (Graduate students register for 226B.) Kant's moral philosophy based primarily on the Groundwork of Metaphysics of Morals, Critique of Practical Reason, and The Metaphysics of Morals.

2-4 units, not given this year

**PHIL 227A. Kant's Value Theory**

(Same as PHIL 127A) (Graduate students register for 227A.) The role of autonomy, principled rational self-governance, in Kant's account of the norms to which human beings are answerable as moral agents, citizens, empirical inquirers, and religious believers. Relations between moral values (goodness, rightness) and aesthetic values (beauty, sublimity).

4 units, Spr (*Hills, D*)

**PHIL 227B. Kant's Anthropology and Philosophy of History**

(Same as PHIL 127B) Kant's conception of anthropology or human nature, based on his philosophy of history, which influenced and anticipated 18th- and 19th-century philosophers of history such as Herder, Fichte, Hegel, and Marx. Texts include Idea for a Universal History, Conjectural Beginning of Human History, and Anthropology from a Pragmatic Point of View. Topics include: Kant's pragmatic approach to the study of human nature; the difficulty of human self knowledge; the role of regulative and teleological principles in studying human history; and Kant's theory of race.

4 units, not given this year

**PHIL 228. Fichte's Ethics**

(Same as PHIL 128) (Graduate students register for 228.) The founder of the German Idealist movement who adopted but revised Kant's project of transcendental philosophy basing it on the principle of awareness of free self-activity. The awareness of other selves and of ethical relations to them as a necessary condition for self-awareness. His writings from 1793-98 emphasizing the place of intersubjectivity in his theory of experience.

4 units, not given this year

**PHIL 230. Hegel**

(Same as PHIL 130) (Formerly 122/222; graduate students register for 230.) Introduction to Hegel's philosophy, emphasizing his moral and political philosophy, through study of his last major work (1821). May be repeated for credit. Prerequisite: course in the history of modern philosophy.

4 units, not given this year

**PHIL 233. Husserl**

Husserl's phenomenology. Main themes in his philosophy and their interconnections, including consciousness, perception, intersubjectivity, lifeworld, ethics, mathematics and the sciences, and time and space. Works in English translation.

4 units, not given this year

**PHIL 234. Phenomenology and Intersubjectivity**

(Same as PHIL 134) (Graduate students register for 234.) Readings from Husserl, Stein, Heidegger, Sartre, and Merleau-Ponty on subjects related to awareness of others. Topics include solipsism, collective experience, empathy, and objectification of the other.

4 units, not given this year

**PHIL 235. Existentialism**

(Same as PHIL 135) (Formerly 132/232.) Focus is on the existentialist preoccupation with human freedom. What constitutes authentic individuality? What is one's relation to the divine? How can one live a meaningful life? What is the significance of death? A rethinking of the traditional problem of freedom and determinism in readings from Rousseau, Kierkegaard, and Nietzsche, and the extension of these ideas by Sartre, Beauvoir, and Camus, including their social and political consequences in light of 20th-century fascism and feminism.

4 units, Aut (*Anderson, L*)

**PHIL 236. History of Analytic Philosophy**

(Same as PHIL 136) (Formerly 147/247; graduate students register for 236.) Theories of knowledge in Frege, Carnap, and Quine. Emphasis is on conceptions of analyticity and treatment of logic

and mathematics. Prerequisite: 50 and one course numbered 150-165 or 181-90.

4 units, not given this year

**PHIL 237. Wittgenstein**

(Same as PHIL 137) (Graduate students register for 237.) The main themes and claims in Wittgenstein's later work concentrating on his views about meaning, mind, knowledge, the nature of philosophical perplexity, and the nature of philosophical progress in his Philosophical Investigations. Emphasis is on the relationship between the novel arguments of the Investigations and its ways of writing up the results of philosophical questioning.

4 units, not given this year

**PHIL 238. Recent European Philosophy: Between Nature and History**

(Same as PHIL 138) A critical introduction to the novel understandings of time, language, and cultural power developed by 20th-century continental thinkers, with close attention to work by Heidegger, Saussure, Benjamin, and Foucault.

4 units, not given this year

**PHIL 239. Teaching Methods in Philosophy**

For Ph.D. students in their first or second year who are or are about to be teaching assistants for the department. May be repeated for credit.

1-4 units, Aut (*Greene, A*), Spr (*Greene, A*)

**PHIL 240. Individual Work for Graduate Students**

May be repeated for credit.

1-15 units, Aut (*Staff*), Win (*Staff*), Spr (*Staff*), Sum (*Staff*)

**PHIL 241. Dissertation Development Seminar**

Required of second-year Philosophy Ph.D. students; restricted to Stanford Philosophy Ph.D. students. Prerequisite: consent of instructor.

1-4 units, Sum (*Staff*)

**PHIL 243. Quine**

(Same as PHIL 143) (Formerly 183/283; graduate students register for 243.) The philosophy of Quine: meaning and communication; analyticity, modality, reference, and ontology; theory and evidence; naturalism; mind and the mental.

4 units, not given this year

**PHIL 248. Medieval Latin Paleography**

The history of medieval scripts and medieval abbreviation. Dating and placing Latin European medieval manuscripts. Editing medieval texts in philosophy, psychology, physics, and theology. Class project: an early 13th century encyclopedia (with entries citing both Plato and Aristotle). Intellectually exciting, easy to read (textualis script).

3-5 units, not given this year

**PHIL 250. Basic Concepts in Mathematical Logic**

(Same as PHIL 150) (Formerly 159.) The concepts and techniques used in mathematical logic, primarily through the study of the language of first order logic. Topics: formalization, proof, propositional logic, quantifiers, sets, mathematical induction, and enumerability.

4 units, Aut (*Wasow, T*)

**PHIL 251. First-Order Logic**

(Same as PHIL 151) (Formerly 160A.) The syntax and semantics of sentential and first-order logic. Concepts of model theory. Gödel's completeness theorem and its consequences: the Löwenheim-Skolem theorem and the compactness theorem. Prerequisite: 150 or consent of instructor.

4 units, Win (*Sommer, R*)

**PHIL 252. Computability and Logic**

(Same as PHIL 152) Approaches to effective computation: recursive functions, register machines, and programming styles. Proof of their equivalence, discussion of Church's thesis. Elementary recursion theory. These techniques used to prove Gödel's incompleteness theorem for arithmetic, whose technical and philosophical repercussions are surveyed. Prerequisite: 151.

4 units, Spr (*Casanovas, E*)

**PHIL 253. Feminist Theories and Methods Across the Disciplines**

(Same as FEMST 103, FEMST 203, PHIL 153) The interdisciplinary foundations of feminist thought. The nature of disciplines and of interdisciplinary work. Challenges of feminism

for scholarship and research.

4-5 units, *Win (Longino, H)*

**PHIL 254. Modal Logic**

(Same as PHIL 154) (Graduate students register for 254.) Syntax and semantics of modal logic, and technical results like completeness and correspondence theory. Applications to philosophy and computer science. Prerequisite: 150 or preferably 151.

4 units, *Spr (van Benthem, J)*

**PHIL 257. Topics in Philosophy of Logic**

(Same as PHIL 157) (Graduate students register for 257.) Disputed foundational issues in logic; the question of what the subject matter and boundaries of logic are, such as whether what is called second-order logic should be counted as logic. What is the proper notion of logical consequence? May be repeated for credit. Pre- or corequisite: 151, or consent of instructor.

3 units, *not given this year*

**PHIL 258. Minds and Machines**

Readings on arguments concerning mechanical models of the mind including Turing machine models to which Gödel's incompleteness theorems are relevant, and connectionist (neural net) models. Prerequisites: 151 (formerly 160A), 152, or equivalents. Recommended: 389. (Feferman)

4 units, *not given this year*

**PHIL 260A. Newtonian Revolution**

(Same as PHIL 160A) (Graduate students register for 260A.) 17th-century efforts in science including by Kepler, Galileo, Descartes, and Huygens, that formed the background for and posed the problems addressed in Newton's *Principia*.

4 units, *not given this year*

**PHIL 260B. Newtonian Revolution**

(Same as PHIL 160B) (Graduate students register for 260B.) Newton's *Principia* in its historical context, emphasizing how it produced a revolution in the conduct of empirical research and in standards of evidence in science.

4 units, *not given this year*

**PHIL 262. Philosophy of Mathematics**

(Same as MATH 162, PHIL 162) (Graduate students register for PHIL 262.) 20th-century approaches to the foundations and philosophy of mathematics. The background in mathematics, set theory, and logic. Schools and programs of logicism, predicativism, platonism, formalism, and constructivism. Readings from leading thinkers. Prerequisite: PHIL151 or consent of instructor.

4 units, *Spr (Mumma, J)*

**PHIL 263. Significant Figures in Philosophy of Science**

(Same as PHIL 163) (Graduate students register for 263.) Directed study of two or more thinkers, past or present, who have made a lasting impact on contemporary philosophy of science. Subjects last year were Henri Poincaré, Pierre Duhem, and Gaston Bachelard.

4 units, *not given this year*

**PHIL 264. Central Topics in the Philosophy of Science: Theory and Evidence**

(Same as PHIL 164) (Graduate students register for 264.) The relation of theory to evidence and prediction, problems of induction, empirical under-determination of theory by evidence, and theory choice. Hypothetico-deductive, Bayesian, pragmatic, and inference to the best explanation models of explanation. The semantic approach to theories.

4 units, *not given this year*

**PHIL 264A. Central Topics in Philosophy of Science: Causation**

(Same as PHIL 164A) (Graduate Students register for 264A.) Establishing causes in science, engineering, and medicine versus establishing them in Anglo-American law, considered in the context of Hume and Mill on causation. May be repeated for credit.

4 units, *not given this year*

**PHIL 265. Philosophy of Physics**

(Same as PHIL 165) (Graduate students register for 265.) Central topic alternates annually between space-time theories and philosophical issues in quantum mechanics. Topics last year:

absolute and relational theories of space, time, and motion. Newton's critique of Descartes and debate with Leibniz. The principle of relativity and space-time formulations of Aristotelian, Galilean, and relativity physics. Mach's principle and the theory of general relativity. Einstein's struggles with the principle of general covariance. Space-time substantivalism, and the meaning of background independence. May be repeated for credit if content is different.

4 units, *Spr (Ryckman, T)*

**PHIL 266. Probability: Ten Great Ideas About Chance**

(Same as PHIL 166, STATS 167, STATS 267) Foundational approaches to thinking about chance in matters such as gambling, the law, and everyday affairs. Topics include: chance and decisions; the mathematics of chance; frequencies, symmetry, and chance; Bayes great idea; chance and psychology; misuses of chance; and harnessing chance. Emphasis is on the philosophical underpinnings and problems. Prerequisite: exposure to probability or a first course in statistics at the level of STATS 60 or 116.

4 units, *Spr (Diaconis, P; Skyrms, B)*

**PHIL 267A. Philosophy of Biology**

(Same as PHIL 167A) (Graduate students register for 267A.) Evolutionary theory and in particular, on characterizing natural selection and how it operates. We examine debates about fitness, whether selection is a cause or force, the levels at which selection operates, and whether cultural evolution is a Darwinian process.

2-4 units, *not given this year*

**PHIL 267B. Philosophy, Biology, and Behavior**

(Same as PHIL 167B) (Graduate students register for 267B.) Continuation of 167A/267A. Further philosophical study of key theoretical ideas in biology, focusing on problems involving explanation of behavior. Topics: evolutionary versus proximate causal explanations of behavior; genetic and other determinisms; and classification and measurement of behavior. Prerequisites: 167A; or one PHIL course and either one BIO course or Human Biology core; or equivalent with consent of instructor.

4 units, *Aut (Longino, H)*

**PHIL 267C. Associative Theories of Mind and Brain**

(Same as PHIL 167C) After a historical survey of associative theories from Hume to William James, current versions will be analyzed including the important early ideas of Karl Lashley. Emphasis will be on the computational power of associative networks and their realization in the brain.

4 units, *not given this year*

**PHIL 268. Theories of Truth**

(Same as PHIL 168) (Graduate students register for 268.) The correspondence, coherence, pragmatist and deflationary theories of truth. Tarski's semantic conception of truth and hierarchical truth definitions. The problems posed by the liar paradox for non-hierarchical theories. Formal theories of truth proposed since the 70s to deal with these problems.

4 units, *not given this year*

**PHIL 269. Evolution of the Social Contract**

(Same as PHIL 169) Explore naturalizing the social contract. Classroom presentations and term papers. Texts: Binmore - Natural Justice Skyrms - Evolution of the Social Contract.

4 units, *not given this year*

**PHIL 270. Ethical Theory**

(Same as ETHICSOC 170, PHIL 170) Major strands in contemporary ethical theory. Readings include Bentham, Mill, Kant, and contemporary authors.

4 units, *Spr (Dannenberg, J)*

**PHIL 270B. Metaphor**

(Same as PHIL 170B) Think and talk about two things at once: two different subject matters are mingled to rich and unpredictable effect. Close critical study of the main modern accounts of metaphors nature and interest, drawing on the work of writers, linguists, philosophers, and literary critics. Attention to how understanding, appreciation, and pleasure connect with one another in the experience of metaphor. Consideration of the possibility that metaphor or something very like it can occur in nonverbal media: gesture, dance, painting, music.

4 units, *not given this year*

**PHIL 270E. Sexual Ethics**

(Same as PHIL 170E) What is sex? What are the implications of different conceptions of sex for sexual ethics? Are there any distinctively sexual ethical principles or virtues or are principles and virtues that govern the sexual domain specific instances of principles and virtues that govern human activity more generally? Readings will range from historical to contemporary sources.

*4 units, Spr (Staff)*

**PHIL 271. Justice**

(Same as ETHICSOC 171, IPS 208, PHIL 171, POLISCI 3P, POLISCI 136S) Focus is on the ideal of a just society, and the place of liberty and equality in it, in light of contemporary theories of justice and political controversies. Topics include protecting religious liberty, financing schools and elections, regulating markets, assuring access to health care, and providing affirmative action and group rights. Issues of global justice including human rights and global inequality.

*4-5 units, Aut (Dougherty, T)*

**PHIL 272. History of Modern Ethics**

(Same as PHIL 172) Major strands in the history of modern, pre-Kantian moral philosophy. Emphasis is on the dialogue between empiricists and rationalists on the subject of the relationship between the natural and the normative. Authors include Frances Hutcheson, David Hume, Adam Smith, Samuel Clarke, and Richard Price.

*4 units, not given this year*

**PHIL 272B. Recent Ethical Theory**

(Same as PHIL 172B) Study the works of several prominent contemporary moral philosophers. Possible authors include: Scanlon, Darwall, Nagel, Williams, Blackburn, Gibbard, Korsgaard. Prerequisite: students should have taken an introduction to moral philosophy (Phil. 20, Phil. 170 or equivalent).

*4 units, not given this year*

**PHIL 273B. Metaethics**

(Same as PHIL 173B) (Graduate students register for 273B.) Can moral and ethical values be justified or is it just a matter of opinion? Is there a difference between facts and values? Are there any moral truths? Does it matter if there are not? Focus is not on which things or actions are valuable or morally right, but what is value or rightness itself. Contemporary metaethics. Prerequisites: 80, 181, and an ethics course.

*4 units, Aut (Hussain, N)*

**PHIL 274. Freedom and the Practical Standpoint**

(Same as PHIL 174) (Graduate students register for 274.) Confronted with the question of how to act, people think of themselves as freely determining their own conduct. Natural science poses a challenge to this by explaining all events, including human actions, in terms of causal processes. Are people justified in thinking of themselves as free? Major philosophical approaches to this question: incompatibilism, compatibilism, and the two-standpoint view.

*4 units, not given this year*

**PHIL 274A. Moral Limits of the Market**

(Same as ETHICSOC 174A, PHIL 174A) Morally controversial uses of markets and market reasoning in areas such as organ sales, procreation, education, and child labor. Would a market for organ donation make saving lives more efficient; if it did, would it thereby be justified? Should a nation be permitted to buy the right to pollute? Readings include Walzer, Arrow, Rawls, Sen, Frey, Titmuss, and empirical cases.

*4 units, not given this year*

**PHIL 274L. Betrayal and Loyalty, Treason and Trust**

(Same as ETHICSOC 174L, ETHICSOC 274L, PHIL 174L) The main topic of the seminar is Betrayal: its meaning as well as its moral, legal and political implications. We shall discuss various notions of betrayal: Political (military) betrayal such as treason, Religious betrayal with Judas as its emblem, but also apostasy (converting one's religion) which is regarded both as a basic human right and also as an act of betrayal, social betrayal - betraying class solidarity as well as Ideological betrayal - betraying a cause. On top of political betrayal we shall deal with personal betrayal, especially in the form of infidelity and in the form of financial betrayal of the kind performed by Madoff. The

contrasting notions to betrayal, especially loyalty and trust, will get special consideration so as to shed light or cast shadow, as the case may be, on the idea of betrayal. The seminar will focus not only on the normative aspect of betrayal - moral or legal, but also on the psychological motivations for betraying others. The seminar will revolve

*2 units, Win (Staff)*

**PHIL 275. Philosophy of Law**

(Same as PHIL 175) Philosophical foundations of law and the legal system. The justifiability of patterns of assigning legal responsibility within criminal law. Prerequisite: PHIL 80 and one additional PHIL course.

*4 units, not given this year*

**PHIL 275A. Ethics and Politics of Public Service**

(Same as CSRE 178, ETHICSOC 133, HUMBIO 178, PHIL 175A, POLISCI 133) Ethical and political questions in public service work, including volunteering, service learning, humanitarian assistance, and public service professions such as medicine and teaching. Motives and outcomes in service work. Connections between service work and justice. Is mandatory service an oxymoron? History of public service in the U.S. Issues in crosscultural service work. Integration with the Haas Center for Public Service to connect service activities and public service aspirations with academic experiences at Stanford.

*5 units, Win (Mitchell, T)*

**PHIL 275M. Two Ethical Theories and Being a Person**

(Same as PHIL 175M) The distinction between the ethics of being a person and the ethics of rules as opposed to the distinction between Kantian ethics and utilitarianism or consequentialism. Comparison of these two types of ethics with respect to their relationship to agency and being a good person. Relations between Western ethics and those of other continents.

*4 units, not given this year*

**PHIL 276. Political Philosophy: The Social Contract Tradition**

(Same as PHIL 176) (Graduate students register for 276.) Why and under what conditions do human beings need political institutions? What makes them legitimate or illegitimate? What is the nature, source, and extent of the obligation to obey the legitimate ones, and how should people alter or overthrow the others? Answers by political theorists of the early modern period: Hobbes, Locke, Rousseau, and Kant.

*4 units, Win (Hills, D)*

**PHIL 276A. Classical Seminar: Origins of Political Thought**

(Same as CLASSHIS 133, CLASSHIS 333, PHIL 176A, POLISCI 230A, POLISCI 330A) Political philosophy in classical antiquity, focusing on canonical works of Thucydides, Plato, Aristotle, and Cicero. Historical background. Topics include: political obligation, citizenship, and leadership; origins and development of democracy; and law, civic strife, and constitutional change.

*4-5 units, Win (Ober, J)*

**PHIL 276B. The Economic Individual in the Behavioral Sciences**

(Same as PHIL 176B) (Graduate students register for 276B.)

*4 units, not given this year*

**PHIL 277M. Human Rights and Moral Question**

(Same as ETHICSOC 177M, ETHICSOC 277M, PHIL 177M) The proliferation of human rights in the discourse of international justice has raised a number of important questions in both moral and legal theory. What are human rights? How should they be conceptualized? Who ought to bear the duties associated with them? Can their protection justify military interventions into sovereign states? This course will cover topics in moral and legal theory surrounding human rights. The course has three main focuses. The first concerns the question of what these rights are. The second focus is on the various substantive moral justifications for the protection of human rights. The third is on the moral issues raised by the dominance of human rights in international law and relations: can any rights be universal? How are these rights to be framed in the light of cross-cultural values and claims about cultural dominance? A theme throughout will be the connections between these questions. The way we answer the question of what human rights are, and how they c

*4-5 units, Spr (Thomas, J)*

**PHIL 278A. The Ethics of Environmental Choices**

(Same as EARTHSYS 178, EARTHSYS 278, PHIL 178A) (Formerly PHIL 278/378.) The institutional and individual dimensions of environmental choices. On the institutional side, examine externalities, the tragedy of the commons, sustainable development and environmental policy. On the individual side, discuss individual responsibility, intrinsic value, and moral pluralism. Focus is on decision making including the role of risk analysis, the rate of discount for effects on future generations, cost-benefit analysis, and scientific epistemology.

4 units, not given this year

**PHIL 278M. Justice and the Environment**

(Same as ETHICSOC 178M, ETHICSOC 278M, PHIL 178M, POLISCI 134L) Explores the normative questions that arise in environmental policy debates, including arguments over pollution permit markets, conservation regulations, and global warming mitigation efforts. What are the morally relevant ways in which the environment is different from other economic resources? How should the environment be valued? What are our obligations to conserve for future generations? How should the burdens of conservation be distributed? Engages with a variety of philosophical traditions including utilitarianism, deep ecology, liberalism, and communitarianism.

5 units, Win (Mazor, J)

**PHIL 279S. Moral Psychology, Reasons for Action, and Moral Theory**

(Same as PHIL 179S) What sorts of considerations does an ethical agent take to be good reasons for action? Work in moral psychology to illuminate the theory of practical reasons, and the theory of practical reasons to test the prospects for systematic moral theory. Can any systematic moral theory be reconciled with the moral psychology of ordinary, morally respectable agents? Reading include Bernard Williams, Rosalind Hursthouse, Peter Railton, T.M. Scanlon, and Barbara Herman.

4 units, not given this year

**PHIL 280. Metaphysics**

(Same as PHIL 180) Does God exist? If not, then what are we even talking about when we debate his/her/its existence? What does it take for a thought, existential or otherwise, to be true? It's true that this sentence is too long, but does that entail that there's a property (or feature or attribute) that this sentence has, namely: being too long? If so, what are such properties like? Are they located where and when the objects that have them are located? Are objects just bundles of properties? How exactly are they related to the molecules that make them up? How can objects persist through time, if they're constantly changing their parts and properties? Do human beings persist in the same way? Does time really flow, or is it just another 'static' dimension alongside the spatial ones? If it's the latter, does that mean everything that will ever happen is already determined now? Is determinism compatible with free will? What does it even mean to say that something could have happened differently?

4 units, Spr (Malmgren, A)

**PHIL 280A. Realism, Anti-Realism, Irrealism, Quasi-Realism**

(Same as PHIL 180A) Realism and its opponents as options across a variety of different domains: natural science, mathematics, ethics, and aesthetics. Clarify the various conceptions that fall under these terms and outline the reasons for and against adopting realism for the various domains. Highlight the general issues involved. Prerequisites: 80, 181

4 units, Win (Hussain, N)

**PHIL 281. Philosophy of Language**

(Same as PHIL 181) The study of conceptual questions about language as a focus of contemporary philosophy for its inherent interest and because philosophers see questions about language as behind perennial questions in other areas of philosophy including epistemology, philosophy of science, metaphysics, and ethics. Key concepts and debates about the notions of meaning, truth, reference, and language use, with relations to psycholinguistics and formal semantics. Readings from philosophers such as Frege, Russell, Wittgenstein, Grice, and Kripke. Prerequisites: 80 and background in logic.

4 units, Aut (Crimmins, M)

**PHIL 281B. Philosophy of Language: Contemporary Debates**

(Same as PHIL 181B) This course builds on the material of 181/281, focusing on debates and developments in the pragmatics of conversation, the semantics/pragmatics distinction, the contextuality of meaning, the nature of truth and its connection to meaning, and the workings of particular linguistic constructions of special philosophical relevance. Students who have not taken 181/281 should seek the instructor's advice as to whether they have sufficient background.

4 units, Win (Crimmins, M)

**PHIL 282. Truth**

(Same as PHIL 182) Philosophical debates about the place in human lives and the value to human beings of truth and its pursuit. The nature and significance of truth-involving virtues such as accuracy, sincerity, and candor.

4 units, Aut (Hills, D)

**PHIL 284. Theory of Knowledge**

(Same as PHIL 184) Competing theories of epistemic justification (foundationalism, coherentism, and externalism) against the background of radical scepticism. Readings from contemporary sources. Prerequisite: 80 or consent of instructor.

4 units, Spr (Malmgren, A)

**PHIL 284C. Epistemology of Testimony**

(Same as PHIL 184C) Many of our beliefs come from others, and not from direct experience. Is testimony a source of fundamental reasons? reasons that do not have to be supported or validated by other sources like perception or inference? What sort of responsibility does one have to one's hearers, when one gives testimony?

4 units, Win (Lawlor, K)

**PHIL 284F. Feminist Theories of Knowledge**

(Same as FEMST 166, PHIL 184F) Feminist critique of traditional approaches in epistemology and alternative feminist approaches to such topics as reason and rationality, objectivity, experience, truth, the knowing subject, knowledge and values, knowledge and power.

4 units, not given this year

**PHIL 285B. Philosophy of Perception**

(Same as PHIL 185B) The nature of perceptual experience and the role it plays in securing empirical knowledge. Focus will be on what is sometimes called the problem of perception: the question of how perception could provide us with direct awareness of the surrounding environment given the possibility of illusions or hallucinations. Topics, include the relationship between perception and belief, the nature of perceptual phenomenology, whether or not perceptual experiences are representational states, and the philosophical relevance of empirical research on perception.

4 units, Win (Genone, J)

**PHIL 286. Philosophy of Mind**

(Same as PHIL 186) (Graduate students register for 286.) Debates concerning the nature of mental states, their relation to physical states of the human body, how they acquire their content, how people come to know about them in themselves and others, and the roles they play in the explanation of human conduct.

4 units, Spr (Taylor, K)

**PHIL 287. Philosophy of Action**

(Same as PHIL 187) (Graduate students register for 287.) Contemporary research in the philosophy of action. Topics include: What is it to be an agent? Is there a philosophically defensible contrast between being an agent and being a locus of causal forces to which one is subject? What is it to act purposively? What is intention? What is the relation between intention and belief? What is it to act intentionally? What is it to act for a reason? What is the relation between explaining why someone acted by citing the reasons for which she acted and causal explanation of her action? What is the relation between theoretical and practical rationality? What is the nature of our knowledge of our own intentional activity? What is it to act autonomously? What is shared cooperative activity? Prerequisite: 80..

4 units, Spr (Bratman, M)

**PHIL 288. Personal Identity**

(Same as PHIL 188) Do you persist through time the way that a skyscraper persists through space, by having different parts at different locations? Or are you 'wholly present' at every moment

of your life, in something more like the way that an elevator is present in each place as it travels up to the top floor? What criteria determine whether you now are the very same person as some unique person located at some time in the past? Is the continuity of your memories or other mental states sufficient for your survival? Can you survive the loss or destruction of your body? Do you really exist for more than just the present moment? How do different answers to these questions bear on your moral, personal, and professional obligations? What kinds of considerations could possibly help us to answer these questions? This course explores these and related issues. Readings include a mix of introductory survey, historical, and contemporary material.

*4 units, not given this year*

**PHIL 289. Examples of Free Will**

(Same as PHIL 189) Examples drawn from three domains: choice, computation, and conflict of norms. Conceptually, a distinction is made between examples that are predictable and those that are not, but skepticism about making a sharp distinction between determinism and indeterminism is defended.

*4 units, not given this year*

**PHIL 300. Proseminar**

Typically focused seminar. Required of all first year Philosophy PhD students

*4 units, Aut (Taylor, K)*

**PHIL 301. Dissertation Development Proseminar**

Typically focused seminar. Optional of all second and third year Philosophy PhD students

*4 units, Win (De Pierris, G), Spr (De Pierris, G)*

**PHIL 312. Aristotle's Psychology**

De Anima and parts of Parva Naturalia.

*4 units, not given this year*

**PHIL 314. Practical Reasoning in Plato and Aristotle**

It is often said that the greatest difference between Plato's ethics and those of Aristotle is that the latter thinks that practical and theoretical reason are distinct, but the former does not. We shall read some of both Plato and Aristotle and ask whether the above claim is true and then consider what the implications the differences between their views of practical reason have for the rest of their ethics.

*2-4 units, not given this year*

**PHIL 317. Topics in Plato: Middle and Late Ethics & Politics**

Examine the fundamentals of Plato's political philosophy by reading the Politics as well relevant parts of some of his other ethical and political works.

*2-4 units, Win (Bobonich, C)*

**PHIL 318. Aristotle's Ethics**

Topics in Aristotle's ethical theory and related parts of his psychology.

*4 units, not given this year*

**PHIL 319. Aristotle's Metaphysics**

Aristotle's views about substance and the nature and possibility of metaphysics. Focus is on Categories and Metaphysics Book Zeta.

*3 units, not given this year*

**PHIL 321. Leibniz's Metaphysics**

Leibniz's metaphysical views during his so-called mature period (early 1680s to 1716). Topics will include Leibniz's conception of substance, his alleged idealism, his doctrine of possible worlds and his doctrine of pre-established harmony. Reading of the Discourse on Metaphysics (1686) and the correspondence with Arnauld (1686-1690).

*2-4 units, not given this year*

**PHIL 322. Hume**

Hume's theoretical philosophy emphasizing skepticism and naturalism, the theory of ideas and belief, space and time, causation and necessity, induction and laws of nature, miracles, a priori reasoning, the external world, and the identity of the self.

*2-4 units, Aut (De Pierris, G)*

**PHIL 323. Kant's Criticism of Metaphysics**

Motivations and strategies of Kant's criticisms of traditional metaphysics in the Critique of Pure Reason. Leibnizian and Wolffian versions of the concept containment theory of truth and the Wolffian ideal of a conceptual system of metaphysical knowledge. Kant's analytic/synthetic distinction, focusing on its

place in the rejection of metaphysics and in arguments about the ideas of reason in the transcendental dialectic. Prerequisite: course on the first Critique, or consent of instructor.

*4 units, Spr (Anderson, L)*

**PHIL 332. Nietzsche**

Preference to doctoral students. Nietzsche's later works emphasizing The Gay Science, Beyond Good and Evil, and On the Genealogy of Morals. The shape of Nietzsche's philosophical and literary projects, and his core doctrines such as eternal recurrence, will to power, and perspectivism. Problems such as the proper regulation of belief, and the roles of science, morality, art, and illusion in life.

*2-4 units, not given this year*

**PHIL 334. Habermas**

Does Habermas have a distinctive account of normativity and normative judgements?

*3-5 units, not given this year*

**PHIL 335. Topics in Aesthetics**

May be repeated for credit.

*4 units, not given this year*

**PHIL 340. Time and Free Will**

Free will and the consequence argument of Peter van Inwagen and others. Focus is on the principle that one cannot change the past and the problem of backtracking conditionals, and less on the problem raised by determinism. Hypotheses less drastic than determinism support backtrackers; given the backtracker, would someone's not having done something require that he change the past? Issues related to time, change, the phenomenology of agency, and McTaggart's argument about the reality of time.

*3-5 units, not given this year*

**PHIL 348. Evolution of Signals**

Explores evolutionary (and learning) dynamics applied to simple models of signaling, emergence of information and inference. Classroom presentations and term papers. Text: Skyrms - SIGNALS: EVOLUTION, LEARNING and INFORMATION and selected articles.

*2-4 units, Spr (Skyrms, B)*

**PHIL 349. Evidence and Evolution**

(Same as PHIL 249) The logic behind the science. The concept of evidence and how it is used in science with regards to testing claims in evolutionary biology and using tools from probability theory, Bayesian, likelihoodist, and frequentist ideas. Questions about evidence that arise in connection with evolutionary theory. Creationism and intelligent design. Questions that arise in connection with testing hypotheses about adaptation and natural selection and hypotheses about phylogenetic relationships.

*3-5 units, not given this year*

**PHIL 350A. Model Theory**

Back-and-forth arguments with applications to completeness, quantifier-elimination and omega-categoricity. Elementary extensions and the monster model. Preservation theorems. Interpolation and definability theorems. Imaginaries. Prerequisite: Phil151A or consent of the instructor.

*3 units, Spr (Casanovas, E)*

**PHIL 350B. Model Theory B**

(Same as MATH 290B) Decidable theories. Model-theoretic background. Arithmetic of addition, real closed and algebraically closed fields, weak second order arithmetic, theories of terms, theories of arrays, temporal logic. Combining decision procedures. May be repeated for credit. Prerequisite: 151,152 or equivalents.

*1-3 units, not given this year*

**PHIL 351A. Recursion Theory**

Theory of recursive functions and recursively enumerable sets. Register machines, Turing machines, and alternative approaches. Gödel's incompleteness theorems. Recursively unsolvable problems in mathematics and logic. Introduction to higher recursion theory. The theory of combinators and the lambda calculus. Prerequisites: 151, 152, and 161, or equivalents.

*3 units, not given this year*

**PHIL 351B. Proof Mining**

Uses of proof theory in analysis and number theory. Proof mining: extraction of bounds from non-effective proofs. May be repeated for credit. Prerequisite: 151,152 or equivalents, and a calculus

course.

*1-3 units, not given this year*

**PHIL 352A. Set Theory**

(Same as MATH 292A) The basics of axiomatic set theory; the systems of Zermelo-Fraenkel and Bernays-Gödel. Topics: cardinal and ordinal numbers, the cumulative hierarchy and the role of the axiom of choice. Models of set theory, including the constructible sets and models constructed by the method of forcing. Consistency and independence results for the axiom of choice, the continuum hypothesis, and other unsettled mathematical and set-theoretical problems. Prerequisites: PHIL151 and MATH 161, or equivalents.

*3 units, not given this year*

**PHIL 353A. Proof Theory**

(Same as MATH 293A) Gentzen's natural deduction and sequential calculi for first-order propositional and predicate logics. Normalization and cut-elimination procedures. Relationships with computational lambda calculi and automated deduction. Prerequisites: 151, 152, and 161, or equivalents.

*3 units, Aut (Mints, G)*

**PHIL 353B. Proof Theory B**

Consistency ordinal as a measure of the strength of a mathematical theory. The open problem of describing the ordinal of mathematical analysis (second order arithmetic). Present state of the problem and approaches to a solution. Prerequisites: Phil 151, 152 or equivalents

*3 units, Win (Mints, G)*

**PHIL 353C. Functional Interpretations**

Finite-type arithmetic. Gödel's functional interpretation and Kreisel's modified realizability. Systems based on classical logic. Spector's extension by bar-recursive functionals. Kohlenbach's monotone interpretation and the bounded functional interpretation. The elimination of weak König's lemma. Uniform boundedness. A look at Tao's hard/soft analysis distinction.

*4 units, not given this year*

**PHIL 354. Topics in Logic**

Epsilon-calculus. Syntax and semantics of first-order epsilon-calculus. Hilbert's epsilon substitution method. Recent progress and open problems. May be repeated for credit. Prerequisite: 151, 152 or equivalents

*1-3 units, not given this year*

**PHIL 355. Logic and Social Choice**

Topics in the intersection of social choice theory and formal logic. Voting paradoxes, impossibility theorems and strategic manipulation, logical modeling of voting procedures, preference versus judgment aggregation, role of language in social choice, and metatheory of social choice. May be repeated for credit. Prerequisite: 151 or consent of instructor.

*4 units, not given this year*

**PHIL 356. Applications of Modal Logic**

Applications of modal logic to knowledge and belief, and actions and norms. Models of belief revision to develop a dynamic doxastic logic. A workable modeling of events and actions to build a dynamic deontic logic on that foundation. (Staff)

*3 units, not given this year*

**PHIL 358. Rational Agency and Intelligent Interaction**

(Same as CS 222) For advanced undergraduates, and M.S. and beginning Ph.D. students. Logic-based methods for knowledge representation, information change, and games in artificial intelligence and philosophy. Topics: knowledge, certainty, and belief; time and action; belief dynamics; preference and social choice; games; and desire and intention. Prerequisite: propositional and first-order logic.

*3 units, not given this year*

**PHIL 359. Advanced Modal Logic**

Mathematical analysis of modal systems, including bisimulation and expressive power, correspondence theory, algebraic duality, completeness and incompleteness, and extended modal logics, up to guarded fragments of first-order logic, fixed-point logics, and second-order logic. Prerequisite: 151, 154/254, or equivalent background.

*2-4 units, Spr (van Benthem, J)*

**PHIL 360. Core Seminar in Philosophy of Science**

Limited to first- and second-year Philosophy Ph.D. students.

*4 units, not given this year*

**PHIL 365. Seminar in Philosophy of Science: Time**

*4 units, not given this year*

**PHIL 366. Evolution and Communication**

Topics include information bottlenecks, signaling networks, information processing, invention of new signals, teamwork, evolution of complex signals, teamwork. Sources include signaling games invented by David Lewis and generalizations thereof, using evolutionary and learning dynamics.

*4 units, not given this year*

**PHIL 370. Core Seminar in Ethics**

Limited to first- and second-year students in the Philosophy Ph.D. program.

*4 units, not given this year*

**PHIL 371D. Graduate Seminar on Equality**

(Same as POLISCI 431L) This seminar will focus on ideas of equality of opportunity, with readings from political theory, as well as American constitutional law, political science, economics, and sociology. The readings will address four main questions: What is equality of opportunity? Why is equality of opportunity an important requirement of justice? What are the principal sources of inequalities of opportunity? And how might those inequalities be remedied? Readings from: Hayek, Rawls, Dworkin, Okin, Roemer, Tawney, Bourdieu, Barry, Jencks, Mazumder, Alstott, McLanahan, and Heckman.

*5 units, not given this year*

**PHIL 372. Topics in Kantian Ethics**

Selected topics in ethics, considering both Kant's texts and recent writings by Kant interpreters and moral philosophers in the Kantian tradition. Among the topics covered will be: Practical reason, personal relationships, duties to oneself, evil, right and politics, lying, constructivism in ethics.

*4 units, not given this year*

**PHIL 372E. Graduate Seminar on Moral Psychology**

Recent philosophical works on desire, intention, the motivation of action, valuing, and reasons for action. Readings: Williams, Korsgaard, Smith, Blackburn, Velleman, Stampe, Frankfurt.

*3-5 units, not given this year*

**PHIL 372P. Korsgaard and her Critics**

Derek Parfit has characterized Christine Korsgaard's view as one whose complexity and scope make it unusually hard both to summarize and classify. Korsgaard combines Kantian, Humean, and existentialist ideas in unexpected, platitude-denying ways. Korsgaard's theory is at once a theory of morality, agency and personal identity. Present her view both by reading her latest and most mature formulation of it (Self-Constitution), and by examining prominent critiques of it (Parfit, Hussain, Enoch, Fitzpatrick, etc.). These critiques focus on several fundamental issues worthy of discussion in their own right. What is the relation between moral judgment and moral motivation? Does moral thinking trade in practical or descriptive concepts? In what sense does morality admit of analysis or explanation? What does it mean for a moral theory to be addressed to the deliberative rather than the scientific or anthropological point of view? If moral norms were constitutive of agency, would that account

*2-4 units, not given this year*

**PHIL 372R. Political Realism**

(Same as POLISCI 435R) This seminar will explore various articulations of political realism in their historical contexts. Realism is generally taken to be a pragmatic approach to a political world marked by the competition for material interests and the struggle for power. Yet beyond a shared critique of idealism and an insistence on the priority and autonomy of the political, realists tend to have very different normative visions and political projects. We will consider the works of several political realists from the history of political and international relations thought, including: Thucydides, Machiavelli, Hobbes, Carr, Niebuhr, and Morgenthau.

*3-5 units, Aut (McQueen, A)*

**PHIL 373. Moral Psychology: The Concept of Inclination**

The weight placed by Kantian and rationalist moral theories on the distinction between inclination and reason. The concept of inclination as that which inclines but does not determine how people act. How are inclinations related to the people who hold



them? Are they expressions of values, or more like internal weather? What is their nature? What does it mean to act from inclination? Are actions on inclination unchosen or just badly chosen? Historical and contemporary sources.

*4 units, not given this year*

**PHIL 374. Caring and Practical Reasoning**

What is it to care about something; how is caring related to desiring, emotions, and having policies; what is the relationship between caring and the will; why do people care about things; can attention to caring help explain the phenomenon of silencing reasons? Readings from contemporary literature, including Frankfurt, Watson, Bratman, Scanlon, Williams, Helm, and Kolodny. May be repeated for credit.

*4 units, not given this year*

**PHIL 374C. Democracy and the Constitution**

(Same as POLISCI 438) Connections between democratic theory and constitutional theory. Sources include literature from political philosophy, constitutional law, and jurisprudence, and arguments about freedom of expression, campaign finance, legislative apportionment, federalism, and separation of powers. Readings from Scalia, Breyer, Ely, Ackerman, Dahl, Rawls, Habermas, Dworkin, Riker, and Schumpeter, as well as constitutional cases.

*5 units, not given this year*

**PHIL 376. Agency and Personal Identity**

How philosophical theories of agency interact with philosophical accounts of personal identity. Readings include David Velleman and Harry Frankfurt.

*4 units, not given this year*

**PHIL 377. Rational and Social Agency**

(Same as POLISCI 333) Contemporary discussions of practical reason, individual rational agency, planning agency, diachronic agency, intention, belief, intentional action, shared agency, identification and self-governance. Tentative list of authors whose work will be studied includes: Michael Bratman, Margaret Gilbert, Richard Holton, Christine Korsgaard, Alfred Mele, Kieran Setiya, Scott Shapiro, Michael Smith, David Velleman, Jay Wallace, and Gary Watson.

*2-4 units, Win (Bratman, M)*

**PHIL 378. Amartya Sen's capability theory**

(Same as POLISCI 436R) Amartya Sen's pioneering work attempts to open up economics to missing informational and evaluative dimensions. This seminar will explore Sen's capability approach and its implications for the study of economics, gender, and justice. It will look at different ways that the capability approach has been developed, in particular, by Martha Nussbaum, but also by other political philosophers.

*2-4 units, not given this year*

**PHIL 379. Graduate Seminar in Metaethics**

Theories about the meaning of ethical terms and the content of ethical judgements. Do these theories fit with best accounts of human agency and practical deliberation? Readings from recent literature. Prerequisites: 173B/273B, 181, 187/287 or equivalent.

*2-4 units, Spr (Hussain, N)*

**PHIL 380. Core Seminar in Metaphysics and Epistemology**

Limited to first- and second-year students in the Philosophy Ph.D. program.

*4 units, not given this year*

**PHIL 381. Core Seminar in Philosophy of Language**

Limited to first- and second-year students in the Philosophy Ph.D. program.

*4 units, not given this year*

**PHIL 382. Seminar on Reference**

Philosophical issues concerning the relationship between linguistic expressions and the objects to which they refer. Is it possible to get one unified theory of reference for different kinds of referring expressions such as proper names, pronouns, demonstratives, and other kinds of indexicals? Unsolved problems and desiderata for a theory of reference?

*4 units, not given this year*

**PHIL 382A. Pragmatics and Reference**

Grice's theory of conversational implicatures, Relevance Theory and other contemporary pragmatic theories, focusing on issues involving singular reference, pragmatic intrusion, and the

semantics - pragmatics interface. Throughout the seminar will be developing the approach Kapa Korta and Perry call critical pragmatics.

*4 units, not given this year*

**PHIL 383. Philosophy of Mind Seminar**

May be repeated for credit.

*2-4 units, not given this year*

**PHIL 383B. What's an Inference?**

Fundamental issues in epistemology, philosophy of mind and language issues relating to the notion (or rather, notions) of an inference. What's inferential justification? What's an inferential reasoning process? What are inference rules and what distinguishes a good rule of inference from a bad rule? Subtopics to be discussed include: the problem of mental causation, the distinction between personal and subpersonal levels of explanation, preservation of content and warrant, the epistemic support relation, and time permitting the nature of perceptual justification.

*4 units, Win (Staff)*

**PHIL 384. Seminar in Metaphysics and Epistemology**

May be repeated for credit.

*4 units, not given this year*

**PHIL 385. Pragmatics and Reference**

Problems about reference have played a large role in the philosophy of language since the days of Frege and Russell. An approach to reference from the point of view of pragmatics, that Kapa Korta and John Perry have developed in their book CRITICAL PRAGMATICS. Rely on ideas from John Perry's book REFERENCE AND REFLEXIVITY. Also look at other approaches to reference, and to pragmatics.

*2-4 units, not given this year*

**PHIL 385B. Topics in Metaphysics and Epistemology:**

**Vagueness**

Contemporary proposals for how and whether to explain and accommodate vagueness in reality and in representation. Theories of mental and linguistic representation that struggle to explain imprecise representation, and metaphysical theories of the ultimate structure of reality that are threatened with incoherence if worldly boundaries are vague. May be repeated for credit.

*4 units, not given this year*

**PHIL 385C. Topics in Philosophy of Language: The Frege-Russell Problems**

Explore various approaches to the difficulties for semantic theories raised by the behavior of propositional attitude sentences. How, if Superman and Clark are the same person, can Lois have different beliefs about them? Classic treatments of the issues including Frege, Russell, Quine, Davidson, and Kripke. Contemporary debates about the most promising approaches, including naive Russellianism and unarticulated constituent accounts.

*2-4 units, not given this year*

**PHIL 385D. Topics in Philosophy of Language**

*4 units, Spr (Crimmins, M)*

**PHIL 385M. The Metaphysics of Meaning**

One central project in the philosophy of language is to explain the relationships between paradigmatically semantic phenomena like meaning, truth, and reference (as well as entailment, satisfaction, application, and others). Often the pursuit of this project generates orders of explanation in which some notions are privileged as more fundamental than others, in what is arguably a metaphysical sense of the expression. The dominant order of explanation in both philosophical and linguistic semantics seems to be Referentialism, according to which word/world relationships like reference and application are taken to be more fundamental than sentential truth or meaning. (Think: correspondence theory + model-theoretic semantics.) Alternatives to the orthodoxy include certain versions of conceptual-role semantics, Brandom's inferentialism, and Horwich's use theory of meaning. The aims of this seminar will be to acquaint ourselves with these and other going concerns in the theory of meaning,

*2-4 units, not given this year*

**PHIL 385R. Metaphysics of Reference**

*4 units, Win (Taylor, K)*



**PHIL 386B. Husserl and Adam Smith**

Readings from Husserl and others in the phenomenological tradition, and recent work on intentionality and consciousness by philosophers and cognitive scientists.

4 units, not given this year

**PHIL 386C. Subjectivity**

Continuation of 386B.

4 units, not given this year

**PHIL 387. Practical Rationality**

Contemporary research on practical reason, practical rationality and reasons for action. May be repeated for credit

2-4 units, not given this year

**PHIL 387C. Consistency and Coherence**

Some philosophers think that attitudes like belief and intention are subject to consistency and coherence requirements. Are there such general purpose cogency requirements on attitudes? If so, what is their nature and strength? What grounds these requirements; for instance, does the point or purpose of a belief or an intention ground consistency and coherence requirements on that attitude? How are such requirements on belief related to requirements on intention? How does the answer to such questions bear on understanding of the interrelations between theoretical and practical rationality?

2-4 units, not given this year

**PHIL 387S. Practical Reasons and Practical Reasoning**

Attempts to develop alternatives to Humean, instrumentalist conceptions of practical reasoning, and alternatives to Humean, non-cognitivist views of practical reasons. Readings include Aurel Kolnai, Bernard Williams, David Wiggins, Joseph Raz, Michael Bratman, Elijah Millgram, and T.M. Scanlon.

4 units, not given this year

**PHIL 388. Normativity**

May be repeated for credit.

2-4 units, not given this year

**PHIL 389. Advanced Topics in Epistemology**

Skepticism and contextualism, epistemic closure, and problems generated by closure.

3-5 units, Aut (Lawlor, K)

**PHIL 391. Research Seminar in Logic and the Foundations of Mathematics**

(Same as MATH 391) Contemporary work. May be repeated a total of three times for credit.

1-3 units, Aut (Mints, G; Feferman, S), Win (Mints, G; Feferman, S), Spr (Mints, G; Feferman, S)

**PHIL 450. Thesis**

(Staff)

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**PHIL 470. Proseminar in Moral Psychology**

Restricted to Philosophy doctoral students. May be repeated for credit.

4 units, not given this year

**PHIL 500. Advanced Dissertation Seminar**

Presentation of dissertation work in progress by seminar participants. May be repeated for credit.

1 unit, Aut (Hills, D), Win (Hills, D), Spr (Hills, D)

**PHIL 801. TGR Project**

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**PHIL 802. TGR Dissertation**

(Staff)

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

## PHYSICS (PHYSICS) COURSES

### UNDERGRADUATE COURSES IN PHYSICS

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**PHYSICS 15. The Nature of the Universe**

The structure, origin, and evolution of the major components of the Universe: planets, stars, and galaxies. Emphasis is on the

formation of the Sun and planets, the evolution of stars, and the structure and content of the Milky Way galaxy. Topics: cosmic enigmas (dark matter, black holes, pulsars, x-ray sources), star birth and death, and the origins of and search for life in the solar system and beyond. GER: DB-NatSci

3 units, Aut (Madejski, G), Sum (Staff)

**PHYSICS 16. Cosmic Horizons**

The origin and evolution of the universe and its contents: stars, galaxies, quasars. The overall structure of the cosmos and the physical laws that govern matter, space, and time. Topics include the evolution of the cosmos from the origin of the elements and the formation of stars and galaxies, exotic astronomical objects (black holes, quasars, supernovae, and gamma ray bursts), dark matter, inflationary cosmology, and the fate of the cosmos. GER: DB-NatSci

3 units, Win (Allen, S)

**PHYSICS 17. Black Holes**

Newton's and Einstein's theories of gravitation and their relationship to the predicted properties of black holes. Their formation and detection, and role in galaxies and high-energy jets. Hawking radiation and aspects of quantum gravity. GER: DB-NatSci

3 units, Spr (Michelson, P)

**PHYSICS 18N. Revolution in Concepts of the Cosmos**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. The evolution of concepts of the cosmos and its origin, from the Copernican heliocentric model to the current view based on Hubble's discovery of expansion of the Universe. Recent cosmological observations and the relevance of laboratory experiments in particle physics. One night of observations at the Stanford Observatory. GER: DB-NatSci

3 units, Win (Roodman, A)

**PHYSICS 19. How Things Work: An Introduction to Physics**

Introduction to the principles of physics through familiar objects and phenomena, including airplanes, cameras, computers, engines, refrigerators, lighting, radio, microwave ovens, and fluorescent lights. Estimates of real quantities from simple calculations. Prerequisite: high school algebra and trigonometry. GER: DB-NatSci

3 units, Aut (Church, S)

**PHYSICS 21. Mechanics and Heat**

For biology, social science, and premedical students. Introduction to Newtonian mechanics, fluid mechanics, theory of heat. Prerequisite: high school algebra and trigonometry; calculus not required. GER: DB-NatSci

3 units, Aut (Michelson, P)

**PHYSICS 21S. Mechanics and Heat w/ laboratory**

Equivalent to 21 and 22. GER: DB-NatSci

4 units, Sum (Staff)

**PHYSICS 22. Mechanics and Heat Laboratory**

Guided hands-on exploration of concepts in classical mechanics and thermodynamics with an emphasis on student predictions, observations and explanations. Pre- or corequisite: 21.

1 unit, Aut (Michelson, P)

**PHYSICS 23. Electricity and Optics**

Electric charges and currents, magnetism, induced currents; wave motion, interference, diffraction, geometrical optics. Prerequisite: 21. GER: DB-NatSci

3 units, Win (Manoharan, H)

**PHYSICS 24. Electricity and Optics Laboratory**

Guided hands-on exploration of concepts in electricity and magnetism, circuits and optics with an emphasis on student predictions, observations and explanations. Introduction to multimeters and oscilloscopes. Pre- or corequisite: 23.

1 unit, Win (Manoharan, H)

**PHYSICS 25. Modern Physics**

Introduction to modern physics. Relativity, quantum mechanics, atomic theory, radioactivity, nuclear reactions, nuclear structure, high energy physics, elementary particles, astrophysics, stellar evolution, and the big bang. Prerequisite: 23 or consent of instructor. GER: DB-NatSci

3 units, Spr (Linde, A)

**PHYSICS 25S. Modern Physics with Laboratory**

Equivalent to 25 and 26. GER: DB-NatSci

*4 units, Sum (Staff)***PHYSICS 26. Modern Physics Laboratory**

Guided hands-on and simulation-based exploration of concepts in modern physics, including special relativity, quantum mechanics and nuclear physics with an emphasis on student predictions, observations and explanations. Pre- or corequisite: 25.

*1 unit, Spr (Linde, A)***PHYSICS 28. Mechanics, Heat, and Electricity**

For biology, social science, and premedical students. The sequence 28 and 29 fulfills, in ten weeks, the one-year college physics requirement with lab of most medical schools. Topics: Newtonian mechanics, fluid mechanics, theory of heat, electric charges, and currents. Calculus is used as a language and developed as needed. Prerequisite: high school algebra and trigonometry. GER: DB-NatSci

*6 units, Sum (Staff)***PHYSICS 29. Electricity and Magnetism, Optics, Modern Physics**

Magnetism, induced currents; wave motion, optics; relativity, quantum mechanics, atomic theory, radioactivity, nuclear structure and reactions, elementary particles, astrophysics, and cosmology. Prerequisite: 28. GER: DB-NatSci

*6 units, Sum (Staff)***PHYSICS 41. Mechanics**

Vectors, particle kinematics and dynamics, work, energy, momentum, angular momentum; conservation laws; rigid bodies; mechanical oscillations and waves. Discussions based on use of calculus. Prerequisite: High school physics or PHYSICS 19. MATH 19 or 41 or equivalent. Corequisite: MATH 20 or 42 or 51. GER: DB-NatSci

*4 units, Win (Burchat, P)***PHYSICS 41A. Mechanics Concepts, Calculations, and Context**

Additional assistance and applications for PHYSICS 41. In-class problems in physics and engineering. Exercises in the concepts and calculations of vectors, translational and rotational velocity and acceleration, equations of motion for particles and rigid bodies, and principles of energy and linear/angular momentum. In-class participation required. Limited enrollment.

*1 unit, Win (Mitiguy, P)***PHYSICS 41N. Mechanics: Insights, Applications, and Advances**

Preference to freshman. Additional topics for students in PHYSICS 41 such as tidal forces, gyroscopic effects, fractal dimensions, and chaos. Corequisite: 41 or advanced placement.

*1 unit, not given this year***PHYSICS 42. Classical Mechanics Laboratory**

Hand-on exploration of concepts in classical mechanics: Newton's laws, conservation laws, rotational motion. Introduction to laboratory techniques, experimental equipment and data analysis. Pre- or corequisite: 41

*1 unit, Win (Burchat, P)***PHYSICS 43. Electricity and Magnetism**

Electrostatics, Coulomb's law, electric fields and fluxes, electric potential, properties of conductors, Gauss's law, capacitors and resistors, DC circuits; magnetic forces and fields, Biot-Savart law, Faraday's law, Ampere's law, inductors, transformers, AC circuits, motors and generators, electric power, Galilean transformation of electric and magnetic fields, Maxwell's equations; limited coverage of electromagnetic fields and special relativity. Prerequisite: PHYSICS 41 or equivalent. MATH 20 or 42 or 51 or equivalent. Recommended corequisite: Math 52. GER: DB-NatSci

*4 units, Spr (Fisher, I)***PHYSICS 43N. Understanding Electromagnetic Phenomena**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Expands on the material presented in 43; applications of concepts in electricity and magnetism to everyday phenomena and to topics in current physics research. Corequisite: 43 or advanced placement.

*1 unit, Spr (Cabrera, B)***PHYSICS 44. Electricity and Magnetism Lab**

Hands-on exploration of concepts in electricity and magnetism and circuits. Introduction to multimeters, function generators, oscilloscopes, and graphing techniques. Pre- or corequisite: 43.

*1 unit, Spr (Fisher, I)***PHYSICS 45. Light and Heat**

Reflection and refraction, lenses and lens systems; polarization, interference, and diffraction; temperature, properties of matter and thermodynamics, introduction to kinetic theory of matter. Prerequisites: PHYSICS 41 or equivalent. MATH 20 or 42 or 51 or equivalent. GER: DB-NatSci

*4 units, Aut (Gratta, G), Sum (Staff)***PHYSICS 45N. Advanced Topics in Light and Heat**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Expands on the subject matter presented in 45 to include optics and thermodynamics in everyday life, and applications from modern physics and astrophysics. Corequisite: 45 or advanced placement.

*1 unit, Aut (Romani, R)***PHYSICS 46. Light and Heat Laboratory**

Hands-on exploration of concepts in geometrical optics, wave optics and thermodynamics. Pre- or corequisite: 45.

*1 unit, Aut (Gratta, G), Sum (Staff)***PHYSICS 50. Astronomy Laboratory and Observational Astronomy**

Introduction to observational astronomy emphasizing the use of optical telescopes. Observations of stars, nebulae, and galaxies in laboratory sessions with 16- and 24-inch telescopes at the Stanford Observatory. Meets one evening per week from dusk until well after dark at the Stanford Observatory. No previous physics required. Limited enrollment. Lab. GER: DB-NatSci

*3 units, Aut (Cabrera, B), Sum (Staff)***PHYSICS 59. Current Research Topics**

Recommended for prospective Physics majors. Presentations of current research topics by faculty with research interests related to physics, often including tours of experimental laboratories where the research is conducted.

*1 unit, Aut (Raghu, S)***PHYSICS 61. Mechanics and Special Relativity**

(First in a three-part series: 61, 63, 65.) Advanced freshman physics. For students with a strong high school mathematics and physics background contemplating a major in Physics or interested in a rigorous treatment of physics. Special theory of relativity and Newtonian mechanics with multi-variable calculus. Postulates of special relativity, simultaneity, time dilation, length contraction, the Lorentz transformation, causality, and relativistic mechanics. Central forces, contact forces, linear restoring forces. Momentum transport, work, energy, collisions. Angular momentum, torque, moment of inertia in three dimensions. Damped and forced harmonic oscillators. Recommended prerequisites: Mastery of mechanics at the level of AP Physics C and AP Calculus B/C or equivalent. Recommended corequisite: MATH 51. GER: DB-NatSci

*4 units, Aut (Susskind, L)***PHYSICS 62. Classical Mechanics Laboratory**

Introduction to laboratory techniques, experiment design, data collection and analysis simulations, and correlating observations with theory. Labs emphasize discovery with open-ended questions and hands-on exploration of concepts developed in PHYSICS 61 including Newton's laws, conservation laws, rotational motion. Pre- or corequisite 61

*1 unit, Aut (Susskind, L)***PHYSICS 63. Electricity, Magnetism, and Waves**

(Second in a three-part series: 61, 63, 65.) Advanced freshman physics. For students with a strong high school mathematics and physics background contemplating a major in Physics or interested in a rigorous treatment of physics. Electricity, magnetism and waves with some description of optics. Electrostatics and Gauss' law. Electric potential, electric field, conductors, image charges. Other theorems of vector calculus. Electric currents, DC circuits. Moving charges, magnetic field, Ampere's law. Solenoids, transformers, induction, AC circuits, resonance. Relativistic point of view for moving charges. Displacement current, Maxwell's equations. Electromagnetic waves, dielectrics. Diffraction, interference, refraction, reflection, polarization. Prerequisite:

PHYSICS 61 and MATH 51; Pre- or corequisite: MATH 52. GER: DB-NatSci

4 units, Win (Graham, P)

**PHYSICS 64. Electricity, Magnetism and Optics Laboratory**

Introduction to multimeters, breadboards, function generators and oscilloscopes. Emphasis on student-developed design of experimental procedure and data analysis for topics covered in PHYSICS 63: electricity, magnetism, circuits, and optics. Pre- or corequisite: 63

1 unit, Win (Graham, P)

**PHYSICS 65. Quantum and Thermal Physics**

(Third in a three-part series: 61, 63, 65.) Advanced freshman physics. For students with a strong high school mathematics and physics background contemplating a major in Physics or interested in a rigorous treatment of physics. Introduction to quantum mechanics: matter waves, atomic structure, Schrödinger's equation. Thermodynamics and statistical mechanics: entropy and heat, Boltzmann statistics, quantum statistics. Prerequisites: PHYSICS 61 & 63. Pre- or corequisite: MATH 53. GER: DB-NatSci

4 units, Spr (Romani, R)

**PHYSICS 67. Introduction to Laboratory Physics**

Methods of experimental design, data collection and analysis, statistics, and curve fitting in a laboratory setting. Experiments drawn from electronics, optics, heat, and modern physics. Lecture plus laboratory format. Required for 60 series Physics and Engineering Physics majors; recommended, in place of PHYSICS 44, for 40 series students who intend to major in Physics or Engineering Physics. Pre- or corequisite: 65 or 43.

2 units, Spr (Pam, R)

**PHYSICS 70. Foundations of Modern Physics**

Required for Physics majors who completed the 40 series, or the PHYSICS 60 series prior to 2005-06. Special relativity, the experimental basis of quantum theory, atomic structure, quantization of light, matter waves, Schrödinger equation. Prerequisites: 41, 43. Corequisite: 45. Recommended: prior or concurrent registration in MATH 53. GER: DB-NatSci

4 units, Aut (Kasevich, M)

**PHYSICS 70N. Modern Physics in Your Life**

(S,Sem) Stanford Introductory Seminar. How does modern physics intersect with your everyday life? Topics may include the quantum nature of light, atomic physics and an introduction to semiconductor physics, applications to light sources (incandescent, fluorescent, light-emitting diodes, lasers) and light sensors (photodiodes and solar cells), introduction to nuclear physics (e.g., fission, fusion, interaction of radiation with matter). Co- or pre-requisite: Physics 70, Physics 65, or similar high-school physics preparation.

1 unit, Aut (Raghu, S)

**PHYSICS 80N. The Technical Aspects of Photography**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen and sophomores with some background in photography. How cameras record photographic images on film and electronically. Technical photographic processes to use cameras effectively. Camera types and their advantages, how lenses work and their limitations, camera shutters, light meters and the proper exposure of film, film types, depth of focus, control of the focal plane and perspective, and special strategies for macro and night photography. View cameras and range finder technical cameras. Students take photographs around campus. Prerequisite: high school physics.

3 units, Spr (Osheroff, D)

**PHYSICS 83N. Physics in the 21st Century**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Current topics at the frontier of modern physics. Topics include subatomic particles and the standard model, symmetries in nature, extra dimensions of space, string theory, supersymmetry, the big bang theory of the origin of the universe, black holes, dark matter, and dark energy of the universe. Why the sun shines. Cosmology and inflation. GER: DB-NatSci

3 units, Aut (Kallosh, R)

**PHYSICS 87N. The Physics of One: Nanoscale Science and Technology**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Contemporary interdisciplinary research in nanoscience and

nanotechnology; the manipulation of nature's fundamental building blocks. Accomplishments and questions engendered by knowledge at the discrete limit of matter. Prerequisite: high school physics. GER: DB-NatSci

3 units, Spr (Goldhaber-Gordon, D)

**PHYSICS 91SI. PRACTICAL COMPUTING FOR SCIENTISTS**

Essential tools for researchers in the natural sciences. Helping students transition their computing skills from a classroom to a research environment. Topics include UNIX command line scripting, the Python programming language, version control with Mercurial, unit tests, data analysis and regular expressions, with more advanced topics as time allows. We will assume some experience with programming at the CS106A level or equivalent. Enrollment limited.

2 units, ONCEONLY

**PHYSICS 92SI. Physics of the Circus**

Investigate the physics behind circus acts including juggling, unicycling, tightrope walking and slacklining, trapeze swinging, cigar boxes, and diabolo. In addition to learning the math and mechanics behind these arts, students will learn the arts themselves, and for a final project will choose one art to practice and eventually present to the rest of the class. The course seeks to give students an appreciation of the circus from both a physics perspective and firsthand experience

2 units, ONCEONLY

**PHYSICS 100. Introduction to Observational and Laboratory Astronomy**

Designed for undergraduate physics majors but open to all students with a calculus-based physics background and some laboratory experience. Students make and analyse observations using telescopes at the Stanford Student Observatory. Topics include navigating the night sky, the physics of stars and galaxies, telescope instrumentation and operation, quantitative error analysis, and effective scientific communication. Limited enrollment. Prerequisites: prior completion of Physics 40 or 60 series. GER: DB-NatSci

4 units, Spr (Allen, S)

**PHYSICS 105. Intermediate Physics Laboratory I: Analog Electronics**

Analog electronics including Ohm's law, passive circuits and transistor and op amp circuits, emphasizing practical circuit design skills to prepare undergraduates for laboratory research. Short design project. Minimal use of math and physics, no electronics experience assumed beyond introductory physics. Prerequisite: PHYSICS 43 or 63.

3 units, Aut (Pam, R)

**PHYSICS 107. Intermediate Physics Laboratory II: Experimental Techniques and Data Analysis**

Experiments on lasers, Gaussian optics, and atom-light interaction, with emphasis on data and error analysis techniques. Students describe a subset of experiments in scientific paper format. Prerequisites: completion of 40 or 60 series, and 70 and 105. Recommended: 130, prior or concurrent enrollment in 120. WIM

4 units, Win (Kasevich, M)

**PHYSICS 108. Advanced Physics Laboratory: Project**

Small student groups plan, design, build, and carry out a single experimental project in low-temperature physics. Prerequisites 105, 107.

4 units, Win (Osheroff, D), Spr (Kuo, C)

**PHYSICS 110. Intermediate Mechanics**

Lagrangian and Hamiltonian mechanics. Principle of least action, Galilean relativity, Lagrangian mechanical systems, Euler-Lagrange equations. Central potential, Kepler's problem, planetary motion. Scattering problems, disintegration, Rutherford scattering cross section. Harmonic motion in the presence of rapidly oscillating field. Poisson's brackets, canonical transformations, Liouville's theorem, Hamilton-Jacoby equation. Prerequisites: 41 or 61, and MATH 53

4 units, Spr (Gratta, G)

**PHYSICS 112. Mathematical Methods of Physics**

Theory of complex variables, complex functions, and complex analysis. Fourier series and Fourier transforms. Special functions such as Laguerre, Legendre, and Hermite polynomials, and Bessel

functions. The uses of Green's functions. Covers material of MATH 106 and 132 most pertinent to Physics majors. Prerequisites: MATH 50 or 50H series, and MATH 131P or MATH 173.

4 units, Win (Kallosh, R)

### PHYSICS 113. Computational Physics

Numerical methods for solving problems in mechanics, electromagnetism, quantum mechanics, and statistical mechanics. Methods include numerical integration; solutions of ordinary and partial differential equations; solutions of the diffusion equation, Laplace's equation and Poisson's equation with relaxation methods; statistical methods including Monte Carlo techniques; matrix methods and eigenvalue problems. Short introduction to MatLab, used for class examples; class projects may be programmed in any language such as C. Prerequisites: MATH 53, prior or concurrent registration in 120. Previous programming experience not required. GER: DB-NatSci

4 units, Win (Franklin, J)

### PHYSICS 120. Intermediate Electricity and Magnetism I

(First in a two-part series: 120,121.) Vector analysis. Electrostatic fields, including boundary-value problems and multipole expansion. Dielectrics, static and variable magnetic fields, magnetic materials. Maxwell's equations. Prerequisites: PHYSICS 43 or 63; MATH 52 and 53. Pre- or corequisite: MATH 131P or MATH 173. Recommended corequisite: PHYSICS 112.

4 units, Win (Kahn, S)

### PHYSICS 121. Intermediate Electricity and Magnetism

(Second in a two-part series: 120,121.) Conservation laws and electromagnetic waves, Poynting's theorem, tensor formulation, potentials and fields. Plane wave problems (free space, conductors and dielectric materials, boundaries). Dipole and quadrupole radiation. Special relativity and transformation between electric and magnetic fields. Prerequisites: PHYSICS 120 and MATH 131P or MATH 173; Recommended: PHYSICS 112.

4 units, Spr (Hewett, J)

### PHYSICS 130. Quantum Mechanics

(First in a two part series: 130,131.) The origins of quantum mechanics and wave mechanics. Schrödinger equation and solutions for one-dimensional systems. Commutation relations. Generalized uncertainty principle. Time-energy uncertainty principle. Separation of variables and solutions for three-dimensional systems, application to hydrogen atom. Spherically symmetric potentials and angular momentum eigenstates. Spin angular momentum. Prerequisites: PHYSICS 65 or 70, and 110. Pre- or corequisites: PHYSICS 120, 121, and MATH 131P or MATH 173.

4 units, Aut (Burchat, P)

### PHYSICS 131. Quantum Mechanics II

(Second in a two-part series: 130,131.) Addition of angular momentum. Identical particles; Fermi and Bose statistics. Time-independent perturbation theory. Fine structure, the Zeeman effect and hyperfine splitting in the hydrogen atom. Variational principle. Prerequisite: PHYSICS 130. Pre- or corequisites: PHYSICS 120, 121, and MATH 131P or MATH 173.

4 units, Win (Blandford, R)

### PHYSICS 134. Advanced Topics in Quantum Mechanics

Time-dependent perturbation theory. Scattering theory, partial wave expansion, Born approximation. Additional topics may include WKB approximation; structure of multi-electron atoms (Hartree-Fock); nature of quantum measurement, EPR paradox and Bell's inequality; relativistic quantum mechanics (Dirac equation); quantum information science. Prerequisites: PHYSICS 130, 131.

4 units, Spr (Peskin, M)

### PHYSICS 150. Physics of the Cell Phone

(Same as PHYSICS 250) This course surveys the physics involved in present-day high technology, as prototyped by a common cell phone. Specific technical topics covered include semiconduction, optical sensing, organic optics, flash memory, light-emitting diodes, twisted liquid crystals, mechanical transducers, radio detection and transmission, and Li-ion batteries. This is fundamentally a writing course. Its chief requirement is the delivery of two short written reports on topics chosen by students and released by them for use on the Internet. Examples of such reports may be found at

<http://large.stanford.edu/courses/2010/ph240>. The material is designed to be broadly accessible. Students outside physics are encouraged to enroll, as are undergraduates. There are no formal prerequisites. A strong background in undergraduate-level quantum mechanics, electromagnetism and statistical mechanics is desirable, and some familiarity with solid state physics is also helpful.

3 units, Spr (Laughlin, R)

### PHYSICS 152A. Introduction to Particle Physics I

(Same as PHYSICS 252A) Elementary particles and the fundamental forces. Quarks and leptons. The mediators of the electromagnetic, weak and strong interactions. Interaction of particles with matter; particle acceleration, and detection techniques. Symmetries and conservation laws. Bound states. Decay rates. Cross sections. Feynman diagrams. Introduction to Feynman integrals. The Dirac equation. Feynman rules for quantum electrodynamics and for chromodynamics. Prerequisite: 130. Pre- or corequisite: 131.

3 units, Spr (Dimopoulos, S)

### PHYSICS 152B. Introduction to Particle Physics II

(Same as PHYSICS 252B) Discoveries and observations in experimental particle physics and relation to theoretical developments. Asymptotic freedom. Charged and neutral weak interactions. Electroweak unification. Weak isospin. Gauge theories, spontaneous symmetry breaking and the Higgs mechanism. Quark and lepton mixing. CP violation. Neutrino oscillations. Prerequisites: 152 or 152A, 130, 131.

3 units, not given this year

### PHYSICS 153A. Introduction to String Theory, Quantum Gravity, and Black Holes

This course will begin with a basic introduction to the physics and mathematics of string theory and its relation to gravity. Following that we will study the quantum mechanics of black holes, and how string theory has impacted our understanding of these extreme gravitational objects. Prerequisites: 130 and 131.

4 units, Win (Susskind, L)

### PHYSICS 160. Introduction to Stellar and Galactic Astrophysics

Observed characteristics of stars and the Milky Way galaxy. Physical processes in stars and matter under extreme conditions. Structure and evolution of stars from birth to death. White dwarfs, planetary nebulae, supernovae, neutron stars, pulsars, binary stars, x-ray stars, and black holes. Galactic structure, interstellar medium, molecular clouds, HI and HII regions, star formation, and element abundances. Prerequisites: 40 or 60 series, and 70.

3 units, Win (Romani, R)

### PHYSICS 161. Introduction to Extragalactic Astrophysics and Cosmology

Observations of the distances and compositions of objects on cosmic scales: galaxies, galaxy clusters, quasars, and diffuse matter at high red shift. Big bang cosmology, physical processes in the early universe, the origin of matter and the elements, inflation, and creation of structure in the Universe. Observational evidence for dark matter and dark energy. Future of the Universe. Prerequisites: calculus and college physics at the level of the 40 or 60 series, and 70.

3 units, Spr (Church, S)

### PHYSICS 169A. Independent Study in Astrophysics and Honors Thesis: Selection of the Problem

Description of the problem, its background, work planned in the subsequent two quarters, and development of the theoretical apparatus or initial interpretation of the problem.

1-9 units, Aut (Staff)

### PHYSICS 169B. Independent Study in Astrophysics and Honors Thesis: Continuation of Project

Substantial completion of the required computations or data analysis for the research project selected.

1-9 units, Win (Staff)

### PHYSICS 169C. Independent Study in Astrophysics and Honors Thesis: Completion of Project

Completion of research and writing of a paper presenting methods used and results.

1-9 units, Spr (Staff)

**PHYSICS 170. Thermodynamics, Kinetic Theory, and Statistical Mechanics I**

(First in a two-part series: 170,171.) Basic probability and statistics for random processes such as random walks. The derivation of laws of thermodynamics from basic postulates; the determination of the relationship between atomic substructure and macroscopic behavior of matter. Temperature; equations of state, heat, internal energy, equipartition; entropy, Gibbs paradox; equilibrium and reversibility, heat engines; applications to various properties of matter; absolute zero and low temperature phenomena. Distribution functions, fluctuations, the partition function for classical and quantum systems, irreversible processes. Pre- or corequisite: PHYSICS 130.

4 units, Aut (Kivelson, S)

**PHYSICS 171. Thermodynamics, Kinetic Theory, and Statistical Mechanics II**

(Second in a two-part series: 170,171.) Maxwell-Boltzmann distribution, Debye model and phonons. Transport phenomena, fluctuations, equilibrium between phases, phase changes, Bose-Einstein condensation, and the electron gas. Cooperative phenomena including ferromagnetism, the Ising model, and lattice gas. Irreversible processes. Prerequisite: PHYSICS 170. Pre- or corequisite: PHYSICS 131.

4 units, Win (Zhang, S)

**PHYSICS 172. Solid State Physics**

(Same as APPPHYS 272) Introduction to the properties of solids. Crystal structures and bonding in materials. Momentum-space analysis and diffraction probes. Lattice dynamics, phonon theory and measurements, thermal properties. Electronic structure theory, classical and quantum; free, nearly-free, and tight-binding limits. Electron dynamics and basic transport properties; quantum oscillations. Properties and applications of semiconductors. Reduced-dimensional systems. Undergraduates should register for PHYSICS 172 and graduate students for APPPHYS 272. Prerequisites: PHYSICS 170 and 171, or equivalents.

3 units, Spr (Manoharan, H; Hwang, H)

**PHYSICS 190. Independent Research and Study**

Undergraduate research in experimental or theoretical physics under the supervision of a faculty member. Prerequisites: superior work as an undergraduate Physics major and consent of instructor.

1-9 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**PHYSICS 204A. Seminar in Theoretical Physics**

This course plans to give a basic introduction to topological insulators and superconductors. Graduates students and postdocs are welcome to attend the class. The course materials will be based on a recent review article on the subject by Qi and Zhang, to be published in Review of Modern Physics. Basic knowledge in quantum mechanics and solid state physics is required. Prerequisites: 130, 172.

3 units, Win (Zhang, S)

**PHYSICS 204B. Seminar in Theoretical Physics**

Topics including quantum computing, Berry phase, and quantum Hall effect. May be repeated for credit.

3 units, Win (Doniach, S)

**PHYSICS 205. Senior Thesis Research**

Long-term experimental or theoretical project and thesis in Physics under supervision of a faculty member. Planning of the thesis project is recommended to begin as early as middle of the junior year. Successful completion of a senior thesis requires a minimum of 3 units for a letter grade completed during the senior year, along with the other formal thesis and physics major requirements. Students doing research for credit prior to senior year should sign up for Physics 190. Prerequisites: superior work as an undergraduate Physics major and approval of the thesis application.

1-12 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**GRADUATE COURSES IN PHYSICS**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**PHYSICS 210. Advanced Particle Mechanics**

The Lagrangian and Hamiltonian dynamics of particles. Beyond small oscillations. Phase portraits, Hamilton-Jacobi theory, action-

angle variables, adiabatic invariance. Nonlinear dynamical systems, continuous and discrete. Behavior near the fixed points, stability of solutions, attractors, chaotic motion. Transition to continuum mechanics. Prerequisite: 110 or equivalent.

3 units, Aut (Goldhaber-Gordon, D)

**PHYSICS 211. Continuum Mechanics**

Elasticity, fluids, turbulence, waves, gas dynamics, shocks, and MHD plasmas. Examples from everyday phenomena, geophysics, and astrophysics.

3 units, Win (Abel, T)

**PHYSICS 212. Statistical Mechanics**

Principles, ensembles, statistical equilibrium. Thermodynamic functions, ideal and near-ideal gases. Fluctuations. Mean-field description of phase-transitions and associated critical exponents. One-dimensional Ising model and other exact solutions. Renormalization and scaling relations. Prerequisites: 130, 131, 171, or equivalents.

3 units, Spr (Kivelson, S)

**PHYSICS 216. Back of the Envelope Physics**

Techniques such as scaling and dimensional analysis, useful to make order-of-magnitude estimates of physical effects in different settings. Goals are to promote a synthesis of physics through solving problems, some not included in a standard curriculum. Applications include properties of materials, fluid mechanics, geophysics, astrophysics, and cosmology. Prerequisites: undergraduate mechanics, statistical mechanics, electricity and magnetism, and quantum mechanics.

3 units, Aut (Blandford, R)

**PHYSICS 220. Classical Electrodynamics I**

Special relativity: The principles of relativity, Lorentz transformations, four vectors and tensors, relativistic mechanics and the principle of least action. Lagrangian formulation, charges in electromagnetic fields, gauge invariance, the electromagnetic field tensor, covariant equations of electrodynamics and mechanics, four-current and continuity equation. Noether's theorem and conservation laws, Poynting's theorem, stress-energy tensor. Constant electromagnetic fields: conductors and dielectrics, magnetic media, electric and magnetic forces, and energy. Electromagnetic waves: Plane and monochromatic waves, spectral resolution, polarization, electromagnetic properties of matter, dispersion relations, wave guides and cavities. Prerequisites: PHYSICS 121 and 210, or equivalent; MATH 106 or 116, and 132 or equivalent.

3 units, Win (Senatore, L)

**PHYSICS 221. Classical Electrodynamics II**

Electromagnetic waves in dielectric and conducting materials, causality and analyticity, negative index of refraction and metamaterials. Waveguides and cavities, nonlinear solitons and optical fibers. Maxwell's equations in fluids: hydromagnetics, bulk and surface plasmons, plasmonics. Non-relativistic radiation: dipole and quadrupole radiation, scattering and diffraction. Spherical solutions for vector wave equation. Energy loss of moving particles in a medium, Cherenkov radiation. Relativistic radiation: Liénard-Wiechert potential, angular and frequency distribution, synchrotron radiation. Prerequisites: PHYSICS 220; MATH 106 or 116, and 132 or equivalent.

3 units, Spr (Senatore, L)

**PHYSICS 230. Quantum Mechanics**

Fundamental concepts. Introduction to Hilbert spaces and Dirac's notation. Postulates applied to simple systems, including those with periodic structure. Symmetry operations and gauge transformation. The path integral formulation of quantum statistical mechanics. Problems related to measurement theory. The quantum theory of angular momenta and central potential problems. Prerequisite: 131 or equivalent.

3 units, Aut (Shenker, S)

**PHYSICS 231. Quantum Mechanics**

Basis for higher level courses on atomic solid state and particle physics. Wigner-Eckart theorem and addition of angular momenta. Approximation methods for time-independent and time-dependent perturbations. Semiclassical and quantum theory of radiation, second quantization of radiation and matter fields. Systems of identical particles and many electron atoms and molecules. Prerequisite: 230.

3 units, Win (Hartnoll, S)

### PHYSICS 232. Quantum Mechanics

Special topics. Elementary excitations in solids (the free electron gas, electronic band structure, phonons). Elementary scattering theory (Born approximation, partial wave analyses, resonance scattering). Relativistic single-particle equations. Dirac equation applied to central potentials, relativistic corrections, and nonrelativistic limits.

3 units, Spr (Shenker, S)

### PHYSICS 240. Introduction to the Physics of Energy

Energy as a consumable. Forms and interconvertability. World joule budget. Equivalents in rivers, oil pipelines and nuclear weapons. Quantum mechanics of fire, batteries and fuel cells. Hydrocarbon and hydrogen synthesis. Fundamental limits to mechanical, electrical and magnetic strengths of materials. Flywheels, capacitors and high pressure tanks. Principles of AC and DC power transmission. Impossibility of pure electricity storage. Surge and peaking. Solar constant. Photovoltaic and thermal solar conversion. Physical limits on agriculture.

3 units, Aut (Laughlin, R)

### PHYSICS 241. Introduction to Nuclear Energy

Radioactivity. Elementary nuclear processes. Energetics of fission and fusion. Cross-sections and resonances. Fissionable and fertile isotopes. Neutron budgets. Light water, heavy water and graphite reactors. World nuclear energy production. World reserves of uranium and thorium. Plutonium, reprocessing and proliferation. Half lives of fission decay products and actinides made by neutron capture. Nuclear waste. Three Mile Island and Chernobyl. Molten sodium breeders. Generation-IV reactors. Inertial confinement and magnetic fusion. Laser compression. Fast neutron production and fission-fusion hybrids. PREREQUISITES: Strong undergraduate background in elementary chemistry and physics. PH240 and PH252A recommended but not required. Interested undergraduates encouraged to enroll, with permission of instructor.

3 units, Win (Laughlin, R)

### PHYSICS 250. Physics of the Cell Phone

(Same as PHYSICS 150) This course surveys the physics involved in present-day high technology, as prototyped by a common cell phone. Specific technical topics covered include semiconductor, optical sensing, organic optics, flash memory, light-emitting diodes, twisted liquid crystals, mechanical transducers, radio detection and transmission, and Li-ion batteries. This is fundamentally a writing course. Its chief requirement is the delivery of two short written reports on topics chosen by students and released by them for use on the Internet. Examples of such reports may be found at <http://large.stanford.edu/courses/2010/ph240>. The material is designed to be broadly accessible. Students outside physics are encouraged to enroll, as are undergraduates. There are no formal prerequisites. A strong background in undergraduate-level quantum mechanics, electromagnetism and statistical mechanics is desirable, and some familiarity with solid state physics is also helpful.

3 units, Spr (Laughlin, R)

### PHYSICS 252A. Introduction to Particle Physics I

(Same as PHYSICS 152A) Elementary particles and the fundamental forces. Quarks and leptons. The mediators of the electromagnetic, weak and strong interactions. Interaction of particles with matter; particle acceleration, and detection techniques. Symmetries and conservation laws. Bound states. Decay rates. Cross sections. Feynman diagrams. Introduction to Feynman integrals. The Dirac equation. Feynman rules for quantum electrodynamics and for chromodynamics. Prerequisite: 130. Pre- or corequisite: 131.

3 units, Spr (Dimopoulos, S)

### PHYSICS 252B. Introduction to Particle Physics II

(Same as PHYSICS 152B) Discoveries and observations in experimental particle physics and relation to theoretical developments. Asymptotic freedom. Charged and neutral weak interactions. Electroweak unification. Weak isospin. Gauge theories, spontaneous symmetry breaking and the Higgs mechanism. Quark and lepton mixing. CP violation. Neutrino oscillations. Prerequisites: 152 or 152A, 130, 131.

3 units, not given this year

### PHYSICS 260. Introduction to Astrophysics and Cosmology

The observed properties and theoretical models of stars, galaxies, and the universe. Physical processes for production of radiation from cosmic sources. Observations of cosmic microwave background radiation. Newtonian and general relativistic models of the universe. Physics of the early universe, nucleosynthesis, baryogenesis, nature of dark matter and dark energy and inflation. Prerequisites: 110, 121, and 171, or equivalents.

3 units, Aut (Petrosian, V)

### PHYSICS 262. Introduction to Gravitation

Introduction to general relativity. Curvature, energy-momentum tensor, Einstein field equations. Weak field limit of general relativity. Black holes, relativistic stars, gravitational waves, cosmology. Prerequisite: 121 or equivalent including special relativity.

3 units, Spr (Kallos, R)

### PHYSICS 275. Electrons in Nanostructures

The behavior of electrons in metals or semiconductors at length scales below 1 micron, smaller than familiar macroscopic objects but larger than atoms. Ballistic transport, Coulomb blockade, localization, quantum mechanical interference, and persistent currents. Topics may include quantum Hall systems, graphen, spin transport, spin-orbit coupling in nanostructures, magnetic tunnel junctions, Kondo systems, and 1-dimensional systems. Readings focus on the experimental research literature, and recent texts and reviews. Prerequisite: undergraduate quantum mechanics and solid state physics.

3 units, Win (Goldhaber-Gordon, D)

### PHYSICS 290. Research Activities at Stanford

Required of first-year Physics graduate students; suggested for junior or senior Physics majors for 1 unit. Review of research activities in the department and elsewhere at Stanford at a level suitable for entering graduate students.

1-3 units, Aut (Abel, T)

### PHYSICS 291. Practical Training

Opportunity for practical training in industrial labs. Arranged by student with the research adviser's approval. A brief summary of activities is required, approved by the research adviser.

3 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### PHYSICS 293. Literature of Physics

Study of the literature of any special topic. Preparation, presentation of reports. If taken under the supervision of a faculty member outside the department, approval of the Physics chair required. Prerequisites: 25 units of college physics, consent of instructor.

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### PHYSICS 294. Teaching of Physics Seminar

Required of all first-year Physics graduate students, plus other Teaching Assistants who are teaching Physics courses for the first time. Weekly seminar/discussions. Techniques for teaching physics, especially through interactive engagement. Review of Physics Education Research results. Simulated teaching situations. In-class observations and practice teaching.

1 unit, Aut (Pam, R)

### PHYSICS 301. Astrophysics Laboratory

Open to all graduate students with a calculus-based physics background and some laboratory experience. Students make and analyze observations using telescopes at the Stanford Student Observatory. Topics include navigating the night sky, the physics of stars and galaxies, telescope instrumentation and operation, quantitative error analysis, and effective scientific communication. The course also introduces a number of hot topics in astrophysics and cosmology. Limited enrollment.

3 units, not given this year

### PHYSICS 312. Basic Plasma Physics

For the nonspecialist who needs a working knowledge of plasma physics for space science, astrophysics, fusion, or laser applications. Topics: orbit theory, the Boltzmann equation, fluid equations, MHD waves and instabilities, EM waves, the Vlasov theory of ES waves and instabilities including Landau damping and quasilinear theory, the Fokker-Planck equation, and relaxation processes. Advanced topics in resistive instabilities and particle acceleration. Prerequisite: 210 and 220, or consent of instructor.

3 units, Spr (Petrosian, V)

**PHYSICS 321. Laser Spectroscopy**

Theoretical concepts and experimental techniques. Absorption, dispersion, Kramers-Kronig relations, line-shapes. Classical and laser linear spectroscopy. Semiclassical theory of laser atom interaction: time-dependent perturbation theory, density matrix, optical Bloch equations, coherent pulse propagation, multiphoton transitions. High-resolution nonlinear laser spectroscopy: saturation spectroscopy, polarization spectroscopy, two-photon and multiphoton spectroscopy, optical Ramsey spectroscopy. Phase conjugation. Four-wave mixing, harmonic generation. Coherent Raman spectroscopy, quantum beats, ultra-sensitive detection. Prerequisite: 230. Recommended: 231.

3 units, not given this year

**PHYSICS 323. Laser Cooling and Trapping**

Principles of laser cooling and atom trapping. Optical forces on atoms, forms of laser cooling, atom optics and atom interferometry, ultra-cold collisions, and introduction to Bose condensation of dilute gases. Emphasis is on the development of the general formalisms that treat these topics. Applications of the cooling and trapping techniques: atomic clocks, internal sensors, measurements that address high-energy physics questions, many-body effects, polymer science, and biology. Prerequisite: 231 or equivalent.

3 units, not given this year

**PHYSICS 330. Quantum Field Theory**

Quantization of scalar and Dirac fields. Introduction to supersymmetry. Feynman diagrams. Quantum electrodynamics. Elementary electrodynamic processes: Compton scattering; e<sup>+</sup>e<sup>-</sup> annihilation. Loop diagrams and electron (g-2). Prerequisites: 130, 131, or equivalents.

3 units, Aut (Devereaux, T)

**PHYSICS 331. Quantum Field Theory**

Functional integral methods. Local gauge invariance and Yang-Mills fields. Asymptotic freedom. Spontaneous symmetry breaking and the Higgs mechanism. Unified models of weak and electromagnetic interactions. Prerequisite: 330.

3 units, Win (Silverstein, E)

**PHYSICS 332. Quantum Field Theory**

Theory of renormalization. The renormalization group and applications to the theory of phase transitions. Renormalization of Yang-Mills theories. Applications of the renormalization group of quantum chromodynamics. Perturbation theory anomalies. Applications to particle phenomenology. Prerequisite: PHYSICS 330.

3 units, Spr (Silverstein, E)

**PHYSICS 351. Standard Model of Particle Physics**

Symmetries, group theory, gauge invariance, Lagrangian of the Standard Model, flavor group, flavor-changing neutral currents, CKM quark mixing matrix, GIM mechanism, rare processes, neutrino masses, seesaw mechanism, QCD confinement and chiral symmetry breaking, instantons, strong CP problem, QCD axion. Prerequisite: Physics 330; Physics 331 and 332 recommended.

3 units, Win (Dimopoulos, S)

**PHYSICS 360. Physics of Astrophysics**

Theoretical concepts and tools for modern astrophysics. Radiation transfer equations; emission, scattering, and absorption mechanisms: Compton, synchrotron and bremsstrahlung processes; photoionization and line emission. Equations of state of ideal, interacting, and degenerate gasses. Application to astrophysical sources such as HII regions, supernova remnants, cluster of galaxies, and compact sources such as accretion disks, X-ray, gamma-ray, and radio sources. Prerequisites: 121, 171 or equivalent.

3 units, Win (Petrosian, V)

**PHYSICS 361. Stellar and Galactic Astrophysics**

Astronomical data on stars, star clusters, interstellar medium, and the Milky Way galaxy. Theory of stellar structure; hydrostatic equilibrium, radiation balance, and energy production. Stellar formation, Jean's mass, and protostars. Evolution of stars to the main sequence and beyond to red giants, white dwarfs, neutron stars, and black holes. Supernovae and compact sources. Structure of the Milky Way: disk and spiral arms; dark matter and the halo mass; central bulge or bar; and black hole. Prerequisite: 221 or equivalent. Recommended: 260, 360.

3 units, NEXTYEAR

**PHYSICS 362. Advanced Extragalactic Astrophysics and Cosmology**

Observational data on the content and activities of galaxies, the content of the Universe, cosmic microwave background radiation, gravitational lensing, and dark matter. Models of the origin, structure, and evolution of the Universe based on the theory of general relativity. Test of the models and the nature of dark matter and dark energy. Physics of the early Universe, inflation, baryosynthesis, nucleosynthesis, and galaxy formation. Prerequisites: PHYSICS 210, 211, and 260 or 360.

3 units, Aut (Kuo, C)

**PHYSICS 363. Solar and Solar-Terrestrial Physics**

Structure, mechanisms, and properties of the Sun's interior and atmosphere. Tools for solar observations; magnetic fields and polarimetry. Solar oscillations and helioseismology. Differential rotation and turbulent convection. Solar MHD, Alfven and magneto-acoustic waves. Solar cycle and dynamo. Magnetic energy release, reconnection, particle acceleration. Solar activity, sunspots, flares, coronal mass ejections; UV, X-ray, and high-energy particle emissions. The interaction of the solar wind with Earth's magnetosphere and its terrestrial effects; space weather. Prerequisite: 221 or equivalent.

3 units, not given this year

**PHYSICS 364. Advanced Gravitation**

Introduction to quantum fields in curved space-times, with applications to phenomena in cosmology and quantum gravity. Free scalar fields in curved space-time; quantum fields in an expanding universe; de Sitter space and fluctuations in inflationary cosmology; the Unruh effect; Hawking radiation and black hole thermodynamics. Recommended: 330, some familiarity with general relativity.

3 units, Spr (Hartnoll, S)

**PHYSICS 370. Theory of Many-Particle Systems**

Application of quantum field theory to the nonrelativistic, many-body problem, including methods of temperature-dependent Green's functions and canonical transformations. Theory of finite-temperature, interacting Bose and Fermi systems with applications to superfluidity, superconductivity, and electron gas. Prerequisite: 232.

3 units, not given this year

**PHYSICS 372. Condensed Matter Theory I**

Fermi liquid theory, many-body perturbation theory, response function, functional integrals, interaction of electrons with impurities. Prerequisite: APPPHYS 273 or equivalent.

3 units, Win (Qi, X)

**PHYSICS 373. Condensed Matter Theory II**

Superfluidity and superconductivity. Quantum magnetism. Prerequisite: 372.

3 units, Spr (Qi, X)

**PHYSICS 376. Superfluidity and Superconductivity**

Introduction to superfluid He: two-fluid model, phonons, and rotons, Feynman description, vortices, Bogoliubov theory. Phenomenology of superconductors: London description, Ginzburg-Landau model, type-I vs. type-II materials, Josephson effects, thin films, Kosterlitz-Thouless behavior, electron-phonon coupling. BCS theory: bulk systems, tunneling, strong-coupling materials, dirty and gapless superconductivity, fluctuation effects, Ginzburg criterion. Recommended: APPPHYS 272, 273, or equivalents.

3 units, not given this year

**PHYSICS 450. Primordial Cosmology**

Early universe cosmology. Overview of the thermal history of the universe, big bang nucleosynthesis, and the physics of recombination and the CMB. Inflationary cosmology and generation of density perturbations. Ultraviolet sensitivity of inflation and its CMB predictions to Planck-suppressed operators, mechanisms for inflation in the context of string theory, and their observational signatures. Wilsonian naturalness arguments and shift symmetries; axion inflation in field theory and string theory as a case study. Overview of the relevant upcoming measurements from satellite and ground-based detectors. Recommended prerequisites: PHYSICS 262, 330, 331, 332

3 units, Aut (Linde, A)



**PHYSICS 451. Topics in String Theory**

We will cover a few different topics in string theory, each in a mini-course of 4-8 lectures. Likely topics include string compactifications and 4d physics; string theory and black holes; AdS/CFT correspondence and its applications to strongly coupled gauge theories and condensed matter systems. Prereqs: Physics 262, 330

3 units, Win (Kachru, S)

**PHYSICS 452. Physics Beyond the Standard Model**

A general introduction to what we know and don't know about physics beyond the Standard Model. In particular, the implications of results from the LHC, dark matter, astrophysical, and cosmological experiments. Theories of physics beyond the Standard Model including supersymmetry and its many variants, the axion, large extra dimensions, and theories of flavor. Discussion of the problems with the Standard Model including naturalness and the hierarchy, cosmological constant, and flavor problems. Prerequisites: PHYSICS 330, 331, 332, 351

3 units, Spr (Graham, P)

**PHYSICS 453B. The Renormalization Group Perspective on Physics**

This course outlines the basic concepts of the Renormalization Group and illustrates them with examples. It begins with a philosophical overview, then turns to the ideas of block spins, fixed points and universality. Then the gaussian model, the epsilon and 1/N expansions and Kosterlitz Thouless theory are explained. Prerequisites: Physics 212 or equivalent.

3 units, Win (Kivelson, S; Shenker, S)

**PHYSICS 463. Special Topics in Astrophysics: Theoretical Cosmology**

The application of general relativity to physical phenomena associated with spinning black holes and neutron stars to provide illustrations and tests of the theory of strong field gravity. Topics include: stationary axisymmetric metrics and stellar structure, orbits and rays, accretion disks, stellar companions, electromagnetic effects, gravitational radiation. Emphasis is on developing practical calculational techniques. Prerequisite: PHYSICS 262 or equivalent.

3 units, not given this year

**PHYSICS 490. Research**

Open only to Physics graduate students, with consent of instructor. Work is in experimental or theoretical problems in research, as distinguished from independent study of a non-research character in 190 and 293.

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**PHYSICS 801. TGR Project**

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**PHYSICS 802. TGR Dissertation**

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

## POLITICAL SCIENCE (POLISCI) COURSES

### UNDERGRADUATE COURSES IN POLITICAL SCIENCE

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**POLISCI 1. Introduction to International Relations**

(Same as INTNLREL 1) Approaches to the study of conflict and cooperation in world affairs. Applications to war, terrorism, trade policy, the environment, and world poverty. Debates about the ethics of war and the global distribution of wealth. GER:DB-SocSci

5 units, Spr (Fearon, J)

**POLISCI 2. Introduction to American National Government and Politics**

(Same as AMSTUD 2) The role and importance of the ideal of democracy in the evolution of the American political system. American political institutions (the Presidency, Congress, and the

Court) and political processes (the formation of political attitudes and voting) are examined against the backdrop of American culture and political history. The major areas of public policy in the current practice of the ideal of democracy. GER:DB-SocSci

5 units, Win (Fiorina, M; Frisby, T)

**POLISCI 3P. Justice**

(Same as ETHICSOC 171, IPS 208, PHIL 171, PHIL 271, POLISCI 136S) Focus is on the ideal of a just society, and the place of liberty and equality in it, in light of contemporary theories of justice and political controversies. Topics include protecting religious liberty, financing schools and elections, regulating markets, assuring access to health care, and providing affirmative action and group rights. Issues of global justice including human rights and global inequality. GER:DB-Hum, EC-EthicReas

4-5 units, Aut (Dougherty, T)

**POLISCI 4. Introduction to Comparing Political Systems**

Politics in major regime types including democratic, authoritarian, and communist; how types of politics affect economic development and state/society relations. GER:DB-SocSci, EC-GlobalCom

5 units, Spr (Weinstein, J)

**POLISCI 15N. Explaining Ethnic Violence**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Over the last twenty years, more than one third of all countries had a violent civil conflict ongoing in which at least 1,000 people had died. More than half of these conflicts killed tens of thousands and produced massive refugee flows, and some caused mass starvation. Analysts describe the violence in many of these conflicts as ethnic and the parties to the violence as ethnic groups. In ordinary language, however, the term ethnic violence can be used to refer to an extraordinary range of phenomena, from certain barroom brawls to the Nazi genocide. This course begins with an examination of the meaning of ethnic violence and related terms like ethnic group. We will consider case histories of three large-scale civil conflicts commonly described as ethnic. These case materials will then be used to work through a range of possible explanations, from the individual psychology of ethnic violence to various political, military, GER:DB-SocSci

5 units, Win (Fearon, J)

**POLISCI 24N. The Politics of Communication**

(F,Sem) Stanford Introductory Seminar. This course will explore how elected officials present and explain their work to constituents and how this communication shapes American politics. Elected officials use press releases, newsletters, press conferences, and public events to connect with their constituents. While almost none of this communication is formally required, it can have important consequences on what elected officials do in office and how constituents perceive their representatives' activities. We will explore the strategies elected officials use when communicating with constituents and identify the consequences of these strategies on the process of representation. GER:DB-SocSci

3 units, Win (Grimmer, J)

**POLISCI 24Q. Law and Order**

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. The role of law in promoting social order. What is the rule of law? How does it differ from the rule of men? What institutions best support the rule of law? Is a state needed to ensure that laws are enforced? Should victims be allowed to avenge wrongs? What is the relationship between justice and mercy? GER:DB-SocSci

3 units, Aut (Rutten, A)

**POLISCI 25N. The US Congress in Historical and Comparative Perspective**

(F,Sem) Stanford Introductory Seminar. This course traces the development of legislatures from their medieval European origins to the present, with primary emphasis on the case of the U.S. Congress. Students will learn about the early role played by assemblies in placing limits on royal power, especially via the power of the purse. About half the course will then turn to a more detailed consideration of the U.S. Congress's contemporary performance, analyzing how that performance is affected by procedural legacies from the past that affect most democratic legislatures worldwide. GER:DB-SocSci

3 units, Spr (Cox, G)



**POLISCI 26N. American Transportation Politics**

(F,Sem) Stanford Introductory Seminar. Politics has been defined as who gets what, when, and how. In the process of resolving this question, the political process also ends up deciding who goes where, and how. This course will draw upon American debates over transportation policy to guide an exploration of major research themes in American politics. We'll examine how American transportation controversies from debates over 19th century canal financing to the 21st-century fight over high-speed rail have cast into relief the major problems that shape decision making in a representative democracy. GER:DB-SocSci

3 units, Aut (Nall, C)

**POLISCI 43N. Oil, Regime Change, and Conflict**

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Relationships among dependence on oil export, democratization and authoritarian rule, and rising conflict. Case studies including Venezuela, Nigeria, Iran, Iraq, Chad, and Indonesia. The resource curse: the impact of oil on a country's political economy. The relationship between such economic dependence and regime type. Why oil exporting countries are more prone to conflict and civil war than other countries. Research paper. GER:DB-SocSci

5 units, Win (Karl, T)

**POLISCI 110C. America and the World Economy**

(Same as INTNLREL 110C, POLISCI 110X) Examination of contemporary US foreign economic policy. Areas studied: the changing role of the dollar; mechanism of international monetary management; recent crises in world markets including those in Europe and Asia; role of IMF, World Bank and WTO in stabilizing world economy; trade politics and policies; the effects of the globalization of business on future US prosperity. GER:DB-SocSci

5 units, Aut (Goldstein, J)

**POLISCI 110D. War and Peace in American Foreign Policy**

(Same as INTNLREL 110D, POLISCI 110Y) (Students not taking this course for WIM, register for 110Y.) The causes of war in American foreign policy. Issues: international and domestic sources of war and peace; war and the American political system; war, intervention, and peace making in the post-Cold War period. GER:DB-SocSci, DB-SocSci

5 units, Win (Schultz, K)

**POLISCI 110X. America and the World Economy**

(Same as INTNLREL 110C, POLISCI 110C) Examination of contemporary US foreign economic policy. Areas studied: the changing role of the dollar; mechanism of international monetary management; recent crises in world markets including those in Europe and Asia; role of IMF, World Bank and WTO in stabilizing world economy; trade politics and policies; the effects of the globalization of business on future US prosperity. GER:DB-SocSci

5 units, Aut (Goldstein, J)

**POLISCI 110Y. War and Peace in American Foreign Policy**

(Same as INTNLREL 110D, POLISCI 110D) (Students not taking this course for WIM, register for 110Y.) The causes of war in American foreign policy. Issues: international and domestic sources of war and peace; war and the American political system; war, intervention, and peace making in the post-Cold War period. GER:DB-SocSci, DB-SocSci

5 units, Win (Schultz, K)

**POLISCI 114D. Democracy, Development, and the Rule of Law**

(Same as IPS 230, INTNLREL 114D, POLISCI 314D) Links among the establishment of democracy, economic growth, and the rule of law. How democratic, economically developed states arise. How the rule of law can be established where it has been historically absent. Variations in how such systems function and the consequences of institutional forms and choices. How democratic systems have arisen in different parts of the world. Available policy instruments used in international democracy, rule of law, and development promotion efforts. GER:DB-SocSci

5 units, Aut (Diamond, L; Stoner-Weiss, K)

**POLISCI 114S. International Security in a Changing World**

(Same as IPS 241) The major international and regional security problems in the modern world. Interdisciplinary faculty lecture on the political and technical issues involved in nuclear proliferation, terrorism and homeland security, civil wars and insurgencies, and future great power rivalries. GER:DB-SocSci

5 units, Win (Crenshaw, M)

**POLISCI 116. History of Nuclear Weapons**

(Same as HISTORY 103E) The development of nuclear weapons and policies. How existing nuclear powers have managed their relations with each other. How nuclear war has been avoided so far and whether it can be avoided in the future. GER:DB-SocSci

5 units, Spr (Holloway, D)

**POLISCI 118P. U.S. Relations in Iran**

The evolution of relations between the U.S. and Iran. The years after WW II when the U.S. became more involved in Iran. Relations after the victory of the Islamic republic. The current state of affairs and the prospects for the future. Emphasis is on original documents of U.S. diplomacy (White House, State Department, and the U.S. Embassy in Iran). Research paper. GER:DB-SocSci

5 units, Aut (Milani, A)

**POLISCI 120B. Campaigns, Voting, Media, and Elections**

(Same as COMM 162, COMM 262) This course examines the theory and practice of American campaigns and elections. First, we will attempt to explain the behavior of the key players -- candidates, parties, journalists, and voters -- in terms of the institutional arrangements and political incentives that confront them. Second, we will use current and recent election campaigns as laboratories for testing generalizations about campaign strategy and voter behavior. Third, we examine selections from the academic literature dealing with the origins of partisan identity, electoral design, and the immediate effects of campaigns on public opinion, voter turnout, and voter choice. As well, we'll explore issues of electoral reform and their more long-term consequences for governance and the political process. GER:DB-SocSci

4-5 units, Win (Iyengar, S)

**POLISCI 120C. American Political Institutions: Congress, the Executive Branch, and the Courts**

How politicians, once elected, work together to govern America. The roles of the President, Congress, and Courts in making and enforcing laws. Focus is on the impact of constitutional rules on the incentives of each branch, and on how they influence law. GER:DB-SocSci, DB-SocSci

5 units, Spr (Weingast, B; Bonica, A)

**POLISCI 122. Introduction to American Law**

(Same as AMSTUD 179, PUBLPOL 302A) For undergraduates. The structure of the American legal system including the courts; American legal culture; the legal profession and its social role; the scope and reach of the legal system; the background and impact of legal regulation; criminal justice; civil rights and civil liberties; and the relationship between the American legal system and American society in general. GER:DB-SocSci

3-5 units, Aut (Friedman, L)

**POLISCI 123. Politics and Public Policy**

(Same as PUBLPOL 101, PUBLPOL 201) How policies come to be formed. How interests compete within public institutions to turn ideas into policies. Examples of this process from contemporary policy areas, including tax, social welfare, and environmental policy; results evaluated using equity and efficiency criteria. Prerequisite: POLISCI 2 (or equivalent for Public Policy majors). GER:DB-SocSci

5 units, Spr (Frisby, T)

**POLISCI 124R. The Federal System: Judicial Politics and Constitutional Law**

The impact of constitutional rules on policy making in the U.S. with a focus on structural issues such as separation of powers and federalism. Topics such as: the role of unelected judges in a democracy; the rule of law; and the constitutionality of the war in Iraq. Prerequisites: 2 or equivalent, and sophomore standing. WIM GER:DB-SocSci, DB-SocSci, WIM

5 units, Win (Rutten, A)

**POLISCI 124S. Civil Liberties: Judicial Politics and Constitutional Law**

The role and participation of courts, primarily the U.S. Supreme Court, in public policy making and the political system. Judicial activity in civil liberty areas (religious liberty, free expression, race and sex discrimination, political participation, and rights of persons accused of crime). Prerequisites: 2 or equivalent, and sophomore standing. GER:DB-SocSci

5 units, Aut (Rutten, A)

**POLISCI 125S. Chicano/Latino Politics**

(Same as CHICANST 125S) The political position of Latinos and Latinas in the U.S.. Focus is on Mexican Americans, with attention to Cuban Americans, Puerto Ricans, and other groups. The history of each group in the American polity; their political circumstances with respect to the electoral process, the policy process, and government; the extent to which the demographic category Latino is meaningful; and group identity and solidarity among Americans of Latin American ancestry. Topics include immigration, education, affirmative action, language policy, and environmental justice. GER:DB-SocSci

5 units, not given this year

**POLISCI 125V. Minority Representation and the Voting Rights Act**

(Same as CSRE 125V) Focus is on whether and how racial and ethnic minorities including African Americans, Asian Americans, and Latinos are able to organize and press their demands on the political system. Topics include the political behavior of minority citizens, the strength and effect of these groups at the polls, the theory and practice of group formation among minorities, the responsiveness of elected officials, and the constitutional obstacles and issues that shape these phenomena. GER:DB-SocSci

5 units, Aut (Segura, G)

**POLISCI 128F. The Constitution: A Short History**

(Same as HISTORY 57) (Same as HISTORY 157. History majors and others taking 5 units, enroll in 157.) A broad survey of the Constitution, from its Revolutionary origins to the contemporary disputes over interpretation. Topics include the invention of the written constitution and interpretative canons; the origins of judicial review; the Civil War and Reconstruction as constitutional crises; the era of substantive due process; the rights revolution; and the Constitution in wartime. GER:DB-SocSci, EC-AmerCul

3 units, Win (Rakove, J)

**POLISCI 128S. The Constitution: A Brief History**

(Same as HISTORY 157) (Same as HISTORY 57. History majors and others taking 5 units, register for 157.) A broad survey of the Constitution, from its Revolutionary origins to the contemporary disputes over interpretation. Topics include the invention of the written constitution and interpretative canons; the origins of judicial review; the Civil War and Reconstruction as constitutional crises; the era of substantive due process; the rights revolution; and the Constitution in wartime. GER:DB-SocSci, EC-AmerCul

5 units, Win (Rakove, J)

**POLISCI 131L. Modern Political Thought**

This course offers an introduction to the history of political thought from the late fifteenth century through the nineteenth century. We will consider the changing relationship between the individual and society, the rise of consent-based forms of political authority, and the development and critiques of liberal conceptions of property. Thinkers covered will include: Machiavelli, Hobbes, Locke, Rousseau, Mill, and Marx.

5 units, Spr (McQueen, A)

**POLISCI 133. Ethics and Politics of Public Service**

(Same as CSRE 178, ETHICSOC 133, HUMBIO 178, PHIL 175A, PHIL 275A) Ethical and political questions in public service work, including volunteering, service learning, humanitarian assistance, and public service professions such as medicine and teaching. Motives and outcomes in service work. Connections between service work and justice. Is mandatory service an oxymoron? History of public service in the U.S. Issues in crosscultural service work. Integration with the Haas Center for Public Service to connect service activities and public service aspirations with academic experiences at Stanford. GER:DB-SocSci

5 units, Win (Mitchell, T)

**POLISCI 134L. Justice and the Environment**

(Same as ETHICSOC 178M, ETHICSOC 278M, PHIL 178M, PHIL 278M) Explores the normative questions that arise in environmental policy debates, including arguments over pollution permit markets, conservation regulations, and global warming mitigation efforts. What are the morally relevant ways in which the environment is different from other economic resources? How should the environment be valued? What are our obligations to conserve for future generations? How should the burdens of

conservation be distributed? Engages with a variety of philosophical traditions including utilitarianism, deep ecology, liberalism, and communitarianism. GER:EC-EthicReas

5 units, Win (Mazor, J)

**POLISCI 136R. Introduction to Global Justice**

(Same as ETHICSOC 136R, INTNLREL 136R, PHIL 76, POLISCI 336) Recent work in political theory on global justice. Topics include global poverty, human rights, fair trade, immigration, climate change. Do developed countries have a duty to aid developing countries? Do rich countries have the right to close their borders to economic immigrants? When is humanitarian intervention justified? Readings include Charles Beitz, Thomas Pogge, John Rawls.

5 units, Spr (Satz, D)

**POLISCI 136S. Justice**

(Same as ETHICSOC 171, IPS 208, PHIL 171, PHIL 271, POLISCI 3P) Focus is on the ideal of a just society, and the place of liberty and equality in it, in light of contemporary theories of justice and political controversies. Topics include protecting religious liberty, financing schools and elections, regulating markets, assuring access to health care, and providing affirmative action and group rights. Issues of global justice including human rights and global inequality. GER:DB-Hum, EC-EthicReas

4-5 units, Aut (Dougherty, T)

**POLISCI 140L. China in World Politics**

(Same as POLISCI 340L) The implications of the rise of China in contemporary world politics and for American foreign policy, including issues such as arms and nuclear proliferation, regional security arrangements, international trade and investment, human rights, environmental problems, and the Taiwan and Tibet questions. GER:DB-SocSci, EC-GlobalCom

5 units, Win (Miller, L)

**POLISCI 141. The Global Politics of Human Rights**

The global development and changing nature of human rights and the rise of an international human rights movement. Conflicts between national sovereignty and rights, and among types of rights. Case studies include genocide in Rwanda, holding torturers accountable in Chile and El Salvador, factory workers versus Nike, and the rights of women in S. Africa. GER:DB-SocSci

5 units, Win (Karl, T)

**POLISCI 148. Chinese Politics: The Transformation and the Era of Reform**

(Same as POLISCI 348) Overview of the reforms in China since 1978 that have made its economy one of the fastest growing in the world yet it still has the Chinese Communist Party at the helm wielding one party rule. Key questions addressed include the following: What has been the process and challenges of reform that have reshaped China's economic landscape? What are the political consequences of these dramatic economic changes? Why has the CCP remained strong while other communist regimes have failed? Markets have spread but what is the role of the state? What are the opportunities for political participation and prospects for political change? Materials will include readings, lectures, and selected films. This course has no prerequisites. (Graduate students register for 348.) WIM. GER:DB-SocSci, EC-GlobalCom

5 units, Aut (Oi, J)

**POLISCI 149S. Islam, Iran, and the West**

Changes in relative power and vitality of each side. The relationship in the Middle Ages revolved around power and domination, and since the Renaissance around modernity. Focus is on Muslims of the Middle East. GER:DB-SocSci, EC-GlobalCom

5 units, Win (Milani, A)

**POLISCI 149T. Middle Eastern Politics**

Topics in contemporary Middle Eastern politics including institutional sources of underdevelopment, political Islam, electoral authoritarianism, and the political economy of oil. GER:DB-SocSci

5 units, Aut (Blaydes, L)

**POLISCI 150A. Political Methodology I**

(Same as POLISCI 350A, PUBLPOL 303A) Introduction to probability and statistical inference, with applications to political science and public policy. Prerequisite: elementary calculus. GER:DB-Math

5 units, Aut (Grimmer, J)

**POLISCI 150B. Political Methodology II**

(Same as POLISCI 350B, PUBLPOL 303B) Understanding and using the linear regression model in a social-science context: properties of the least squares estimator; inference and hypothesis testing; assessing model fit; presenting results for publication; consequences and diagnosis of departures from model assumptions; outliers and influential observations, graphical techniques for model fitting and checking; interactions among exploratory variables; pooling data; extensions for binary responses. GER:DB-Math

5 units, Win (Rivers, D)

**POLISCI 150C. Political Methodology III**

(Same as POLISCI 350C) Models for discrete outcomes, time series, measurement error, and simultaneity. Introduction to nonlinear estimation, large sample theory. Prerequisite: 150B/350B.

3-5 units, Spr (Wand, J)

**POLISCI 152. Introduction to Game Theoretic Methods in Political Science**

(Same as POLISCI 352) Concepts and tools of non-cooperative game theory developed using political science questions and applications. Formal treatment of Hobbes' theory of the state and major criticisms of it; examples from international politics. Primarily for graduate students; undergraduates admitted with consent of instructor.

3-5 units, Win (Fearon, J)

**POLISCI 210. Special Topics: The Political Economy of Immigration**

The goal of this class is to explore the political economy of immigration in receiving states over the last two hundred years, with a special focus on the current debates over immigration in the US today. The course assumes some knowledge of international relations and a more limited background in economic theory and economic history. Course readings and lectures are designed to provide both a theoretical orientation and the substantive information necessary to understand and analyze a range of policy issues that now confront immigrant-receiving states.

5 units, Spr (Peters, M)

**POLISCI 212S. Ethics and War**

What ethical norms and laws influence decisions to go to war, the conduct of military operations in war, and post-war settlements and institutions? We will study the evolution of just war theory in law and in practice. What are the rules that protect civilians and noncombatants in armed conflict? How do these rules apply in non-traditional, asymmetric conflicts between states and terrorist and other non-state groups? How do we determine in which kinds of conflicts to apply the moral and legal framework that governs war? Research paper required.

5 units, Spr (Sagan, S; Weiner, A)

**POLISCI 213R. Political Economy of Financial Crisis**

(Same as POLISCI 313R) Political responses to domestic and international financial crises. Monetary and fiscal policy. The role of interest groups. International cooperation and the role of the IMF.

5 units, Spr (Lipsky, J)

**POLISCI 213S. A Post American Century? American Foreign Policy in a Multi-unipolar World**

This seminar examines recent policy from Bush to Obama in the context of two classic traditions: Wilsonianism vs. Realism. What is the role of the international system, what is the weight of domestic forces like ideology, history and identity? Prerequisite: junior or senior standing. GER:DB-SocSci

5 units, Aut (Joffe, J)

**POLISCI 214G. International Political Economy and International Organizations: Theory and Practice**

(Same as IPS 221) What is the appropriate balance between government regulation and market freedom? Introduction to important theoretical and policy debates in international political economy. Topics include: political economy of trade; exchange rate policy; the liberalization of trade and finance; the global move to openness; development, debt and aid; and the role of international organizations. Discussion of application of academic insights to key policy debates, including whether governments should offset the welfare costs of globalization, whether the IMF

and World Bank should be reformed to meet the needs of the 21st century, and how the international community should respond to financial crises. Students will research, write and orally present policy briefs on specific policy questions. GER:DB-SocSci

3-5 units, Win (Gould, E)

**POLISCI 214R. Challenges and Dilemmas in American Foreign Policy**

(Same as POLISCI 314R) This seminar will examine the complexities and trade offs involved in foreign policy decision-making at the end of the twentieth century and the dawn of the post-9/11 era. Students will analyze dilemmas confronting policymakers through case studies including post-conflict reconstruction and state-building, nuclear proliferation, democratization and peace negotiation. The seminar will conclude with a 48-hour crisis simulation. For advanced undergraduates and graduate students. Application for enrollment required. Pick up application in Political Science Department (Encina West 100).

5 units, Win (Rice, C)

**POLISCI 216E. International History and International Relations Theory**

(Same as HISTORY 202, HISTORY 306E, POLISCI 316) The relationship between history and political science as disciplines. Sources include studies by historians and political scientists on topics such as the origins of WW I, the role of nuclear weapons in international politics, the end of the Cold War, nongovernmental organizations in international relations, and change and continuity in the international system. GER:DB-SocSci

5 units, Win (Holloway, D)

**POLISCI 219. Directed Reading and Research in International Relations**

May be repeated for credit.

1-10 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**POLISCI 220R. The Presidency**

(Same as POLISCI 320R) This course provides students with a comprehensive perspective on the American presidency and covers a range of topics: elections, policy making, control of the bureaucracy, unilateral action, war-making, and much more. But throughout, the goal is to understand why presidents behave as they do, and why the presidency as an institution has developed as it has; with special attention to the dynamics of the American political system and how they condition incentives, opportunities, and power.

5 units, Win (Moe, T)

**POLISCI 224L. The Psychology of Communication About Politics in America**

(Same as COMM 164, COMM 264, PSYCH 170) Focus is on how politicians and government learn what Americans want and how the public's preferences shape government action; how surveys measure beliefs, preferences, and experiences; how poll results are criticized and interpreted; how conflict between polls is viewed by the public; how accurate surveys are and when they are accurate; how to conduct survey research to produce accurate measurements; designing questionnaires that people can understand and use comfortably; how question wording can manipulate poll results; corruption in survey research. Preference to juniors, seniors, graduate students.

4 units, Spr (Krosnick, J)

**POLISCI 226U. Approaches to American Legal History**

(Same as HISTORY 253D) Legal history, once primarily devoted to exploring legal doctrines and key judicial opinions and thus of interest mainly to legal scholars and lawyers, now resembles historical writing more generally; the study of legal ideas and practices is increasingly integrated with social, intellectual, cultural, and political history. Recent writings in American legal history; how the field reflects developments in historical writing; and how the use of legal materials affects understanding of American history.

5 units, Win (Rakove, J)

**POLISCI 229. Directed Reading and Research in American Politics**

May be repeated for credit.

1-10 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**POLISCI 230A. Classical Seminar: Origins of Political**

**Thought**

(Same as CLASSHS 133, CLASSHS 333, PHIL 176A, PHIL 276A, POLISCI 330A) Political philosophy in classical antiquity, focusing on canonical works of Thucydides, Plato, Aristotle, and Cicero. Historical background. Topics include: political obligation, citizenship, and leadership; origins and development of democracy; and law, civic strife, and constitutional change. GER:DB-Hum

4-5 units, Win (Ober, J)

**POLISCI 232T. The Dialogue of Democracy**

(Same as AMSTUD 137, COMM 137W, COMM 237, POLISCI 332T) All forms of democracy require some kind of communication so people can be aware of issues and make decisions. This course looks at competing visions of what democracy should be and different notions of the role of dialogue in a democracy. Is it just campaigning or does it include deliberation? Small scale discussions or sound bites on television? Or social media? What is the role of technology in changing our democratic practices, to mobilize, to persuade, to solve public problems? This course will include readings from political theory about democratic ideals - from the American founders to J.S. Mill and the Progressives to Joseph Schumpeter and modern writers skeptical of the public will. It will also include contemporary examinations of the media and the internet to see how those practices are changing and how the ideals can or cannot be realized. GER:EC-EthicReas

4-5 units, Win (Fishkin, J)

**POLISCI 236. Theories of Civil Society, Philanthropy, and the Nonprofit Sector**

(Same as ETHICSOC 232T) What is the basis of private action for the public good? How are charitable dollars distributed and what role do nonprofit organizations and philanthropic dollars play in a modern democracy? How do nongovernmental organizations operate domestically and globally? The historical development and modern structure of civil society emphasizing philanthropy and the nonprofit sector. Readings in political philosophy, political sociology, and public policy.

5 units, Spr (Staff)

**POLISCI 237. Models of Democracy**

(Same as COMM 212, COMM 312, POLISCI 337) Ancient and modern varieties of democracy; debates about their normative and practical strengths and the pathologies to which each is subject. Focus is on participation, deliberation, representation, and elite competition, as values and political processes. Formal institutions, political rhetoric, technological change, and philosophical critique. Models tested by reference to long-term historical natural experiments such as Athens and Rome, recent large-scale political experiments such as the British Columbia Citizens' Assembly, and controlled experiments.

3-5 units, not given this year

**POLISCI 239. Directed Reading and Research in Political Theory**

May be repeated for credit.

1-10 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**POLISCI 240C. The Comparative Political Economy of Post-Communist Transitions**

(Same as REES 340) Dominant theoretical perspectives of comparative democratization and marketization; focus is on the political economy of transition in Eastern Europe and Eurasia while comparing similar processes in Latin America and Asia. Topics include: meanings of democracy, synergy between democracies and markets, causes of the collapse of communism, paths to political liberalization and democracy, civil society, constitutions, parliaments, presidents, the rule of law, electoral systems, market requirements, strategies of reform, the Russian experience of market building, exporting democracy and the market, and foreign aid and assistance. GER:DB-SocSci

3-4 units, Aut (Staff)

**POLISCI 241S. Spatial Approaches to Social Science**

(Same as ANTHRO 130D, ANTHRO 230D) This multidisciplinary course combines different approaches to how GIS and spatial tools can be applied in social science research. We take a collaborative, project oriented approach to bring together technical expertise and substantive applications from several social

science disciplines. The course aims to integrate tools, methods, and current debates in social science research and will enable students to engage in critical spatial research and a multidisciplinary dialogue around geographic space.

5 units, Win (Rodden, J; Engel, C)

**POLISCI 242P. Politics of Corruption**

Causes, effects, and solutions to various forms of corruption in business and politics in both developing regions (e.g. Asia, E. Europe) and developed ones (the US and the EU). GER:DB-SocSci

5 units, Aut (Young, P)

**POLISCI 243L. POLITICS OF ECONOMIC REFORM**

5 units, Spr (Young, P)

**POLISCI 243T. The Politics of Globalization**

This seminar will critically examine contemporary debates about the political and economic impact of globalization with an emphasis on, but not restricted to, developing countries. Selected topics include the impact of enhanced economic integration on domestic and global governance, public policies to reduce poverty and inequality, the role of civil society in a global context, and new forms of political organization such as transnational networks. GER:DB-SocSci

5 units, Aut (Razo, A)

**POLISCI 244. An Introduction to Political Development**

Political development concerns the evolution of three categories of institutions: (1) the state itself; (2) the rule of law; and (3) accountable government. Focus on many of the major theories of political development, beginning with some classic social theorists and continuing up through the present.

5 units, Win (Fukuyama, Y)

**POLISCI 245R. Politics in Modern Iran**

Modern Iran has been a smithy for political movements, ideologies, and types of states. Movements include nationalism, constitutionalism, Marxism, Islamic fundamentalism, social democracy, Islamic liberalism, and fascism. Forms of government include Oriental despotism, authoritarianism, Islamic theocracy, and liberal democracy. These varieties have appeared in Iran in an iteration shaped by history, geography, proximity to oil and the Soviet Union, and the hegemony of Islamic culture. GER:DB-SocSci, EC-GlobalCom

5 units, Aut (Milani, A)

**POLISCI 246P. The Dynamics of Change in Africa**

(Same as AFRICAST 301A, HISTORY 346, POLISCI 346P) Crossdisciplinary colloquium; required for the M.A. degree in African Studies. Open to advanced undergraduates and PhD students. Addresses critical issues including patterns of economic collapse and recovery; political change and democratization; and political violence, civil war, and genocide. Focus on cross-cutting issues including the impact of colonialism; the role of religion, ethnicity, and inequality; and Africa's engagement with globalization.

4-5 units, Win (Weinstein, J)

**POLISCI 249. Directed Reading and Research in Comparative Politics**

May be repeated for credit.

1-10 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**POLISCI 259. Directed Reading and Research in Political Methodology**

May be repeated for credit.

1-10 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**POLISCI 291. Political Institutions**

This course focuses on the role of political institutions in shaping policy outcomes around the world, with special attention to the United States. Students will become familiar with a wide range of theoretical approaches to the study of institutions, and they will learn the basics of applied quantitative empirical analysis. Enrollment is restricted to Political Science Research Honors Track students.

5 units, Win (Rodden, J)

**POLISCI 292. Political Behavior**

This research seminar will survey important topics in the study of mass political behavior including public opinion, political participation, partisanship and voting. Open only to students in the

Political Science Research Honors Track.

5 units, Spr (Fiorina, M)

**POLISCI 293. Research Design**

This course is designed to teach students how to design a research project. The course emphasizes the specification of testable hypotheses, the building of data sets, and the inferences from that may be drawn from that evidence. It is only open to students in the PS Research Honors Track.

5 units, Spr (Haber, S)

**POLISCI 299A. Honors Thesis**

Students conduct independent research work towards a senior honors thesis. Restricted to students in the Research Track Honors Program in Political Science.

1-5 units, Aut (Staff)

**POLISCI 299B. Honors Thesis**

Students conduct independent research work towards a senior honors thesis.

1-5 units, Win (Staff)

**POLISCI 299C. Honors Thesis**

Students conduct independent research work towards a senior honors thesis.

1-5 units, Spr (Staff)

**GRADUATE COURSES IN POLITICAL SCIENCE**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**POLISCI 313R. Political Economy of Financial Crisis**

(Same as POLISCI 213R) Political responses to domestic and international financial crises. Monetary and fiscal policy. The role of interest groups. International cooperation and the role of the IMF.

5 units, Spr (Lipscy, P)

**POLISCI 314D. Democracy, Development, and the Rule of Law**

(Same as IPS 230, INTNLREL 114D, POLISCI 114D) Links among the establishment of democracy, economic growth, and the rule of law. How democratic, economically developed states arise. How the rule of law can be established where it has been historically absent. Variations in how such systems function and the consequences of institutional forms and choices. How democratic systems have arisen in different parts of the world. Available policy instruments used in international democracy, rule of law, and development promotion efforts.

5 units, Aut (Diamond, L; Stoner-Weiss, K)

**POLISCI 314R. Challenges and Dilemmas in American Foreign Policy**

(Same as POLISCI 214R) This seminar will examine the complexities and trade offs involved in foreign policy decision-making at the end of the twentieth century and the dawn of the post-9/11 era. Students will analyze dilemmas confronting policymakers through case studies including post-conflict reconstruction and state-building, nuclear proliferation, democratization and peace negotiation. The seminar will conclude with a 48-hour crisis simulation. For advanced undergraduates and graduate students. Application for enrollment required. Pick up application in Political Science Department (Encina West 100).

5 units, Win (Rice, C)

**POLISCI 314S. Decision Making in U.S. Foreign Policy**

(Same as IPS 314S) Priority to IPS students. Formal and informal processes involved in U.S. foreign policy decision making. The formation, conduct, and implementation of policy, emphasizing the role of the President and executive branch agencies. Theoretical and analytical perspectives; case studies.

5 units, Spr (Blacker, C)

**POLISCI 316. International History and International Relations Theory**

(Same as HISTORY 202, HISTORY 306E, POLISCI 216E) The relationship between history and political science as disciplines. Sources include studies by historians and political scientists on topics such as the origins of WW I, the role of nuclear weapons in international politics, the end of the Cold War, nongovernmental

organizations in international relations, and change and continuity in the international system.

5 units, Win (Holloway, D)

**POLISCI 319. Directed Reading in International Relations**

May be repeated for credit.

1-10 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**POLISCI 320R. The Presidency**

(Same as POLISCI 220R) This course provides students with a comprehensive perspective on the American presidency and covers a range of topics: elections, policy making, control of the bureaucracy, unilateral action, war-making, and much more. But throughout, the goal is to understand why presidents behave as they do, and why the presidency as an institution has developed as it has, with special attention to the dynamics of the American political system and how they condition incentives, opportunities, and power.

5 units, Win (Moe, T)

**POLISCI 323R. The Press and the Political Process**

(Same as COMM 160, COMM 260) (Graduate students register for COMM 260.) The role of mass media and other channels of communication in political and electoral processes.

4-5 units, not given this year

**POLISCI 324. Graduate Seminar in Political Psychology**

(Same as COMM 308) For students interested in research in political science, psychology, or communication. Methodological techniques for studying political attitudes and behaviors. May be repeated for credit.

1-3 units, Aut (Krosnick, J), Win (Krosnick, J), Spr (Krosnick, J)

**POLISCI 327. Minority Behavior and Representation**

Politics of minorities in the U.S. Topics include: historic and contemporary struggles of Latinos, African Americans, and gays and lesbians for political power and social acceptance; group-level public opinion and electoral behavior; scholarship on group influence in the policy making process and policy issues of importance; and the jurisprudence shaping minority political access and civil rights.

5 units, Aut (Segura, G)

**POLISCI 329. Directed Reading and Research in American Politics**

May be repeated for credit.

1-10 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**POLISCI 330A. Classical Seminar: Origins of Political Thought**

(Same as CLASSHIS 133, CLASSHIS 333, PHIL 176A, PHIL 276A, POLISCI 230A) Political philosophy in classical antiquity, focusing on canonical works of Thucydides, Plato, Aristotle, and Cicero. Historical background. Topics include: political obligation, citizenship, and leadership; origins and development of democracy; and law, civic strife, and constitutional change.

4-5 units, Win (Ober, J)

**POLISCI 332T. The Dialogue of Democracy**

(Same as AMSTUD 137, COMM 137W, COMM 237, POLISCI 232T) All forms of democracy require some kind of communication so people can be aware of issues and make decisions. This course looks at competing visions of what democracy should be and different notions of the role of dialogue in a democracy. Is it just campaigning or does it include deliberation? Small scale discussions or sound bites on television? Or social media? What is the role of technology in changing our democratic practices, to mobilize, to persuade, to solve public problems? This course will include readings from political theory about democratic ideals - from the American founders to J.S. Mill and the Progressives to Joseph Schumpeter and modern writers skeptical of the public will. It will also include contemporary examinations of the media and the internet to see how those practices are changing and how the ideals can or cannot be realized.

4-5 units, Win (Fishkin, J)

**POLISCI 333. Rational and Social Agency**

(Same as PHIL 377) Contemporary discussions of practical reason, individual rational agency, planning agency, diachronic agency, intention, belief, intentional action, shared agency, identification and self-governance. Tentative list of authors whose work will be

studied includes: Michael Bratman, Margaret Gilbert, Richard Holton, Christine Korsgaard, Alfred Mele, Kieran Setiya, Scott Shapiro, Michael Smith, David Velleman, Jay Wallace, and Gary Watson.

2-4 units, *Win (Bratman, M)*

**POLISCI 334. Philanthropy and Civil Society**

(Same as EDUC 374, SOC 374) Associated with the Center for Philanthropy and Civil Society (PACS). Year-long workshop for doctoral students and advanced undergraduates writing senior theses on the nature of civil society or philanthropy. Focus is on pursuit of progressive research and writing contributing to the current scholarly knowledge of the nonprofit sector and philanthropy. Accomplished in a large part through peer review. Readings include recent scholarship in aforementioned fields. May be repeated for credit for a maximum of 9 units.

1-3 units, *Aut (Powell, W), Win (Powell, W), Spr (Powell, W)*

**POLISCI 336. Introduction to Global Justice**

(Same as ETHICSOC 136R, INTNLREL 136R, PHIL 76, POLISCI 136R) Recent work in political theory on global justice. Topics include global poverty, human rights, fair trade, immigration, climate change. Do developed countries have a duty to aid developing countries? Do rich countries have the right to close their borders to economic immigrants? When is humanitarian intervention justified? Readings include Charles Beitz, Thomas Pogge, John Rawls.

5 units, *Spr (Satz, D)*

**POLISCI 336S. Justice**

(Same as ETHICSOC 171, IPS 208, PHIL 171, PHIL 271, POLISCI 3P, POLISCI 136S) Focus is on the ideal of a just society, and the place of liberty and equality in it, in light of contemporary theories of justice and political controversies. Topics include protecting religious liberty, financing schools and elections, regulating markets, assuring access to health care, and providing affirmative action and group rights. Issues of global justice including human rights and global inequality.

4-5 units, *Aut (Dougherty, T)*

**POLISCI 337. Models of Democracy**

(Same as COMM 212, COMM 312, POLISCI 237) Ancient and modern varieties of democracy; debates about their normative and practical strengths and the pathologies to which each is subject. Focus is on participation, deliberation, representation, and elite competition, as values and political processes. Formal institutions, political rhetoric, technological change, and philosophical critique. Models tested by reference to long-term historical natural experiments such as Athens and Rome, recent large-scale political experiments such as the British Columbia Citizens' Assembly, and controlled experiments.

3-5 units, *not given this year*

**POLISCI 337S. Seminar on Liberation Technologies**

(Same as CS 546) This one-unit seminar will present speakers relevant in a variety of ways to how various forms of information technology are being used to defend human rights, improve governance, deepen democracy, empower the poor, promote economic development, protect the environment, enhance public health, and pursue a variety of other social goods.

1 unit, *Aut (Winograd, T; Cohen, J), Win (Diamond, L; Winograd, T)*

**POLISCI 337T. Designing Liberation Technology**

(Same as CS 379L) Small project teams work with NGOs to design new technologies for promoting development and democracy. Students conduct observations to identify needs, generate concepts, create prototypes, and test their appropriateness. Some projects may continue past the quarter toward full-scale implementation. Taught through the Hasso Plattner Institute of Design at Stanford (<http://dschool.stanford.edu>). Enrollment limited. Application required. Prerequisites: consent of instructor(s). Design Institute class; see <http://dschool.stanford.edu>.

3-4 units, *Spr (Winograd, T)*

**POLISCI 339. Directed Reading and Research in Political Theory**

May be repeated for credit.

1-5 units, *Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**POLISCI 340L. China in World Politics**

(Same as POLISCI 140L) The implications of the rise of China in

contemporary world politics and for American foreign policy, including issues such as arms and nuclear proliferation, regional security arrangements, international trade and investment, human rights, environmental problems, and the Taiwan and Tibet questions.

5 units, *Win (Miller, L)*

**POLISCI 344. Politics and Geography**

The role of geography in topics in political economy, including development, political representation, voting, redistribution, regional autonomy movements, fiscal competition, and federalism.

3-5 units, *Win (Rodden, J; Nall, C)*

**POLISCI 344U. Political Culture**

An approach to culture emphasizing equilibrium attributes through relationships among culture, choice, coordination, and common knowledge. Implications for the study of political processes and institutions.

5 units, *Aut (Laitin, D)*

**POLISCI 346P. The Dynamics of Change in Africa**

(Same as AFRICAST 301A, HISTORY 346, POLISCI 246P) Crossdisciplinary colloquium; required for the M.A. degree in African Studies. Open to advanced undergraduates and PhD students. Addresses critical issues including patterns of economic collapse and recovery; political change and democratization; and political violence, civil war, and genocide. Focus on cross-cutting issues including the impact of colonialism; the role of religion, ethnicity, and inequality; and Africa's engagement with globalization.

4-5 units, *Win (Weinstein, J)*

**POLISCI 346S. The Logic of Authoritarian Government, Ancient and Modern**

(Same as HISTORY 378A) If authoritarianism is less economically efficient than democracy, and if authoritarianism is a less stable form of political organization than democracy, then why are there more authoritarian governments than democracies? To address this paradox, focus is on theoretical and empirical literature on authoritarian governments, and related literatures on the microeconomic analysis of property rights and credible commitments.

5 units, *not given this year*

**POLISCI 348. Chinese Politics: The Transformation and the Era of Reform**

(Same as POLISCI 148) Overview of the reforms in China since 1978 that have made its economy one of the fastest growing in the world yet it still has the Chinese Communist Party at the helm wielding one party rule. Key questions addressed include the following: What has been the process and challenges of reform that have reshaped China's economic landscape? What are the political consequences of these dramatic economic changes? Why has the CCP remained strong while other communist regimes have failed? Markets have spread but what is the role of the state? What are the opportunities for political participation and prospects for political change? Materials will include readings, lectures, and selected films. This course has no prerequisites. (Graduate students register for 348.) WIM.

5 units, *Aut (Oi, J)*

**POLISCI 349. Directed Reading and Research in Comparative Politics**

May be repeated for credit.

1-10 units, *Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**POLISCI 350A. Political Methodology I**

(Same as POLISCI 150A, PUBLPOL 303A) Introduction to probability and statistical inference, with applications to political science and public policy. Prerequisite: elementary calculus.

5 units, *Aut (Grimmer, J)*

**POLISCI 350B. Political Methodology II**

(Same as POLISCI 150B, PUBLPOL 303B) Understanding and using the linear regression model in a social-science context: properties of the least squares estimator; inference and hypothesis testing; assessing model fit; presenting results for publication; consequences and diagnosis of departures from model assumptions; outliers and influential observations, graphical techniques for model fitting and checking; interactions among exploratory variables; pooling data; extensions for binary responses.

5 units, Win (Rivers, D)

**POLISCI 350C. Political Methodology III**

(Same as POLISCI 150C) Models for discrete outcomes, time series, measurement error, and simultaneity. Introduction to nonlinear estimation, large sample theory. Prerequisite: 150B/350B.

3-5 units, Spr (Wand, J)

**POLISCI 351A. Foundations of Political Economy**

Introduction to political economy with an emphasis on formal models of collective choice, public institutions, and political competition. Topics include voting theory, social choice, institutional equilibria, agenda setting, interest group politics, bureaucratic behavior, and electoral competition.

4 units, Aut (Hatfield, J)

**POLISCI 351B. Economic Analysis of Political Institutions**

Applying techniques such as information economics, games of incomplete information, sequential bargaining theory, repeated games, and rational expectations of microeconomic analysis and game theory to political behavior and institutions. Applications include agenda formation in legislatures, government formation in parliamentary systems, the implications of legislative structure, elections and information aggregation, lobbying, electoral competition and interest groups, the control of bureaucracies, interest group competition, and collective choice rules.

4 units, Win (Shotts, K)

**POLISCI 351C. Testing Models of Governmental Decision Making**

(Same as POLECON 682) This course surveys applications of formal models to several stages of decision making, primarily in the U.S. national government and with an emphasis on the legislative branch. The course begins with explicit consideration of issues in philosophy of science and introduces an analytic framework to be applied to specific research throughout remaining sessions. Substantive topics and applications covered include strategies of committees, roll call voting, policy formation, effects of special rules, congressional-presidential relations, and congressional-agency relations. Students should have taken POLECON 680 and POLECON 681. Also listed as Political Science 351C.

4 units

**POLISCI 352. Introduction to Game Theoretic Methods in Political Science**

(Same as POLISCI 152) Concepts and tools of non-cooperative game theory developed using political science questions and applications. Formal treatment of Hobbes' theory of the state and major criticisms of it; examples from international politics. Primarily for graduate students; undergraduates admitted with consent of instructor.

3-5 units, Win (Fearon, J)

**POLISCI 353A. Workshop in Statistical Modeling**

Theoretical aspects and empirical applications of statistical modeling in the social sciences. Guest speakers. Students present a research paper. Prerequisite: 350B or equivalent.

1-2 units, Aut (Wand, J), Spr (Wand, J)

**POLISCI 359. Advanced Individual Study in Political Methodology**

May be repeated for credit.

1-10 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**POLISCI 362. New Economics of Organization**

Survey of economic approaches to organization, emphasizing theory and application, with attention to politics.

5 units, Win (Weingast, B)

**POLISCI 369. Directed Reading and Research in Political Organizations**

Advanced individual study in public administration. (Staff)

1-10 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**POLISCI 400. Dissertation**

1-10 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**POLISCI 404. Dispute Resolution in International Economic Law**

(Same as LAW 356.) Topics include: theoretical work on international trade and investment disputes; empirical work on

WTO dispute resolution and the efficacy of developing country participation; and legal analysis of current, prominent disputes in the WTO and under international investment treaties. Substantial paper required. May be repeated for credit.

1 unit, not given this year

**POLISCI 410A. International Relations Theory, Part I**

First of a three-part graduate sequence. History of international relations, current debates, and applications to problems of international security and political economy.

5 units, Aut (Schultz, K)

**POLISCI 410B. International Relations Theory, Part II**

Second of a three-part graduate sequence. History of international relations theory, current debates, and applications to problems of international security and political economy. Prerequisite: 410A.

5 units, Win (Lipsy, P)

**POLISCI 410C. Research in International Relations**

Third of a three-part graduate sequence. Focus is on developing research papers begun in 410A or B, and exploring active areas of research in the field. Prerequisite: 410B.

5 units, Spr (Sagan, S)

**POLISCI 411A. Workshop in International Relations**

For graduate students. Contemporary work. Organized around presentation of research by students and outside scholars. May be repeated for credit.

1-2 units, Aut (Goldstein, J)

**POLISCI 411B. Workshop in International Relations**

For graduate students. Contemporary work. Organized around presentation of research by students and outside scholars. May be repeated for credit.

1-2 units, Win (Goldstein, J)

**POLISCI 420A. American Political Institutions**

Theories of American politics, focusing on Congress, the presidency, the bureaucracy, and the courts.

5 units, Aut (Moe, T)

**POLISCI 420B. Topics in American Political Behavior**

For graduate students with background in American politics embarking on their own research. Current research in American politics, emphasizing political behavior and public opinion. Possible topics: uncertainty and ambivalence in political attitudes, heterogeneity in public opinion, the structure of American political ideology, political learning, the media as a determinant of public opinion, and links between public opinion and public policy.

4-5 units, Win (Sniderman, P; Jackman, S)

**POLISCI 420C. Discovery in American Politics**

What are the novel facts being generated in the study of American politics, and how are these discoveries being made? Emphasis on strengths and limitations of emerging methodologies and review of the substantive contributions they yield. Student-led replication of extant research and development of original research ideas a key component of the course. Prerequisites: 420A,B.

5 units, Spr (Jackman, S)

**POLISCI 421R. American Political Development, 1865-present**

In this reading-intensive course, we will conduct a wide-ranging survey of major transformations in the American political system in the post-Civil War period. Our inquiries about these transformations will focus on the origins of the modern administrative state, the interactive role of the state and social movements, and changes in the party system. We will examine these developments not only to understand institutional change, but to learn how changing institutions have shaped the behavior of the American electorate.

5-5 units, Spr (Nall, C)

**POLISCI 422. Workshop in American Politics**

Research seminar. Frontiers in mass political behavior. Sources include data sets from the 2004 election cycle. Prerequisite: 420B or equivalent.

1-2 units, Aut (Sniderman, P; Iyengar, S), Win (Sniderman, P; Iyengar, S)

**POLISCI 422N. Campaign Finance**

5 units, Spr (Wand, J; Bonica, A)

**POLISCI 425. Political Communication**

(Same as COMM 360G) An overview of research in political



communication with particular reference to work on the impact of the mass media on public opinion and voting behavior. Limited to Ph.D. students. Prerequisite: 260 or consent of instructor.

1-5 units, Spr (Iyengar, S)

**POLISCI 431A. Ancient Greek Law**

(Same as CLASSHIS 335A) The development and practice of law and legal procedure in the ancient Greek world, emphasizing the well documented case of classical Athens. Constitutional, criminal, and civil law, approached through analysis of actual laws and speeches by litigants in Athenian courtrooms. Review of a growing scholarship juxtaposing Greek law to other prominent legal traditions and exploring the role of law in Greek social relations, economics, and literature.

5 units, Win (Ober, J)

**POLISCI 431B. Ancient Greek Law**

(Same as CLASSHIS 135B, CLASSHIS 335B) Workshop, which continues the work of the previous quarter. The development and practice of law and legal procedure in the ancient Greek world, emphasizing the well documented case of classical Athens. Constitutional, criminal, and civil law, approached through analysis of actual laws and speeches by litigants in Athenian courtrooms. Review of a growing scholarship juxtaposing Greek law to other prominent legal traditions and exploring the role of law in Greek social relations, economics, and literature.

5 units, Spr (Ober, J)

**POLISCI 431L. Graduate Seminar on Equality**

(Same as PHIL 371D) This seminar will focus on ideas of equality of opportunity, with readings from political theory, as well as American constitutional law, political science, economics, and sociology. The readings will address four main questions: What is equality of opportunity? Why is equality of opportunity an important requirement of justice? What are the principal sources of inequalities of opportunity? And how might those inequalities be remedied? Readings from: Hayek, Rawls, Dworkin, Okin, Roemer, Tawney, Bourdieu, Barry, Jencks, Mazumder, Alstott, McLanahan, and Heckman.

5 units, not given this year

**POLISCI 433. Workshop in Political Theory**

For graduate students. May be repeated for credit.

1-2 units, Aut (McQueen, A), Win (McQueen, A), Spr (McQueen, A)

**POLISCI 435R. Political Realism**

(Same as PHIL 372R) This seminar will explore various articulations of political realism in their historical contexts. Realism is generally taken to be a pragmatic approach to a political world marked by the competition for material interests and the struggle for power. Yet beyond a shared critique of idealism and an insistence on the priority and autonomy of the political, realists tend to have very different normative visions and political projects. We will consider the works of several political realists from the history of political and international relations thought, including: Thucydides, Machiavelli, Hobbes, Carr, Niebuhr, and Morgenthau.

3-5 units, Aut (McQueen, A)

**POLISCI 436R. Amartya Sen's capability theory**

(Same as PHIL 378) Amartya Sen's pioneering work attempts to open up economics to missing informational and evaluative dimensions. This seminar will explore Sen's capability approach and its implications for the study of economics, gender, and justice. It will look at different ways that the capability approach has been developed, in particular, by Martha Nussbaum, but also by other political philosophers.

2-4 units, not given this year

**POLISCI 438. Democracy and the Constitution**

(Same as PHIL 374C) Connections between democratic theory and constitutional theory. Sources include literature from political philosophy, constitutional law, and jurisprudence, and arguments about freedom of expression, campaign finance, legislative apportionment, federalism, and separation of powers. Readings from Scalia, Breyer, Ely, Ackerman, Dahl, Rawls, Habermas, Dworkin, Riker, and Schumpeter, as well as constitutional cases.

5 units, not given this year

**POLISCI 440A. Theories in Comparative Politics**

Required of Political Science Ph.D. students with comparative politics as first or second concentration; others by consent of

instructor. Theories addressing major concerns in the comparative field including democracy, regime change, the state, revolutions, national heterogeneity, and economic performance.

5 units, Aut (Laitin, D)

**POLISCI 440B. Political Economy of Development**

(Same as HISTORY 378E) Required of Political Science Ph.D. students with comparative politics as a first or second concentration; others by consent of the instructor. The origins of political and economic institutions and their impact on long run outcomes for growth and democracy. Emphasis is on the analysis of causal models, hypothesis testing, and the quality of evidence.

5 units, Win (Haber, S)

**POLISCI 440C. Methods in Comparative Politics**

Required of Political Science Ph.D. candidates with comparative politics as a first or second concentration; others by consent of instructor. Current methodological standards in comparative politics. Students develop their own research design that meets these standards.

5 units, Spr (Weinstein, J; Laitin, D)

**POLISCI 440D. Workshop in Comparative Politics**

Faculty, guest speakers, and graduate students conducting research in comparative politics present work-in-progress. Graduate students may enroll for up to 5 total units apportioned by quarter. Auditors welcome. Graduate students whose major or minor field is comparative politics must make at least one presentation to the seminar.

1-2 units, Aut (Magaloni, B; Blaydes, L), Win (Blaydes, L; Magaloni, B), Spr (Magaloni, B; Blaydes, L)

**POLISCI 443S. Political Economy of Reform in China**

Content, process, and problems of China's post-Mao reforms. Changes in property rights, markets, credit, and the role of the state in economic development. Comparative insights about reform in the Chinese communist system that distinguishes it from the experience of regimes in E. Europe and the former Soviet Union.

5 units, Aut (Oi, J)

**POLISCI 444. Comparative Political Economy: Advanced Industrial Societies**

(Same as PUBLPOL 304A) Political economy approaches to key policy outcomes including redistribution, the size of government, fiscal behavior, and pork-barrel politics. Theories related to institutions, interest groups, and geography, focusing on middle- and upper-income countries.

3-5 units, Spr (Cox, G)

**POLISCI 448R. Workshop: China Social Science**

(Same as SOC 368W) For Ph.D. students in the social sciences and history. Research on contemporary society and politics in the People's Republic of China. May be repeated for credit. Prerequisite: consent of instructor.

1 unit, Aut (Walder, A; Oi, J), Win (Walder, A; Oi, J), Spr (Walder, A; Zhou, X; Oi, J)

**POLISCI 451. Design and Analysis of Experiments**

Political scientists increasingly rely on experimental methods. This course covers the principles and logic of experimental design as applied to laboratory, field and survey experiments. We discuss the strengths and limitations of experiments in relation to observational methods. Design considerations include randomization, the construction of treatments, the use of deception, the ethical implications of deception, and new developments in subject recruitment. Turning to the analysis of experimental data, we describe the methods for estimating treatment effects, interactions, and more complex indirect effects stemming from either mediator or moderator variables. We also cover appropriate data analytic strategies for quasi-experimental designs including interrupted time series, matching and propensity scores.

3-5 units, Spr (Iyengar, S; Jackman, S)

**POLISCI 801. TGR Project**

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**POLISCI 802. TGR Dissertation**

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)



# PORTUGUESE LANGUAGE (PORTLANG) COURSES

## UNDERGRADUATE COURSES IN PORTUGUESE LANGUAGE

Primarily for undergraduates; graduate students may enroll with consent of adviser.

### **PORTLANG 1A. Accelerated First-Year Portuguese, Part 1**

For students with two years of college level study of a Romance language, preferably Spanish. Goal is to use socially and culturally appropriate forms in conversations, providing and obtaining information, and expressing feelings, emotions, and opinions. Students learn the language as they contrast Brazilian culture with their own. Lab. Completion of 2A fulfills the University's foreign language requirement.

*4-5 units, Aut (Wiedemann, L; Morris, A), Win (Staff), Spr (Sotelino, K)*

### **PORTLANG 2A. Accelerated First-Year Portuguese, Part 2**

Continuation of 1A. For students with two years of college level study of a Romance language, preferably Spanish. Goal is to use socially and culturally appropriate forms in conversations, providing and obtaining information, describing and narrating, and expressing feelings, emotions, and opinions. Students learn the language as they contrast Brazilian culture with their own. Lab. Completion of 2A fulfills the University's foreign language requirement. Prerequisite: placement test, 1A or consent of instructor.

*4-5 units, Aut (Silveira, A; Wiedemann, L), Win (Staff), Spr (Wiedemann, L)*

### **PORTLANG 11A. Accelerated Second-Year Portuguese, Part 1**

Goal is to use linguistically and culturally appropriate forms in oral narrations, descriptions, and expression of ideas and opinions. Emphasis is on expository speech. Prerequisite: placement test, 2A, 3, or consent of instructor.

*4-5 units, Aut (Wiedemann, L; Silveira, A), Win (Wiedemann, L), Spr (Wiedemann, L)*

### **PORTLANG 12A. Accelerated Second-Year Portuguese, Part 2**

Continuation of 11A. Goal is to use linguistically and culturally appropriate forms in narrations, descriptions, and expression of ideas and opinions. Emphasis on expository writing. Prerequisite: placement tests, 11A, or consent of instructor.

*4-5 units, Aut (Wiedemann, L), Win (Staff), Spr (Wiedemann, L)*

### **PORTLANG 99. Language Specials**

Prerequisite: consent of instructor. (Staff)

*1-5 units, Aut (Staff), Win (Staff), Spr (Staff)*

### **PORTLANG 101. Reading Brazil**

Short expository readings, guest lectures, discussions, compositions on Brazilian issues. Review of grammatical structures. Vocabulary building with emphasis on common idiomatic expressions and troublesome lexical distinctions. Prerequisite: 12A or equivalent, or consent of instructor.

*3-5 units, Aut (Wiedemann, L)*

### **PORTLANG 102. Brazil in Text: Advanced Grammar and Composition**

3rd year course. Further development of academic writing. Short fictional and expository readings, guest lectures, discussions, compositions on Brazilian issues. Emphasis is on building paragraphs, organizing arguments, and justifying positions. May be used as workshop to write papers in Portuguese for another course. May be repeated once for credit. Prerequisite: 12A or equivalent, or consent of instructor.

*3-5 units, Win (Wiedemann, L)*

### **PORTLANG 103. Advanced Conversation: Brazil Today**

3rd year course. Reading and discussions on issues from current newspapers and magazines, reading comprehension strategies with online news updates, and vocabulary building with emphasis on formal expository writing. Writing practice if desired. Students

prepare short presentations and lead subsequent discussions. May be repeated once for credit. Prerequisite: 12A or consent of instructor.

*3-5 units, Spr (Wiedemann, L)*

### **PORTLANG 161. Advanced Reading in Portuguese, Fourth-year Portuguese**

The course emphasizes high-level reading comprehension and leads to advanced development of communication skills for extended formal and informal discourse in Portuguese. Prerequisite: placement test, 101, or consent of instructor.

*3-5 units, Aut (Wiedemann, L)*

### **PORTLANG 162. Advanced Writing in Portuguese, Fourth-year Portuguese**

The course has two tracks, depending on the interest of the student: a) technical writing (business letters, technical reports, expressing/supporting opinions, etc.) and b) creative writing (crônicas; short stories, poems, etc.). Prerequisite: placement test, 102, or consent of instructor.

*3-5 units, Win (Wiedemann, L)*

### **PORTLANG 163. Contemporary Issues in the Lusophone World. Fourth-Year Portuguese**

The class emphasizes formal presentations/discussions in Portuguese, based on contemporary issues in the lusophone world. Students use as linguistic models newspaper and magazine articles, TV news broadcasts, online news services, films, art exhibits, news on scientific advances, etc. Focus is on mastering high-level vocabulary/structures, as well as reading and rhetorical strategies, for appropriate use in professional settings. Prerequisite: placement test, 103 or consent of instructor.

*3-5 units, Spr (Wiedemann, L)*

### **PORTLANG 164. Translating the Lusophone world, Fourth-Year Portuguese**

For advanced students. Literary and technical translation. Readings on theoretical topics on translation; discussion, analysis and comparison of existing translations (literary and technical); individual translation projects according to students field of study, and discussion and analysis of those projects in class. Final translation project to be undertaken individually. Prerequisite: PORTLANG 250, completion of Port completion of 3rd year sequence or consent of instructor.

*3-5 units, not given this year*

### **PORTLANG 193Q. Spaces and Voices of Brazil through Film**

(S,Sem) (Same as ILAC 193Q) Stanford Introductory Seminar. The manners in which a country is perceived and defines itself is a result of many complex forces, and involves the reproduction of social relations and complex social constructions both on the part of those who live there and those who see it from a distance. The perceptions of what Brazil is and what defines the country has changed throughout times, but has conserved some clear pervasive defining traits. This course is an introduction to the history, culture, politics and artistic production of Brazil as seen through feature films, documentaries and some complementary readings. Movies include, among others, Banana is my Business, Black Orpheus, Olga, They Don't Use Black-Tie, City of God, Central Station, Gaijin, and Four Days in September-among others. In English. GER:DB-Hum, EC-GlobalCom

*3-4 units, Aut (Wiedemann, L)*

## GRADUATE COURSES IN PORTUGUESE LANGUAGE

Primarily for graduate students; undergraduates may enroll with consent of instructor.

### **PORTLANG 250. Reading in Portuguese**

Introductory class for students with superior reading proficiency in Spanish or another Romance language. Reading competence for research and courses in Luso-Brazilian studies. Literary, journalistic, and academic readings. Fulfills University reading requirement for advanced degrees. May be offered alternate years.

*4 units, Spr (Staff)*

### **PORTLANG 297. Directed Reading**

Prerequisite: consent of instructor. (Staff)

*1-4 units, Aut (Staff), Win (Staff), Spr (Staff)*

### **PORTLANG 394. Graduate Studies in Portuguese**

**Conversation**

Prerequisite: consent of instructor. (Staff)

1-3 units, *Aut (Staff), Win (Staff), Spr (Staff)*

**PORTLANG 395. Graduate Studies in Portuguese**

Prerequisite: consent of instructor. (Staff)

2-5 units, *Aut (Staff), Win (Staff), Spr (Staff)*

## PSYCHIATRY (PSYC) COURSES

### UNDERGRADUATE COURSES IN PSYCHIATRY

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**PSYC 28SI. Alt Spring Break: Changing Face of HIV/AIDS - Confronting a Shifting Epidemic in San Francisco**

Preparation for the 2011 HIV/AIDS spring break trip. Investigates the history of HIV/AIDS in the US and worldwide, with a specific focus on the city of San Francisco. Weekly discussions grapple with social and medical issues such as the discrimination HIV+ people face in obtaining access to care and housing, the huge stigma still attached to the disease, the nature and meaning of how one tiny virus could wipe out almost an entire generation of unsuspecting men and women of all ages, and the cutting-edge technology being developed to combat HIV. Prerequisite: acceptance into the Alternative Spring Break Program.

1 unit, *Win (Staff)*

**PSYC 32SI. Exploring Autism**

Examines autism and the issues, from neurobiology to education and the role of schools, surrounding its increasing prevalence - today one of every 110 children and one of every 70 boys. Researchers, politicians, teachers, and families are searching for answers. Weekly presentations by guest lecturers capped by a service-learning component visiting and assisting local autism-focused organizations.

2 units, *Spr (Staff)*

**PSYC 71Q. Eight Ages of Man**

Ways in which a psychologically-minded attitude can add to the appreciation of literature; how literature can be used to understand issues and themes of the developing personality. Using the well-known essay by psychoanalyst Erik Erikson, *The Eight Ages of Man*, as a foundation, works reflecting elements of an age or ages are read. *Wisdom of the Ego* by Dr. George Valliant serves as a resource to better understand this model, as well as offering a more contemporary theory of personality development.

3 units, *not given this year*

**PSYC 72Q. Traumatic Stress**

Effects of traumatic events; interventions to alleviate their psychosocial impact. Events include natural disasters, illness, interpersonal violence, war, the Holocaust, and terrorism. Resilience factors that protect individuals from adverse effects. Oral and multimedia presentation.

3 units, *not given this year*

**PSYC 76Q. Temperament and Creativity in Mood Disorders**

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Western cultural notions of mad geniuses and artistic temperaments. How many individuals who suffer from depression, bipolar disorder, and related problems are nonetheless productively creative. Current psychological and neurobiological research, and assessment of mood, temperament, and creativity. Emphasis is on written and oral communications and multimedia presentations. Write 2. Prerequisite: PWR 1.

4 units, *Win (Ketter, T)*

**PSYC 77Q. Deviants in Literature**

(S,Sem) Stanford Introductory Seminar. Many literary works are enhanced by, in fact demand, a psychological perspective to achieve a fully informed reading. In *The Devils* Dostoevsky uses the issues and process of anarchy as a platform on which to develop some of the most unforgettable characters in literary history. *Death in Venice* contains among its many themes the darker dynamic of paraphilia. Guilt searches for a validating crime in Kafka's *The Penal Colony*. Capote uses a journalistic style to

manage horrible fact during *In Cold Blood*. Conrad shows that telling a story of the journey outward is more nearly an analysis of the journey inward in *Heart of Darkness*. Albee's *Zoo Story* asks whether the man on the street is prepared to confront his own worst nightmare. Close reading of works such as these presents opportunities to learn about character pathology and to expand traditional approaches to literary criticism by applying a psychological perspective.

3 units, *Aut (Van Natta, J)*

**PSYC 78Q. Mental Health in Collegiate Athletes**

(S,Sem) Stanford Introductory Seminar. Developmental, psychological, social, and performance issues in collegiate sports. Topics include transition to Stanford, time management, optimizing mental fitness, coping with injuries.

3 units, *Win (Steiner, H)*

**PSYC 81Q. Fate of Orphans and Vulnerable Children in Sub Saharan Africa: The HIV/AIDS Pandemic**

(S,Sem) Stanford Introductory Seminar. The complicated forces, shaped by geopolitical history and current events, that frame all social programs, the care of orphans in the context of the AIDS pandemic in particular; history of the care of orphans; developmental effects of deprivation of care and nurturing. Guest speakers.

2 units, *Win (Solvason, H; Reicherter, D)*

**PSYC 111Q. Madness and the Womb: Medical and Artistic Approaches to Mental Illness in Women Through the Ages**

(S,Sem) Stanford Introductory Seminar. Historical and current concepts of mental illness in women. Premenstrual dysphoric disorder (PMS), postpartum depression, menopausal mood disorders, and eating disorders. Historical biopsychosocial approach. Readings include women's diaries and advice books, physicians' casebooks, and 19th- and 20th-century medical texts. Guest speakers from art and literature departments. Literary and artistic images, and the social and cultural contexts of these disorders during the last 300 years.

3 units, *Win (Williams, K)*

**PSYC 135. Sleep and Dreams**

(Same as PSYC 235) Current research on how sleep affects our daily lives. Physiology of non-REM and REM sleep, dreams and dreaming, content, psychophysiological cause, lucid dreaming, sleep need, sleep debt, daytime alertness, and performance; biological clock and circadian rhythms; sleep disorders, insomnia, narcolepsy, sleep apnea, sleepwalking, jet lag, sleeping pills, sleep and mental illness, sleep and memory, and the impact of sleep deprivation and sleep disorders on academic and social life. Multimedia presentations, guest lectures, and projects.

3 units, *Win (Dement, W), Spr (Dement, W)*

**PSYC 136A. Valuescience: Shedding Illusion to Live Better**

(Same as PSYC 236A) Apply scientific methods and principles to discern and realize value. Read history, philosophy, ecology, economics, sociology, linguistics and psychology pertinent to emergence of valuescience as foundation for an increasing range of human action. Explore perceptual, cognitive, and cultural impediments to valuescience; strategies for overcoming these; and personal and social benefits of doing so. 4 units includes weekly practice (e.g., meditation, aerobic exercise).

3-4 units, *Aut (Schrom, D; Enge, N)*

**PSYC 136B. Valuescience: Shedding Illusion to Live Better**

(Same as PSYC 236B) Continuation of 136A/236A. Apply scientific methods and principles to discern and realize value. Read history, philosophy, ecology, economics, sociology, linguistics and psychology pertinent to emergence of valuescience as foundation for an increasing range of human action. Explore perceptual, cognitive, and cultural impediments to valuescience; strategies for overcoming these; and personal and social benefits of doing so. 4 units includes weekly practice (e.g., meditation, aerobic exercise).

3-4 units, *Spr (Schrom, D)*

**PSYC 139. Changing Relationships: A Couples and Family Therapy Perspective**

(Same as PSYC 239) Basic concepts underlying family-systems theory and practice, drawing on concepts from psychology, psychiatry, biology, anthropology, and sociology. Major theoretical premises of the family-systems approach to the assessment of intimate relationships, including family structure,

development, history, intimacy and sexuality, culture, and larger systems. Tools required for assessing and changing relationships are examined and videotaped case examples are used to develop case formulations and illustrate systemic intervention strategies of major contributors to the field. Finally, applications of the family-systems approach in educational, medical, business, and community settings are considered.

3 units, Spr (Staff)

### PSYC 195. Special Laboratory Projects

Assist Behavioral Neuroendocrinology Program with data entry, library organization, and study-related projects.

1-3 units, Aut (Rasgon, N), Win (Rasgon, N), Spr (Rasgon, N), Sum (Rasgon, N)

### PSYC 199. Undergraduate Research

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

## GRADUATE COURSES IN PSYCHIATRY

Primarily for graduate students; undergraduates may enroll with consent of instructor.

### PSYC 211. Child and Adolescent Psychopathology

Common syndromes in child psychiatry. Topics include diagnosis, epidemiology, etiology, course, outcome and therapeutic interventions. Prerequisite: familiarity with the basics of psychiatric and psychological discourse; psychiatry clerkship or course in psychology.

1 unit, Aut (Hinman, K; Fielding, K; Rodriguez, B)

### PSYC 212. Pediatric Psychosomatic Medicine: Psychological Issues in the Physically Ill Child

Open to MD and graduate students; qualified undergraduates by consent of instructor. Diagnosis and management of emotional disorders and difficulties in physically ill children and adolescents. Topics include psychotherapeutic and psychopharmacologic approaches to psychiatric disorders encountered in the pediatric medical health care setting. Oral and multimedia presentations. Prerequisite: familiarity with basic principles of psychopathology.

1 unit, Sum (Brown, M; Shaw, R)

### PSYC 225. Stanford Klingenstein Fellowship Program

A mentoring program designed to expose first and second year medical students to the rewarding field of child and adolescent psychiatry, and to increase awareness and education about child and adolescent mental health issues. Offers a year-long program wherein medical students are paired with child and adolescent psychiatrists, meeting bimonthly for clinical experiences and mentoring. Also provides opportunities for the students to get involved in cutting-edge scientific research, networking opportunities, and opportunities to attend professional conferences.

1 unit, Aut (Joshi, S; Londono Tobon, A), Win (Joshi, S; Londono Tobon, A), Spr (Joshi, S; Londono Tobon, A), Sum (Joshi, S)

### PSYC 233. Mindfulness: An Awareness-Based Stress Reduction Program in Medicine

An experiential program in which the participants learn the techniques of mindfulness meditation. Modeled after the program started by Jon Kabat-Zinn and featured on Bill Moyers' *Healing and the Mind*, there are approximately 400 hospitals around the world that provide mindfulness-based programs. Courses are designed to work with the mind/body relationship to stress and chronic illness. Participants are involved in a class with patients and observe the impact of the program on a variety of medical conditions. Requires daily practice of mindfulness meditation, attendance at weekly class meetings and the all day retreat, home reading, and a final paper covering the student's observations.

3 units, Aut (Spiegel, D), Win (Staff), Spr (Staff), Sum (Staff)

### PSYC 235. Sleep and Dreams

(Same as PSYC 135) Current research on how sleep affects our daily lives. Physiology of non-REM and REM sleep, dreams and dreaming, content, psychophysiological cause, lucid dreaming, sleep need, sleep debt, daytime alertness, and performance; biological clock and circadian rhythms; sleep disorders, insomnia, narcolepsy, sleep apnea, sleepwalking, jet lag, sleeping pills, sleep and mental illness, sleep and memory, and the impact of sleep

deprivation and sleep disorders on academic and social life. Multimedia presentations, guest lectures, and projects.

3 units, Win (Dement, W), Spr (Dement, W)

### PSYC 236A. Valuescience: Shedding Illusion to Live Better

(Same as PSYC 136A) Apply scientific methods and principles to discern and realize value. Read history, philosophy, ecology, economics, sociology, linguistics and psychology pertinent to emergence of valuescience as foundation for an increasing range of human action. Explore perceptual, cognitive, and cultural impediments to valuescience; strategies for overcoming these; and personal and social benefits of doing so. 4 units includes weekly practice (e.g., meditation, aerobic exercise).

3-4 units, Aut (Schrom, D; Enge, N)

### PSYC 236B. Valuescience: Shedding Illusion to Live Better

(Same as PSYC 136B) Continuation of 136A/236A. Apply scientific methods and principles to discern and realize value. Read history, philosophy, ecology, economics, sociology, linguistics and psychology pertinent to emergence of valuescience as foundation for an increasing range of human action. Explore perceptual, cognitive, and cultural impediments to valuescience; strategies for overcoming these; and personal and social benefits of doing so. 4 units includes weekly practice (e.g., meditation, aerobic exercise).

3-4 units, Spr (Schrom, D)

### PSYC 239. Changing Relationships: A Couples and Family Therapy Perspective

(Same as PSYC 139) Basic concepts underlying family-systems theory and practice, drawing on concepts from psychology, psychiatry, biology, anthropology, and sociology. Major theoretical premises of the family-systems approach to the assessment of intimate relationships, including family structure, development, history, intimacy and sexuality, culture, and larger systems. Tools required for assessing and changing relationships are examined and videotaped case examples are used to develop case formulations and illustrate systemic intervention strategies of major contributors to the field. Finally, applications of the family-systems approach in educational, medical, business, and community settings are considered.

3 units, Spr (Staff)

### PSYC 247. Principles and Practices in Care of the Dying

Detailed, systematic survey of a generalized terminal illness and elaboration of the basic principles underlying approaches to the care of the dying. Particular attention is paid to problem areas involving medical ethics and multi-culture. Practical strategies for managing the special medical and emotional problems that arise in the care of the dying patient. There may be guest speakers and patient interviews. No final examination. (Minimum: 4 students)

1 unit, not given this year

### PSYC 250. Methodology of Research in Behavioral Sciences

Statistical and methodological issues in three major psychiatric research themes: clinical psychiatric research (Aut), neuroimaging research (Win) and genetic studies (Spr). Autumn series includes: basics of inferential statistics, group comparison, analysis of variance, regression analysis, multivariate analysis, and longitudinal analysis in the context of psychiatric and behavioral research. Also included are conceptual topics such as risk factors, mediation, moderation, and causal inference. Winter series includes: functional and structural neuroimaging research methods (e.g. functional magnetic resonance imaging (fMRI), structural MRI (sMRI), diffusion tensor imaging (DTI), transcranial magnetic stimulation (TMS), near-infrared spectroscopy (NIRS), electroencephalogram (EEG)). Basic principles, statistical analysis methods, advantages and limitations, and applications are discussed. Spring series covers statistical methods and issues encountered in genetic studies of human disease.

1-3 units, Aut (Jo, B), Win (Kesler, S)

### PSYC 290. Teaching in Psychiatry

Practical experience in teaching by serving as a teaching assistant in a psychiatry course. Unit values are allotted individually to reflect the level of teaching responsibility assigned to the student.

1-10 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### PSYC 299. Directed Reading in Psychiatry

Prerequisite: consent of instructor.

1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**PSYC 370. Medical Scholars Research**

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

4-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**PSYC 399. Graduate Research**

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

## PSYCHOLOGY (PSYCH) COURSES

### UNDERGRADUATE COURSES IN PSYCHOLOGY

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**PSYCH 1. Introduction to Psychology**

Human behavior and mental processes including the nervous system, consciousness, learning, memory, development, emotion, psychopathology, interpersonal process, society, and culture. Current research. GER:DB-SocSci

5 units, Aut (Gross, J), Win (Knutson, B), Spr (Walton, G)

**PSYCH 7Q. Language Understanding by Children and Adults**

(S,Sem) Stanford Introductory Seminar. How do we first learn to find meaning in strings of speech sounds? Understanding spoken language requires the rapid integration of acoustic information with linguistic knowledge and with conceptual knowledge based on experience with how things happen in the world. Topics include research on early development of language understanding and laboratory methods of how young children make sense of speech. Observations of preschool children and visits to Stanford laboratories. Might be repeatable for credit.

3 units, Aut (Fernald, A)

**PSYCH 8N. The New Longevity**

Adult development from the perspective of life-span theory -- a conceptual framework that views development as a series of adaptations to physical, societal and individual resources and constraints. Students will learn about demographic and medical changes, ways that individuals typically change socially, emotionally and cognitively as they move through adulthood. An understanding of the conceptual foundations of the life-span approach and place aging of young people today in historical context. GER:DB-SocSci

3 units, not given this year

**PSYCH 10. Introduction to Statistical Methods: Precalculus**

(Same as STATS 60, STATS 160) Techniques for organizing data, computing, and interpreting measures of central tendency, variability, and association. Estimation, confidence intervals, tests of hypotheses, t-tests, correlation, and regression. Possible topics: analysis of variance and chi-square tests, computer statistical packages. GER:DB-Math

5 units, Aut (Walther, G), Win (Thomas, E), Spr (Staff), Sum (Staff)

**PSYCH 11N. Origin of Mental Life**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Mental life in infancy; how thinking originates. How do babies construe the objects, events, people, and language that surround them? Recent advances in psychological theory, hypotheses, and evidence about how the infant human mind develops. GER:DB-SocSci

3 units, Spr (Markman, E)

**PSYCH 12N. Self Theories**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. The impact of people's belief in a growing versus fixed self on their motivation and performance in school, business, sports, and relationships. How such theories develop and can be changed. GER:DB-SocSci

3 units, Aut (Dweck, C)

**PSYCH 17N. Language and Society: How Languages Shape Lives**

Do people who speak different languages think differently? What role does language play in politics, law, and religion? The role of language in individual cognition and in society. Breaking news about language and society; the scientific basis for thinking about these broad issues. GER:DB-SocSci

3 units, not given this year

**PSYCH 25N. Psychology, Inequality, and the American Dream**

Despite legal prohibitions against discrimination and the fact that many people endorse egalitarian values, inequality persists in America. What role do psychological factors play in perpetuating inequality? How can psychologically wise reforms promote equal opportunity? Topics include prejudice and discrimination, school achievement, social class, and race/ethnicity.

3 units, not given this year

**PSYCH 26N. Language Acquisition: Exploring the Minds of Children**

(F,Sem) Stanford Introductory Seminar. Language is an extraordinary competence distinguishing humans from other species, yet there is debate about the role of biology in guiding language acquisition. Does language development follow an innate "bioprogram" or does it build on more general cognitive abilities, influenced by early experience? Topics include biological and experiential influences on the emergence of linguistic ability as children learn a first language. Discussions of theory and research, visits to Stanford laboratories and observations of very young language learners.

3 units, Win (Fernald, A)

**PSYCH 27N. The Psychology of Prejudice**

Preference to freshmen. Social psychological theories and research on stereotypes, prejudice, discrimination, and racism. Psychological perspectives include those emphasizing personologic, cognitive, motivational, and sociocultural contributions to prejudice. Emphasis is on applying each approach to understanding real-world contexts such as educational and occupational contexts, and to the implications of this research for efforts to reduce prejudice and discrimination.

3 units, not given this year

**PSYCH 28N. The Cultural Shaping of Mental Health and Illness**

(F,Sem) (Same as CSRE 28N) Stanford Introductory Seminar. This seminar examines how our cultural ideas and practices shape our conceptions, perceptions, experiences, and treatment of emotional wellness and distress. We will read and discuss empirical research and case studies from psychology, anthropology, sociology, and medicine. Course requirements include weekly reading and thought papers, weekly discussion, and a final research project and presentation.

3 units, Win (Tsai, J)

**PSYCH 29N. Growing Up in America**

(F,Sem) (Same as ENGLISH 64N) Stanford Introductory Seminar. Preference to freshmen. To what extent is it possible to describe an American experience? How are different people included in or excluded from the imagined community that is America? How do a person's race, class, gender and sexuality affect his or her experience of belonging to this country? These are just some of the questions we will consider as we familiarize ourselves with the great diversity of childhood and young adult experiences of people who have grown up in America. We will read and discuss narratives written by men and women, by urban, suburban, and rural Americans, and by Asian Americans, African Americans, Syrian Americans, Native Americans, Latina/os, and European Americans. Throughout the course, we will explore how these writers write the self in literature. GER:DB-Hum, EC-AmerCul

3 units, Spr (Markus, H; Moya, P)

**PSYCH 30. Introduction to Perception**

Behavioral and neural aspects of perception focusing on visual and auditory perception. Topics include: scientific methods for studying perception, anatomy and physiology of the visual and auditory systems, color vision, depth perception, motion perception, stereopsis, visual recognition, pitch and loudness perception, speech perception, and reorganization of the visual system in the blind. GER: DB-NatSci

3 units, Aut (Grill-Spector, K)

### PSYCH 45. Introduction to Learning and Memory

The literature on learning and memory including cognitive and neural organization of memory, mechanisms of remembering and forgetting, and why people sometimes falsely remember events that never happened. Cognitive theory and behavioral evidence integrated with data from patient studies and functional brain imaging. Recommended: 1.

3 units, Spr (Wagner, A)

### PSYCH 50. Introduction to Cognitive Neuroscience

Survey of topics relating brain activity to cognitive processes and behavior. The course begins with an overview of neurophysiology and techniques to measure brain activity. We then discuss perceptual and motor processes before investigating neural responses related to attention, memory, and cognitive control. The course concludes with a discussion of brain processes related to reward, decision making, and social cognition. GER: DB-NatSci

4 units, Win (McClure, S)

### PSYCH 55. Introduction to Cognition and the Brain

Major topics in cognitive psychology and neuroscience, including empirical approaches to perception, language, learning, memory, knowledge representation, problem solving, and reasoning.

4 units, Spr (Boroditsky, L)

### PSYCH 60. Introduction to Developmental Psychology

Psychological development from birth to adulthood, emphasizing infancy and the early and middle childhood years. The nature of change during childhood and theories of development. Recommended: 1. GER:DB-SocSci

3 units, Aut (Frank, M)

### PSYCH 60A. Introduction to Developmental Psychology Section

Guided observation of children age 2-5 at Bing Nursery School. Corequisite: 60.

2 units, Aut (Hartman, B; Lomangino, A)

### PSYCH 70. Introduction to Social Psychology

Topics related to the influence of other people on individuals' thoughts, emotions, and behaviors. Factors that affect the way that we perceive ourselves and others; how people influence others; how persuasion happens; what causes us to like, love, help, or hurt others; and how social psychology helps to understand questions about law, business, and health. Fulfills WIM requirement GER:DB-SocSci

4 units, Win (Eberhardt, J)

### PSYCH 75. Introduction to Cultural Psychology

The cultural sources of diversity in thinking, emotion, motivation, self, personality, morality, development, and psychopathology. GER:DB-SocSci, EC-GlobalCom

5 units, not given this year

### PSYCH 80. Introduction to Personality and Affective Science

Current empirical and theoretical approaches to personality. How and why do people differ? Does personality change over time? Can people change their personalities? What makes people happy? What are the physical, mental, and social consequences of personalities? Prerequisite: 1. GER:DB-SocSci

4 units, Spr (Tsai, J)

### PSYCH 90. Introduction to Clinical Psychology

History of clinical psychology, models and assessment of personality, behavior, cognition, psychopathology, and approaches to the treatment of abnormal behavior. Emphasis is on current theory, research, issues in, and the role of clinical psychology in contemporary society. Recommended: 1. GER:DB-SocSci

3 units, Aut (Gotlib, I)

### PSYCH 95. Introduction to Abnormal Psychology

Theories of and approaches to understanding the phenomenology, etiology, and treatment of psychological disorders among adults and children. Research findings and diagnostic issues. Recommended: PSYCH 1. GER:DB-SocSci, DB-SocSci

3 units, Win (Haas, A)

### PSYCH 101. Community Health Psychology

(Same as HUMBIO 128) Social ecological perspective on health emphasizing how individual health behavior is shaped by social forces. Topics include: biobehavioral factors in health; health behavior change; community health promotion; and psychological

aspects of illness, patient care, and chronic disease management. Prerequisites: HUMBIO 3B or PSYCH 1, or equivalent.

4 units, Win (Heaney, C)

### PSYCH 102. Longevity

(Same as HUMBIO 149L, NENS 202) Interdisciplinary. Challenges to and solutions for the young from increased human life expectancy: health care, financial markets, families, work, and politics. Guest lectures from engineers, economists, geneticists, and physiologists. GER:DB-SocSci

4 units, Win (Carstensen, L; Rando, T)

### PSYCH 104. Uniquely Human

Are humans the only species that displays altruism, experiences uncertainty, and is capable of language and deception? Sources include empirical and theoretical papers in comparative psychology. Prerequisite: 1.

3 units, not given this year

### PSYCH 104S. Affective Neuroscience

New frontiers in neuroscience research on emotion. Topics such as neuroscience methodologies, genetic contributions to the experience of emotion, neural bases of emotion, animal models of emotion, and biological approaches to emotional or affective dysfunction.

3 units, not given this year

### PSYCH 105S. General Psychology

The scientific study of behavior and mental processes focusing on history, methods, and findings of the field of psychology. How psychology affects people's lives. How to evaluate psychological claims.

3 units, Sum (Staff)

### PSYCH 107S. Introduction to Social Psychology

A comprehensive overview of social psychology with in-depth lectures exploring the history of the field, reviewing major findings and highlighting areas of current research. Focus is on classic studies that have profoundly changed our understanding of human nature and social interaction, and, in turn, have triggered significant paradigm shifts within the field. Topics include: individuals and groups, conformity and obedience, attraction, intergroup relations, and judgment and decision-making.

3 units, not given this year

### PSYCH 108S. Social Psychology

The history of the field, major findings, and current research. Focus is on classic studies that have changed understanding of human nature and social interaction and significant paradigm shifts within the field. Topics include: individuals and groups; conformity and obedience; attraction; intergroup relations; and judgment and decision making.

3 units, Sum (Staff)

### PSYCH 109S. Cognitive Psychology

Theories and empirical findings in the field of cognitive psychology. How do people perceive? How do they remember? How do they think? How such questions are addressed in the areas of memory, language, perception, reasoning, judgment, and decision making.

3 units, Sum (Staff)

### PSYCH 110. Research Methods and Experimental Design

Structured research exercises and design of an individual research project. Prerequisite: consent of instructor. GER:DB-SocSci

5 units, not given this year

### PSYCH 111S. Abnormal Psychology

What is it like to be clinically depressed, to see things no one else sees, to be a victim of a traumatic experience? What are psychological, biological, and social factors involved in depression, schizophrenia, or post-traumatic stress disorder? The subjective experience, causal factors, clinical presentation, methods of assessment, treatment, and sociocultural context of psychological disorders.

3 units, Sum (Staff)

### PSYCH 113S. Developmental Psychology

A unified view of the developing child. How developmental psychology can be applied to the general understanding of children and the process of growing into adulthood. Findings in the areas of the child's cognitive, language, social, neurological, physical, emotional, personality, and moral development. Strengths and

weaknesses of various perspectives and approaches scientists use to learn about children.

3 units, Sum (Staff)

### **PSYCH 115S. Personality Psychology**

Focus on current empirical and theoretical approaches to personality. Lectures will be organized around the following questions central to personality research: How and why do people differ? How do we measure individual differences? Does personality change over time? How does personality interact with sociocultural factors to influence behavior? What makes people happy? What are the physical, mental, and social consequences of personalities?

3 units, Sum (Staff)

### **PSYCH 119. Psychology and Public Policy**

(Same as PUBLPOL 172) Applications of psychology to public and social policy. Factors that affect the influence of psychological research and individual psychology on the creation of policy, and the influence of policy on attitudes and behavior at the personal and societal levels. Topics include education, health care, and criminal justice.

5 units, not given this year

### **PSYCH 119S. The Psychology of Stigma**

What obese people, African Americans, people with physical disabilities, lesbians, and Muslims have in common: social stigma. The social and psychological experiences of individuals living with social stigmas. Classic and current theory and research. Topics include: function, nature, and types of stigma; how stigmatized individuals view their identities and cope; mental and cognitive consequences; and interactions between stigmatized and non-stigmatized. Literature employing research methods including neuroimaging and social interaction studies.

3 units, Sum (Staff)

### **PSYCH 120. Cellular Neuroscience: Cell Signaling and Behavior**

(Same as BIO 153) Neural interactions underlying behavior. Prerequisites: PSYCH 1 or basic biology. GER: DB-NatSci

4 units, Aut (Wine, J)

### **PSYCH 121. Ion Transport and Intracellular Messengers**

(Same as PSYCH 228) (Graduate students register for 228.) Ion channels, carriers, ion pumps, and their regulation by intracellular messengers in a variety of cell types. Recommended: 120, introductory course in biology or human biology.

1-3 units, Spr (Wine, J)

### **PSYCH 124S. Applying Psychology to Modern Life**

A scientific examination of everyday modern life. Topics include: how research on attention and memory can be applied to improve study strategies; how advertisers persuade and how their techniques can be resisted; how interpersonal conflicts can be avoided through knowledge of common errors in judging other people; and how studies on attraction and love can improve close relationships.

3 units, Sum (Staff)

### **PSYCH 125. Beyond Stereotype Threat: Claiming a Rightful Place in an Academic Community**

(Same as CTL 130) Stereotype threat as mitigating the quality of a student's test performance; its impact on academic success at Stanford. How to reduce the impact of stereotype threat on Stanford students.

3 units, not given this year

### **PSYCH 131. Language and Thought**

(Same as PSYCH 262) The psychology of language including: production and understanding in utterances; from speech sounds to speaker's meaning; children's acquisition of the first language; and the psychological basis for language systems. Language functions in natural contexts and their relation to the processes by which language is produced, understood, and acquired. Prerequisite: 1 or LINGUIST 1. GER:DB-SocSci

4 units, Aut (Clark, H)

### **PSYCH 132. Introduction to Cognitive and Information Sciences**

(Same as LINGUIST 144, PHIL 190, SYMSYS 100) The history, foundations, and accomplishments of the cognitive sciences, including presentations by leading Stanford researchers in artificial

intelligence, linguistics, philosophy, and psychology. Overview of the issues addressed in the Symbolic Systems major. GER:DB-SocSci

4 units, Spr (Goodman, N)

### **PSYCH 133. Human Cognitive Abilities**

(Same as EDUC 369) Psychological theory and research on human cognitive abilities; their nature, development, and measurement; and their importance in society. Persistent controversies and new areas of research, recent perspectives on the nature-nurture debate and the roles of genetics, health and education in shaping HCAs. Prerequisite: PSYCH 1 or equivalent. (PSE) GER:DB-SocSci, DB-SocSci

3 units, not given this year

### **PSYCH 134. Seminar on Language and Deception**

Deceptive, exploitative, and other noncooperative uses of language. How is language used to deceive or exploit? Where are these techniques practiced and why? What are the personal, ethical, and social consequences of these practices? Prerequisite: 131, LINGUIST 1, or PHIL 181. GER:DB-SocSci

3 units, Win (Clark, H)

### **PSYCH 138. Wise Interventions**

(Same as PSYCH 238) Classic and contemporary psychological interventions; the role of psychological factors in social reforms for social problems involving healthcare, the workplace, education, intergroup, relations, and the law. Topics include theories of intervention, the role of laboratory research, evaluation, and social policy.

4 units, not given this year

### **PSYCH 140S. Sport Psychology**

Focus is on research methods and findings and how to apply these findings to students' own performance. Topics include methods of performance enhancement, psychological characteristics of top performers, group dynamics and processes, effective leadership practices, the effects of stereotyping on sport participation and performance, and debates in the field. Emphasis will be on sports, although most topics can be applied to performance in general.

3 units, not given this year

### **PSYCH 141. Cognitive Development**

How children's thinking and mental abilities change from infancy on. The major theories and explanations of intellectual growth. Sources include classic findings and state-of-the-art research on cognitive development. Prerequisite: 1. GER:DB-SocSci

3 units, Aut (Markman, E)

### **PSYCH 141S. Health Psychology**

Why is it so difficult for people to stick to an exercise plan? Why don't people take their doctor's advice? Why aren't public health announcements more effective? This course addresses these questions by providing an overview of health psychology: the scientific study of behaviors and cognitive processes related to health states. In this course, we will discuss the mind/body connection, the influence of social/cultural and physical environments on our health, cognitive processing of health information, health belief models, and the link between emotion and health. Understanding the interactions between these biological, psychological, and social influences on individuals' health states is crucial for developing effective health communication and intervention programs. We will approach all course topics from both theory-driven and applied perspectives.

3 units, Sum (Staff)

### **PSYCH 142S. The Psychology of Social Media**

People interact with the world around them largely through mediated means: internet, television, radio, etc. This course will survey current social media: e.g. Facebook, Twitter, YouTube, etc. and popular culture in order to highlight the psychological processes at play. Topics will include: social belonging, interpersonal attraction, identity, bias, and cyberbullying. Students will be expected to learn how to study social media and popular culture using psychological methods.

3 units, Sum (Staff)

### **PSYCH 143. Developmental Anomalies**

For advanced students. Developmental disorders and impairments. What the sparing of mental abilities in otherwise devastating disorders (or vice versa) tells about the mind and its development in the normal case. Examples of disorders and impairments:

autism, congenital blindness, deafness, mental retardation, attachment disorder, and Williams syndrome. Limited enrollment. Prerequisite: consent of instructor. GER:DB-SocSci

*3 units, not given this year*

**PSYCH 145. Seminar on Infant Development**

For students preparing honors research. Conceptual and methodological issues related to research on developmental psycholinguistics; training in experimental design; and collection, analysis, and interpretation of data.

*1-2 units, Spr (Fernald, A)*

**PSYCH 146. Observation of Children**

Learning about children through guided observations at Bing Nursery School, Psychology's lab for research and training in child development. Physical, emotional, social, cognitive, and language development. Recommended: 60. GER:DB-SocSci

*3-5 units, Win (Hartman, B; Robinette, K; Lomangino, A), Spr (Staff)*

**PSYCH 147. Development in Early Childhood**

Supervised experience with young children at Bing Nursery School. 3 units require 4 hours per week in Bing classrooms throughout the quarter; 4 units require 7 hours per week; 5 units require 10.5 hours per week. Seminar on developmental issues in the Bing teaching/learning environment. Recommended: 60 or 146, or consent of instructor.

*3-5 units, Aut (Wise, B; O'Hanlon, E; Wise, B), Win (Winters, J; Chandra, P; O'Hanlon, E), Spr (Wise, B; Chandra, P; O'Hanlon, E)*

**PSYCH 148. Introduction to Counseling**

(Same as EDUC 130) The goal of counseling is to help others to create more satisfying lives for themselves. Clients learn to create and capitalize on unexpected events to open up new opportunities. The success of counseling is judged, not by the words and actions of the counselor, but by the progress that the client makes in the real world after counseling itself is ended. Students are encouraged to exert their full efforts within reasonable time limits to improve their competence. (PSE)

*3 units, Win (Krumboltz, J)*

**PSYCH 149. The Infant Mind: Cognitive Development over the First Year**

How do babies learn so much in so little time? Emphasis is on cognitive and perceptual development, and the relationship between brain and behavior in infancy. Prerequisite: 1. Recommended: 60 or 141. GER:DB-SocSci

*3 units, not given this year*

**PSYCH 150. Race and Crime**

The goal of this course is to examine social psychological perspectives on race, crime, and punishment in the United States. Readings will be drawn not only from psychology, but also from sociology, criminology, economics, and legal studies. We will consider the manner in which social psychological variables may operate at various points in the criminal justice system- from policing, to sentencing, to imprisonment, to re-entry. Conducted as a seminar.

*3 units, Aut (Eberhardt, J)*

**PSYCH 151. Emotion Regulation and Psychopathology**

A broad overview of specific emotion regulation impairments in various psychopathologies and discussion of how current treatment protocols are likely to aid recovery by forming more adaptive emotion regulation ability. Topics include: Foundations and Emotion regulation models, Emotion regulation impairments in Mood disorders (Unipolar Depression and Bipolar Disorder), Anxiety disorders (Social Phobia, Post Traumatic Stress Disorder, General Anxiety Disorder), Eating disorders (Anorexia and Bulimia Nervosa), and Personality Disorders (Narcissistic Personality Disorder, Borderline Personality Disorder).

*3 units, not given this year*

**PSYCH 152. Mediation for Dispute Resolution**

(Same as EDUC 131) Mediation as more effective and less expensive than other forms of settling disputes such as violence, lawsuits, or arbitration. How mediation can be structured to maximize the chances for success. Simulated mediation sessions.

*3 units, Aut (Krumboltz, J)*

**PSYCH 154. Judgment and Decision-Making**

Survey of research on how we make assessments and decisions particularly in situations involving uncertainty. Emphasis will be on instances where behavior deviates from optimality. Overview of recent works examining the neural basis of judgment and decision-making.

*3 units, not given this year*

**PSYCH 155. Introduction to Comparative Studies in Race and Ethnicity**

(Same as CSRE 196C, ENGLISH 172D, SOC 146) How different disciplines approach topics and issues central to the study of ethnic and race relations in the U.S. and elsewhere. Lectures by senior faculty affiliated with CSRE. Discussions led by CSRE teaching fellows. GER:DB-SocSci, EC-AmerCul

*5 units, not given this year*

**PSYCH 157. Social Foundations of Expertise and Intelligence**

Psychological conceptions of expertise, ability, and intelligence and the research methods used to study these attributes. Topics include: research on how expertise in a diverse set of disciplines is developed; the role of practice in nurturing expertise; whether intelligence predicts life outcomes; the genetic and environmental determinants of intelligence; whether genes or environment explain racial differences such as the Black-White performance gap and the East Asian achievement advantage; and the Flynn effect.

*3 units, not given this year*

**PSYCH 158. Emotions: History, Theories, and Research**

(Same as PSYCH 259) Graduate students register for 259. Theoretical and empirical issues in the domain of emotions. The history of emotion theories, current approaches, and the interaction between emotion and cognition.

*1-3 units, not given this year*

**PSYCH 159. Psychology of Attitude Change and Social Influence**

Review of classic and current research on attitudes, attitude change and persuasion. Increase appreciation for the ways that our thoughts, actions, and feelings are shaped and manipulated by social influences.

*3 units, not given this year*

**PSYCH 161. Emotion**

(Same as PSYCH 261) (Graduate students register for 261.) The scientific study of emotion. Topics: models of emotion, emotion antecedents, emotional responses (facial, subjective, and physiological), functions of emotion, emotion regulation, individual differences, and health implications. Focus is on experimentally tractable ideas. GER:DB-SocSci

*3 units, not given this year*

**PSYCH 167. Seminar on Aggression**

The causes and modification of individual and collective aggression. Major issues in aggression: social labeling of injurious conduct, social determinants of aggression, effects of the mass media, institutionally sanctioned violence, terrorism, psychological mechanisms of moral disengagement, modification of aggressive styles of behavior, and legal sanctions and deterrence doctrines.

*3 units, not given this year*

**PSYCH 168. Emotion Regulation**

(Same as PSYCH 268) (Graduate students register for 268.) The scientific study of emotion regulation. Topics: historical antecedents, conceptual foundations, autonomic and neural bases, individual differences, developmental and cultural aspects, implications for psychological and physical health. Focus is on experimentally tractable ideas. GER:DB-SocSci

*3 units, Spr (Gross, J)*

**PSYCH 170. The Psychology of Communication About Politics in America**

(Same as COMM 164, COMM 264, POLISCI 224L) Focus is on how politicians and government learn what Americans want and how the public's preferences shape government action; how surveys measure beliefs, preferences, and experiences; how poll results are criticized and interpreted; how conflict between polls is viewed by the public; how accurate surveys are and when they are accurate; how to conduct survey research to produce accurate measurements; designing questionnaires that people can understand and use comfortably; how question wording can



manipulate poll results; corruption in survey research. Preference to juniors, seniors, graduate students.

4 units, Spr (Krosnick, J)

#### **PSYCH 171. Research Seminar on Aging**

Two quarter practicum exposes students to multiple phases of research by participating in a laboratory focusing on social behavior in adulthood and old age. Review of current research; participation in ongoing data collection, analysis, and interpretation. Prerequisites: 1, research experience, and consent of instructor.

4 units, Aut (Carstensen, L), Win (Carstensen, L), Spr (Carstensen, L)

#### **PSYCH 179. The Psychology of Everyday Morality**

(Same as PSYCH 270) (Graduate students register for 270.) For graduate students, coterminals, and senior Psychology majors. Traditional approaches focusing on how morality colors mundane human activities such as eating and on morality as defined by actors themselves rather than social scientists. Moral hypocrisy, food and disgust, taboo trade-offs, moral reproach, and prejudice with compunction. Limited enrollment. Prerequisite: 70 and consent of instructor.

4 units, not given this year

#### **PSYCH 183. Mind, Culture, and Society Research Core**

Required of students in the mind, culture, and society specialization track. Research training on a variety of projects that explore how social identities such as race, class, gender, and culture affect psychological experiences across domains including education, law, business and health. Must participate for two consecutive quarters. Permission of instructor required. May be repeated for credit.

2-3 units, Aut (Markus, H; Eberhardt, J), Win (Eberhardt, J; Markus, H), Spr (Markus, H; Eberhardt, J)

#### **PSYCH 186. The Psychology of Everyday Morality**

(Same as PSYCH 286) Recent literature on morality from a social psychological perspective. Topics include moral judgment, moral intuitions, moral hypocrisy, moral identity, moralization, moral reproach, shame and guilt, temptations, and self-regulation. Contemporary psychological research emphasizing descriptive approaches (what people actually do) rather than normative ones (what one should do).

3 units, not given this year

#### **PSYCH 189. Stanford Center on Longevity Practicum**

Student involvement in an interdisciplinary center aimed at changing the culture of human aging using science and technology.

3 units, Aut (Carstensen, L), Win (Carstensen, L), Spr (Carstensen, L), Sum (Staff)

#### **PSYCH 190. Special Research Projects**

May be repeated for credit. Prerequisite: consent of instructor.

1-6 units, Aut (Staff), Win (Staff), Spr (Staff)

#### **PSYCH 193. Special Laboratory Research**

May be repeated for credit. Prerequisites: 1, 10, and consent of instructor.

1-6 units, Aut (Dweck, C; Sullivan, M), Win (Dweck, C), Spr (Staff), Sum (Staff)

#### **PSYCH 194. Reading and Special Work**

Independent study. May be repeated for credit. Prerequisite: consent of instructor.

1-3 units, Aut (Wise, B), Win (Staff), Spr (Staff), Sum (Staff)

#### **PSYCH 195. Special Laboratory Projects**

Independent study. May be repeated for credit. Prerequisites: 1, 10, and consent of instructor.

1-6 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

#### **PSYCH 196. Contemporary Psychology: Overview of Theory, Research, Applications**

Capstone experience for juniors and seniors that bridges course work with research opportunities. Lectures representing the department's areas: social, personality, developmental, neuroscience, and cognitive psychology. Faculty present current research. Discussions led by advanced graduate students in the field represented by that week's guest. Students write research proposals. Small grants available to students to conduct a pilot study of their proposed research. Limited enrollment. Prerequisite: consent of instructor. GER:DB-SocSci

3 units, Aut (Clark, H)

#### **PSYCH 197. Advanced Research**

Limited to students in senior honors program. Weekly research seminar, independent research project under the supervision of an appropriate faculty member. A detailed proposal is submitted at the end of Autumn Quarter. Research continues during Winter and Spring quarters as 198. A report demonstrating sufficient progress is required at the end of Winter Quarter.

1-4 units, Aut (Ross, L)

#### **PSYCH 198. Senior Honors Research**

Limited to students in the senior honors program. Finishing the research and data analysis, written thesis, and presentation at the Senior Honors Convention. May be repeated for credit.

1-4 units, Aut (Staff), Win (Ross, L), Spr (Ross, L)

#### **PSYCH 199. Temptations and Self Control**

(Same as PSYCH 299) (Graduate students register for 299.) Why do people do things that they come to regret? How can people minimize behavior such as exercise avoidance, angry words, overeating, unsafe sex, and dangerous driving? Sources include classical and current research from experimental psychology, neuroscience, behavioral economics, and neuroeconomics. Real-world applications.

2 units, not given this year

#### **PSYCH 289. Sensory Representations in Language and Memory**

Is recollecting an experience similar to re-experiencing it? How closely tied is our knowledge to the perceptual representations and processes that may have given rise to it? What role do perceptuo-motor representations play in understanding language? We will review the recent literature on perceptual re-activation in episodic memory, perceptual grounding in semantic representations, and neural reuse of perceptual mechanisms for abstract thought. Emphasis will be placed on recent research with an interdisciplinary scope, including discussion of theory, behavioral findings, neural mechanisms, and computational models. Prerequisite: Psych 207 or consent of instructor.

1-3 units, not given this year

## **GRADUATE COURSES IN PSYCHOLOGY**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

#### **PSYCH 192. Career and Personal Counseling**

(Same as EDUC 134, EDUC 234) Theories and methods for helping people create more satisfying lives for themselves. Simulated counseling experiences.

3 units, Spr (Krumboltz, J)

#### **PSYCH 201. Social Psychology Lecture Series**

Required of social psychology graduate students. Guest lecturers from Stanford and other institutions. May be repeated for credit. (Miller)

3 units, not given this year

#### **PSYCH 202. Cognitive Neuroscience**

Graduate core course. The anatomy and physiology of the brain. Methods: electrical stimulation of the brain, neuroimaging, neuropsychology, psychophysics, single-cell neurophysiology, theory and computation. Neuronal pathways and mechanisms of attention, consciousness, emotion, language, memory, motor control, and vision. Prerequisite: 207 or consent of instructor.

3 units, Spr (McClure, S)

#### **PSYCH 203. MODELS OF LANGUAGE ACQUISITION**

How do children learn to understand and produce their native language? Language acquisition is a core topic in cognitive science and has been a key test case for formal approaches. Topics include: learnability theory, grammatical approaches, connectionist models, and probabilistic models.

3 units, not given this year

#### **PSYCH 204. Computation and cognition: the probabilistic approach**

This course will introduce the probabilistic approach to cognitive science, in which learning and reasoning are understood as inference in complex probabilistic models. Examples will be drawn from areas including concept learning, causal reasoning, social cognition, and language understanding. Formal modeling



ideas and techniques will be discussed in concert with relevant empirical phenomena.

*3-4 units, Win (Goodman, N)*

**PSYCH 204A. Human Neuroimaging Methods**

This course introduces the student to human neuroimaging using magnetic resonance scanners. The course is a mixture of lectures and hands-on software tutorials. The course begins by introducing basic MR principles. Then various MR measurement modalities are described, including several types of structural and functional imaging methods. Finally algorithms for analyzing and visualizing the various types of neuroimaging data are explained, including anatomical images, functional data, diffusion imaging (e.g., DTI) and magnetization transfer. Emphasis is on explaining software methods used for interpreting these types of data.

*3 units, Aut (Wandell, B; Dougherty, R)*

**PSYCH 204B. Computational Neuroimaging: Analysis Methods**

Neuroimaging methods with focus on data analysis techniques. Basic MR physics and BOLD signals. Methods for neuroimaging data using real and simulated data sets. Topics include: linearity of the fmri signal; time versus space resolution tradeoffs; noise in neuroimaging; correlation analysis; visualization methods; cortical reconstruction, inflation, and flattening; reverse engineering; can cognitive states be predicted from brain activation? Prerequisite: consent of instructor.

*1-3 units, Win (Grill-Spector, K)*

**PSYCH 205. Foundations of Cognition**

Topics: attention, memory, language, similarity and analogy, categories and concepts, learning, reasoning, and decision making. Emphasis is on processes that underlie the capacity to think and how these are implemented in the brain and modeled computationally. The nature of mental representations, language and thought, modular versus general purpose design, learning versus nativism. Prerequisite: 207 or consent of instructor.

*1-3 units, Spr (Staff)*

**PSYCH 206. Cortical Plasticity: Perception and Memory**

Seminar. Topics related to cortical plasticity in perceptual and memory systems including neural bases of implicit memory, recognition memory, visual priming, and perceptual learning. Emphasis is on recent research with an interdisciplinary scope, including theory, behavioral findings, neural mechanisms, and computational models. May be repeated for credit. Recommended: 30, 45

*1-3 units, not given this year*

**PSYCH 207. Professional Seminar for First-Year Ph.D.**

**Graduate Students**

Required of and limited to first-year Ph.D. students in Psychology. Major issues in contemporary psychology with historical backgrounds.

*2-3 units, Aut (McClelland, J)*

**PSYCH 207B. Professional Development Seminar in Psychology**

For graduate students who wish to gain professional development skills to pursue an academic career. May be repeated for credit. Course is intended for second year Ph.D. student in Psychology but open to all years.

*0-1 units, not given this year*

**PSYCH 208. Advanced Topics in Self-Defense**

Seminar. Threat to the self and how people deal with them. Readings from social psychological areas including social comparison, self-affirmation, self-completion, self-discrepancy, shame and guilt, terror management, dimensions of self-worth, self-regulation, self-presentation, psychophysiology, and moral identity. Enrollment limited to 15.

*1-3 units, not given this year*

**PSYCH 209A. The Neural Basis of Cognition: A Parallel Distributed Processing Approach**

Models and data to support the notion that brain representations are patterns of activity over widely dispersed populations of neurons, that mental processing involves coherent distributed engagement of neurons in these populations, and that learning and development occur primarily through the adjustment of the strengths of the connections between the neurons. How models may be used to explain aspects of human cognition, development,

and effects of brain damage on cognition. Prerequisites: linear algebra, differential equations, a programming course, and two courses in psychology or neuroscience.

*3-4 units, not given this year*

**PSYCH 209B. Applications of Parallel Distributed Processing Models to Cognition and Cognitive Neuroscience**

Research seminar. Builds on project proposal developed in 209A. Hands-on use of computational models to address phenomena in cognitive psychology and cognitive neuroscience. Classic and modern papers, and student presentations of their own projects. Final paper in the form of a journal article submission. Prerequisite: 209A.

*4 units, not given this year*

**PSYCH 210. Foundations of Memory**

Memory and human cognition. Behavioral and neural data indicate that memory is not a unitary faculty but consists of multiple systems that support learning and remembering, each with its own processing characteristics and neurobiological substrates. What is known about memory emphasizing the cognitive and neural architectures of working, declarative, and nondeclarative memory. Recommended: 45.

*3 units, Aut (Wagner, A)*

**PSYCH 211. Developmental Psychology**

Prerequisite: 207 or consent of instructor.

*1-3 units, Win (Markman, E; Dweck, C)*

**PSYCH 212. Social Psychology**

Classic studies in experimental social psychology. Group and group dynamics; compliance and social pressure; conformity, cooperation, conflict, and social dilemmas; attraction and preference; attitudes and attitude change; social comparison, emotion, and affiliation; dissonance, consistency, and self-justification; attribution and self-perception; judgment and decision making, motivation, automaticity, and culture. Prerequisite: 207 or consent of instructor.

*1-3 units, Aut (Lepper, M; Ross, L)*

**PSYCH 213. Affective Science**

This seminar is the core graduate course on affective science. We consider definitional issues, such as differences between emotion and mood, as well as issues related to the function of affect, such as the role affect plays in daily life. We review autonomic, neural, genetic, and expressive aspects of affective responding. Later in the course we discuss the role of affect in cognitive processing, specifically how affective states direct attention and influence memory, as well as the role of affect in decision making. We will also discuss emotion regulation and the strategic control of emotion; the cultural shaping of emotional experience and regulation; disorders of emotion; and developmental trajectories of experience and control from early to very late life. Meetings are discussion based. Attendance and active participation are required. Prerequisite: 207 or consent of instructor.

*3 units, Win (Gross, J)*

**PSYCH 215. Mind, Culture, and Society**

Social psychology from the context of society and culture. The interdependence of psychological and sociocultural processes: how sociocultural factors shape psychological processes, and how psychological systems shape sociocultural systems. Theoretical developments to understand social issues, problems, and polity. Works of Baldwin, Mead, Asch, Lewin, Burner, and contemporary theory and empirical work on the interdependence of psychology and social context as constituted by gender, ethnicity, race, religion, and region of the country and the world. Prerequisite: 207 or consent of instructor.

*3 units, Win (Staff)*

**PSYCH 217. Topics and Methods Related to Culture and Emotion**

Preference to graduate students. How cultural factors shape emotion and other feeling states. Empirical and ethnographic literature, theories, and research on culture and emotion. Applications to clinical, educational, and occupational settings. Research in psychology, anthropology, and sociology. May be repeated for credit.

*1-3 units, not given this year*

**PSYCH 218. Early Social Cognitive Development**

Current literature on social and cognitive development in infancy

emphasizing the interface between the two domains. May be repeated for credit. Prerequisite: consent of instructor.

*1-3 units, not given this year*

**PSYCH 220. Special Topics in Cognitive Development**

For graduate students and advanced undergraduates. How research from cognitive development, decision making, and preference change can inform interventions on important social issues. May be repeated for credit.

*1-3 units, not given this year*

**PSYCH 221. Applied Vision and Image Systems**

The design and control of color imaging devices (display, printers, cameras, and scanners). Aspects of human vision relevant to software and hardware design. Topics: digital halftoning, color calibration, color metrics, flicker sensitivity, motion compensation, human spatial resolution, visual masking, JPEG principles, printer design, scanner design, and color software architecture. Lab.

*1-3 units, Win (Wandell, B)*

**PSYCH 223. Social Norms**

(Same as OB 630) This course covers research and theory on the origins and function of social norms. Topics include the estimation of public opinion, the function of norms as ideals and standards of judgment, and the impact of norms on collective and individual behavior. In addition to acquainting students with the various forms and functions of social norms the course will provide students with experience in identifying and formulating tractable research questions.

*4 units, Win (Miller, D)*

**PSYCH 224. Research Topics in Emotion Regulation**

Current research findings and methods, ongoing student research, and presentations by visiting students and faculty. May be repeated for credit. Prerequisite: consent of instructor.

*1 unit, not given this year*

**PSYCH 225. Special Neuroscience Seminar with Dr. Shinobu Kitayama**

How will culture influence the human mind? Is culture a superficial overlay on the basic, universal computational machine called the mind? Alternatively, is culture a crucial constitutive element of the mind? If so, what are specific mechanisms underlying this constitution process? And what theoretical framework do we need to make a visible progress on these questions? More generally, how can we start discussing meaningfully and productively about various problematic dichotomies such as mind versus body, culture versus biology, and nurture versus nature? An emerging field of cultural neuroscience has the potential of addressing these and other important questions and thus bridging natural, behavioral, and social sciences of the human mind. This seminar reviews the field of cultural neuroscience. It starts with a discussion of some theoretical foundations of the field, including cultural psychology, cognitive and social neuroscience, evolutionary psychology, and population genetics (PA)

*1-2 units, Spr (Staff)*

**PSYCH 226. Models and Mechanisms of Memory**

Current topics in memory as explored through computational models addressing experimental findings and physiological and behavioral investigations. Topics include: explicit and implicit learning; role of MTL structures in learning and memory; and single versus dual processes approaches to recognition. May be repeated for credit.

*1-3 units, not given this year*

**PSYCH 228. Ion Transport and Intracellular Messengers**

(Same as PSYCH 121) (Graduate students register for 228.) Ion channels, carriers, ion pumps, and their regulation by intracellular messengers in a variety of cell types. Recommended: 120, introductory course in biology or human biology.

*1-3 units, Spr (Wine, J)*

**PSYCH 232. Brain and Decision Making**

Neuroeconomics combines experimental techniques from neuroscience, psychology, and experimental economics, such as electrophysiology, fMRI, eye tracking, and behavioral studies, and models from computational neuroscience and economics. May be repeated for credit. Prerequisite: consent of instructor.

*3 units, Spr (Knutson, B)*

**PSYCH 233. MATLAB and Psychtoolbox for the Behavioral Sciences**

Topics such as experiment design, stimulus presentation, counterbalancing, response collection, data analysis, and plotting. Programming experiments. Final project programming a complete behavioral experiment relevant to student's research. Prerequisite: introductory programming such as CS 105 or 106, or consent of instructor.

*1-3 units, Spr (Hoffmann Bion, R; Thibodeau, P; Tang, G)*

**PSYCH 234. Topics in Affective Disorders**

Current research topics including epidemiology and phenomenology of affective disorders, psychological theories of depression, gender differences in affective disorders, cognitive and social functioning of depressed persons, psychobiology of affective disorders, depression in children, postpartum depression, suicide issues in the treatment of depression, and cultural aspects of affective disorders. Prerequisite: graduate standing in Psychology or consent of instructor.

*1-3 units, Win (Gotlib, I)*

**PSYCH 236. The Social Self**

The psychological bases of complex social organization such as work teams and national and cultural identities. Topics include: the effect of social influence on perception, beliefs, attitudes, emotions, and behaviors; shared intentionality; and the relational bases of learning, motivation, and performance. Works of classic scholars (Asch, Lewin) and contemporary researchers in social, developmental, and comparative psychology. Prerequisite: graduate standing or consent of instructor.

*3 units, Aut (Walton, G)*

**PSYCH 238. Wise Interventions**

(Same as PSYCH 138) Classic and contemporary psychological interventions; the role of psychological factors in social reforms for social problems involving healthcare, the workplace, education, intergroup, relations, and the law. Topics include theories of intervention, the role of laboratory research, evaluation, and social policy.

*4 units, not given this year*

**PSYCH 239. Formal and Computational Approaches in Psychology and Cognitive Science**

Do psychology and cognitive science need formal theories and/or explicit computational models? What insights should such things provide? What is the proper relationship between different theoretical and modeling approaches? Between different levels or kinds of analysis? Where do informally stated theories fit in and what are the roles of formal and computational modeling approaches in relation to other less explicitly specified forms of theorizing? This seminar will explore these issues and compare different formal and computational model variants, especially connectionist and probabilistic models, within 3-4 different target domains. Possible target domains include categorization, property induction, causal learning, perceptual decision making, language acquisition, semantics and pragmatics, and mid-level vision.

*3 units, Spr (McClelland, J; Goodman, N)*

**PSYCH 243. General Development Seminar**

May be repeated for credit. Prerequisite: consent of instructors.

*1-2 units, Win (Markman, E; Dweck, C; Fernald, A)*

**PSYCH 244. Psychology of Aging**

Theory and research in gerontology. Normal and abnormal changes that occur in biological, cognitive, and psychological aging. Emphasis is on the environmental factors that influence the aging process. Prerequisite: graduate standing in Psychology or consent of instructor.

*1-3 units, Spr (Staff)*

**PSYCH 245. Social Psychological Perspectives on Stereotyping and Prejudice**

Classic and contemporary social psychological approaches to prejudice and stereotyping. Emphasis is on how stereotypes are employed and maintained, and the influence of stereotyping and prejudice on behavior in domains including education, employment, politics, and law. Limited enrollment.

*3 units, not given this year*

**PSYCH 246. Cognitive and Neuroscience Friday Seminar**

Participant presentations. May be repeated for credit. Prerequisite: graduate standing in psychology or neuroscience program.

1 unit, Aut (Wagner, A), Win (Wagner, A), Spr (Wagner, A)

**PSYCH 247. Fundamentals of Neuroscience for Non-Life-Scientists**

Human behavior and the human brain and how it enables perception, learning, decision making, planning, and action with a focus on how neuroscience may be presented or used in law, business, or education contexts. Neurotechnology and experimental methods used to conduct research.

2 units, not given this year

**PSYCH 249. Human Motivation**

Current research and theory including questions concerning the nature of human motives, intrinsic motivation, self-regulation, the roles of affect and cognition, and lifespan and cultural influences on motivation. Prerequisite: 207 or consent of instructors.

1-3 units, Spr (Lepper, M; Dweck, C)

**PSYCH 250. High-Level Vision: Object Representation**

(Same as CS 431) (Formerly CS423 High-Level Vision: Behaviors, Neurons, and Computational Models) Interdisciplinary seminar focusing on understanding how computations in the brain enable rapid and efficient object perception. Covers topics from multiple perspectives drawing on recent research in Psychology, Neuroscience, Computer Science and Applied Statistics. Emphasis on discussing recent empirical findings, methods and theoretical debates in the field. Topics include: theories of object perception, neural computations underlying invariant object perception, how visual exemplars and categories are represented in the brain, what information is present in distributed activations across neural populations and how it relates to object perception, what modern statistical and analytical tools there are for multi-variate analysis of brain activations.

1-3 units, Spr (Li, F; Grill-Spector, K)

**PSYCH 251. Affective Neuroscience**

Theory and research. Comparative and human research approaches map affective function to neuroanatomical and neurochemical substrates. Prerequisite: consent of instructor.

3 units, Spr (Knutson, B)

**PSYCH 252. Statistical Methods for Behavioral and Social Sciences**

For students who seek experience and advanced training in empirical research. Analysis of data from experimental through factorial designs, randomized blocks, repeated measures; regression methods through multiple regression, model building, analysis of covariance; categorical data analysis through two-way tables. Integrated with the use of statistical computing packages. Prerequisite: 10 or equivalent.

1-6 units, Aut (Monin, B; Thomas, E)

**PSYCH 253. Statistical Theory, Models, and Methodology**

Practical and theoretical advanced data analytic techniques such as loglinear models, signal detection, meta-analysis, logistic regression, reliability theory, and factor analysis. Prerequisite: 252 or EDUC 257.

3 units, Spr (Thomas, E)

**PSYCH 254. Lab in Experimental Methods**

Laboratory class in experimental methods for psychology, with a focus on technical/computer-based methods. Programming experience helpful although not required. Topics include data collection on the web, data management and data analysis.

3 units, Win (Frank, M)

**PSYCH 257. Individually Supervised Practicum**

Satisfies INS requirements for curricular practical training. Relevant experience for graduate students as part of their program of study. May be repeated for credit. Prerequisites: graduate standing in Psychology, consent of adviser. (Staff)

3-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**PSYCH 258. Graduate Seminar in Social Psychology Research**

For students who are already or are planning to become involved in research on social construal and the role that it plays in a variety of phenomena, notably the origin and escalation of conflict.

1-3 units, Aut (Walton, G), Win (Markus, H), Spr (Markus, H)

**PSYCH 259. Emotions: History, Theories, and Research**

(Same as PSYCH 158) Graduate students register for 259. Theoretical and empirical issues in the domain of emotions. The history of emotion theories, current approaches, and the interaction

between emotion and cognition.

1-3 units, not given this year

**PSYCH 260. Reinforcement Learning in the Brain**

Recent advances in neural and behavioral models of reinforcement learning. Reinforcement learning models. Key findings in applying models to brain activity and behavior.

2-3 units, Aut (McClure, S)

**PSYCH 261. Emotion**

(Same as PSYCH 161) (Graduate students register for 261.) The scientific study of emotion. Topics: models of emotion, emotion antecedents, emotional responses (facial, subjective, and physiological), functions of emotion, emotion regulation, individual differences, and health implications. Focus is on experimentally tractable ideas.

3 units, not given this year

**PSYCH 261A. Learning and Cognition in Activity**

(Same as EDUC 295) Methods and results of research on learning, understanding, reasoning, problem solving, and remembering, as aspects of participation in social organized activity. Principles of coordination that support cognitive achievements and learning in activity settings in work and school environments.

3 units, Spr (Pea, R)

**PSYCH 262. Language and Thought**

(Same as PSYCH 131) The psychology of language including: production and understanding in utterances; from speech sounds to speaker's meaning; children's acquisition of the first language; and the psychological basis for language systems. Language functions in natural contexts and their relation to the processes by which language is produced, understood, and acquired. Prerequisite: 1 or LINGUIST 1.

4 units, Aut (Clark, H)

**PSYCH 265. Social Psychology and Social Change**

(Same as EDUC 371X, PUBLPOL 305B) The course is intended an exploration of the major ideas, theories, and findings of social psychology and their applied status. Special attention will be given to historical issues, classic experiments, and seminal theories, and their implications for topics relevant to education. Contemporary research will also be discussed. Advanced undergraduates and graduate students from other disciplines are welcome.

2-3 units, Spr (Cohen, G)

**PSYCH 266. Current Debates in Learning and Memory**

Memory is not a unitary faculty, but consists of multiple forms of learning and remembering. The cognitive and neural architectures of memory, focusing on the application of functional brain imaging (primarily fMRI and ERP). Recommended: 45

1-3 units, Win (Wagner, A)

**PSYCH 267. Human Memory: Facts, Fallacies, and Fragile Powers**

Seminar. Applications of memory concepts in everyday life and in social and clinical settings. Topics include personal identity, childhood amnesia, autobiographic memory, emotions and memory, memory distortions, illusions, self-serving biases, recovery of repressed memories, false memories, implicit memories, and unconscious influences on social behavior, with applications to psychopathology.

1-3 units, not given this year

**PSYCH 268. Emotion Regulation**

(Same as PSYCH 168) (Graduate students register for 268.) The scientific study of emotion regulation. Topics: historical antecedents, conceptual foundations, autonomic and neural bases, individual differences, developmental and cultural aspects, implications for psychological and physical health. Focus is on experimentally tractable ideas.

3 units, Spr (Gross, J)

**PSYCH 269. Graduate Seminar in Affective Science**

May be repeated for credit. Prerequisite: graduate standing in Psychology. (Tsai)

1 unit, Aut (Gotlib, I), Win (Gotlib, I), Spr (Gotlib, I)

**PSYCH 270. The Psychology of Everyday Morality**

(Same as PSYCH 179) (Graduate students register for 270.) For graduate students, coterms, and senior Psychology majors. Traditional approaches focusing on how morality colors mundane human activities such as eating and on morality as defined by

actors themselves rather than social scientists. Moral hypocrisy, food and disgust, taboo trade-offs, moral reproach, and prejudice with compunction. Limited enrollment. Prerequisite: 70 and consent of instructor.

*4 units, not given this year*

**PSYCH 272. Special Topics in Psycholinguistics**

May be repeated for credit. Prerequisite: consent of instructor.

*1-3 units, Spr (Clark, H)*

**PSYCH 273. Graduate Seminar on Language, Cognition, and Perception**

Current topics and debates. Readings from psychology, linguistics, neuroscience, ethology, anthropology, and philosophy. May be repeated for credit.

*3 units, not given this year*

**PSYCH 274. Graduate Research Workshop on Psychological Interventions**

(Same as EDUC 287X) Psychological research has the potential to create novel interventions that promote the public good. This workshop will expose students to psychologically 'wise' intervention research and to support their efforts to conduct such interventions, especially in the context of education, broadly conceived, as well as other areas. The first part of the class will address classic interventions and important topics in intervention research, including effective delivery mechanisms, sensitive behavioral outcomes, the role of theory and psychological process, and considerations of the role of time and of mechanisms that can sustain treatment effects over time. In the second part of the class, students will present and receive feedback on their own ongoing and/or future intervention research. Prerequisite: Graduate standing in Psychology or Education, or consent of instructor.

*3 units, Win (Walton, G; Cohen, G)*

**PSYCH 275. Graduate Research**

Intermediate-level research undertaken with members of departmental faculty. Prerequisite: consent of instructor. (Staff)

*1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**PSYCH 279. Topics in Cognitive Control**

The processes that enable flexible behavior by biasing contextually relevant perceptual, mnemonic, and response representations or processing pathways. Cognitive control is central to volitional action, allowing work with memory, task/goal states, and overriding inappropriate responses. Current models of cognitive control, functional neuroimaging, and neuropsychological evidence. Recommended: 45.

*1-3 units, not given this year*

**PSYCH 281. Practicum in Teaching**

Enrollment limited to teaching assistants in selected Psychology courses. May be repeated for credit.

*1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**PSYCH 282. Practicum in Teaching PSYCH 1**

Logistical TA training including: preparing for sections; creating, correcting exams; grading an iterative writing assignment; office hours; review sessions; developing audiovisual expertise; communicating via coursework. Review of student evaluations with instructor to set goals and strategies. Second quarter focuses on pedagogical improvement. Limited to current PSYCH 1 TAs. May be repeated for credit.

*1-2 units, Aut (Gross, J), Win (Knutson, B), Spr (Walton, G)*

**PSYCH 283. International Conflict Resolution Colloquium**

(Same as IPS 250A) (Same as LAW 611.) Sponsored by the Stanford Center on International Conflict and Negotiation (SCICN). Conflict, negotiation, and dispute resolution with emphasis on conflicts and disputes with an international dimension, including conflicts involving states, peoples, and political factions such as the Middle East and Northern Ireland. Guest speakers. Issues including international law, psychology, and political science, economics, anthropology, and criminology.

*1 unit, Win (Weiner, A)*

**PSYCH 284. Computational Modeling of a Range of Neural Circuits**

Lectures, student presentations, and extensive software exercises. Focus on quantifiable models of neural signaling, starting with physical specification of input signals, sensory transductions, spiking, and mean electrical field potentials, and the inter-relation

to BOLD signals (fMRI). Applications will be drawn from many examples, but there will be a particular focus on the visual pathways and how measurements and models relate to visual perception.

*1-3 units, Spr (Staff)*

**PSYCH 286. The Psychology of Everyday Morality**

(Same as PSYCH 186) Recent literature on morality from a social psychological perspective. Topics include moral judgment, moral intuitions, moral hypocrisy, moral identity, moralization, moral reproach, shame and guilt, temptations, and self-regulation. Contemporary psychological research emphasizing descriptive approaches (what people actually do) rather than normative ones (what one should do).

*3 units, not given this year*

**PSYCH 288. Hierarchical Linear Modeling for Psychological Sciences**

HLM is a statistical theory and a computer program used to analyze multi-level data, such as trials within participants or students within classrooms. HLM allows researchers to analyze data at each level of analysis separately, to partition the total variance across different levels, to explain variance at each level separately using level-appropriate predictors, and to model cross-level interactions. How to use the HLM program and to model various types of multi-level data using it. May be repeated for credit.

*1-3 units, not given this year*

**PSYCH 290. Graduate Research Methods**

Primary tool use for psychologists: basics of experiment design; computer-based experiments; web-based experiments; data analysis packages and data presentation; exploratory statistics; eye-tracking methods; psychophysiology methods; survey construction; corpus and discourse analysis; and perhaps hypnosis. Prerequisite: Ph.D. student in Psychology.

*2 units, not given this year*

**PSYCH 291. Psychology Teaching Methods**

Open to graduate students and advanced undergraduates. Principles of good teaching. Students practice teaching skills.

*1-2 units, not given this year*

**PSYCH 297. Seminar for Coterminial Master of Arts**

Contemporary issues and student research. Student and faculty presentations.

*1-2 units, Spr (Staff)*

**PSYCH 299. Temptations and Self Control**

(Same as PSYCH 199) (Graduate students register for 299.) Why do people do things that they come to regret? How can people minimize behavior such as exercise avoidance, angry words, overeating, unsafe sex, and dangerous driving? Sources include classical and current research from experimental psychology, neuroscience, behavioral economics, and neuroeconomics. Real-world applications.

*2 units, not given this year*

**PSYCH 303. Human and Machine Hearing**

Topics: Linear and nonlinear system theory applied to sound and hearing; understanding how to model human hearing in the form of algorithms that can process general sounds efficiently; how to construct, display, and interpret auditory images; how to extract features compatible with machine-learning systems; how to build systems that extract information from sound to do a job; and example applications of machine hearing to speech, music, security and surveillance, personal sound diaries, smart house, etc. Prerequisites: basic calculus and algorithms.

*3 units, not given this year*

**PSYCH 373. Research Seminar: Mind, Brain, and Computation**

Faculty and student research presentations focusing on work linking cellular, systems, cognitive, behavioral, and computational neuroscience. Limited to affiliates of the Center for Mind, Brain and Computation. May be repeated for credit.

*1 unit, Aut (McClelland, J)*

**PSYCH 383. International Conflict: Management and Resolution**

(Same as IPS 250) (Same as LAW 656) Interdisciplinary. Theoretical insights and practical experience in resolving inter-

group and international conflicts. Sources include social psychology, political science, game theory, and international law. Personal, strategic, and structural barriers to solutions. How to develop a vision of a mutually bearable shared future, trust in the enemy, and acceptance of loss that a negotiated settlement may produce. Spoilers who seek to sabotage agreements. Advantages and disadvantages of unilateral versus reciprocal measures. Themes from the Stanford Center of International Conflict and Negotiation (SCICN). Prerequisite for undergraduates: consent of instructor.

3 units, Win (Weiner, A)

#### **PSYCH 459. Frontiers in Interdisciplinary Biosciences**

(Same as BIO 459, BIOC 459, BIOE 459, CHEMENG 459, CHEM 459) Students register through their affiliated department; otherwise register for CHEMENG 459. For specialists and non-specialists. Sponsored by the Stanford BioX Program. Three seminars per quarter address scientific and technical themes related to interdisciplinary approaches in bioengineering, medicine, and the chemical, physical, and biological sciences. Leading investigators from Stanford and the world present breakthroughs and endeavors that cut across core disciplines. Pre-seminars introduce basic concepts and background for non-experts. Registered students attend all pre-seminars; others welcome. See <http://biox.stanford.edu/courses/459.html>. Recommended: basic mathematics, biology, chemistry, and physics.

1 unit, Aut (Robertson, C), Win (Robertson, C), Spr (Robertson, C)

#### **PSYCH 801. Master's TGR Project**

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

#### **PSYCH 802. PhD TGR Dissertation**

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

## PUBLIC POLICY (PUBLPOL) COURSES

### UNDERGRADUATE COURSES IN PUBLIC POLICY

Primarily for undergraduates; graduate students may enroll with consent of adviser.

#### **PUBLPOL 53SI. Creating and Analyzing Public Policy**

How to get your work into the public discourse. Students work in groups to draft policy recommendations for local policymakers serving as project sponsors.

2 units, Win (Abrams, W)

#### **PUBLPOL 101. Politics and Public Policy**

(Same as POLISCI 123, PUBLPOL 201) How policies come to be formed. How interests compete within public institutions to turn ideas into policies. Examples of this process from contemporary policy areas, including tax, social welfare, and environmental policy; results evaluated using equity and efficiency criteria. Prerequisite: POLISCI 2 (or equivalent for Public Policy majors). GER:DB-SocSci

5 units, Spr (Frisby, T)

#### **PUBLPOL 102. Organizations and Public Policy**

(Same as PUBLPOL 202) Analysis of organizational processes emphasizing organizations that operate in a non-market environment. Prerequisite: ECON 1A. GER:DB-SocSci

5 units, Spr (Bendor, J)

#### **PUBLPOL 103B. Ethics and Public Policy**

(Same as MS&E 197, STS 110) Ethical issues in science- and technology-related public policy conflicts. Focus is on complex, value-laden policy disputes. Topics: the nature of ethics and morality; rationales for liberty, justice, and human rights; and the use and abuse of these concepts in policy disputes. Case studies from biomedicine, environmental affairs, technical professions, communications, and international relations. GER:DB-Hum, EC-EthicReas

5 units, Win (McGinn, R)

#### **PUBLPOL 103D. Ethics and Politics of Public Service**

(Same as CSRE 178, ETHICSOC 133, HUMBIO 178, PHIL

175A, PHIL 275A, POLISCI 133) Ethical and political questions in public service work, including volunteering, service learning, humanitarian assistance, and public service professions such as medicine and teaching. Motives and outcomes in service work. Connections between service work and justice. Is mandatory service an oxymoron? History of public service in the U.S. Issues in crosscultural service work. Integration with the Haas Center for Public Service to connect service activities and public service aspirations with academic experiences at Stanford. GER:DB-SocSci

5 units, Win (Mitchell, T)

#### **PUBLPOL 104. Economic Policy Analysis**

(Same as ECON 150, PUBLPOL 204) The relationship between microeconomic analysis and public policy making. How economic policy analysis is done and why political leaders regard it as useful but not definitive in making policy decisions. Economic rationales for policy interventions, methods of policy evaluation and the role of benefit-cost analysis, economic models of politics and their application to policy making, and the relationship of income distribution to policy choice. Theoretical foundations of policy making and analysis, and applications to program adoption and implementation. Prerequisites: ECON 50, and 102B.

5 units, Win (Rosston, G; Clemens, J)

#### **PUBLPOL 106. Economics of Legal Rules and Institutions**

(Same as ECON 154, PUBLPOL 206) Design and consequences of laws, given alternative policy objectives. Welfareist approach to legal policy; deontological perspectives including Kant, Locke, Mill, and Rawls. Economic efficiency and agent rationality, law as mitigation of market and cognitive failures, effects of law on expectations and incentives, balancing costs of type I and type II legal errors. Empirical studies of law's effects. Applications: property, tort, contract, antitrust, discrimination, crime, legal procedure. Examples chiefly from U.S. law, but analytical tools of general applicability. Prerequisite: ECON 50. WIM

4-5 units, Aut (Owen, B)

#### **PUBLPOL 107. Public Finance and Fiscal Policy**

(Same as ECON 141) What role should and does government play in the economy? What are the effects of government spending, borrowing, and taxation on efficiency, equity and economic growth? The course covers economic analysis, statistical evidence and historical and current fiscal policy debates in the U.S. and around the world. Policy topics: budget surpluses/deficits; tax reform; social security, public goods, and externalities; fiscal federalism; public investment; and cost-benefit analysis. Prerequisites: 51, 52 (can be taken concurrently).

5 units, Spr (Boskin, M)

#### **PUBLPOL 121. Policy and Climate Change**

Science and economics, including recent findings. History and evolution of local, state, regional, national, and international policy. California's recent landmark climate change bill. Future policy prospects, emphasizing national and international levels.

4-5 units, not given this year

#### **PUBLPOL 122. Biosecurity and Bioterrorism Response**

(Same as PUBLPOL 222, SURG 222) Open to medical, graduate, and undergraduate students. Explores the questions of how well the US and global healthcare systems are prepared to withstand a bioterrorism attack, what the parallels are to withstanding a pandemic, what can be done to prevent an attack. How the medical/healthcare field, government, and the technology sectors are involved in biosecurity and bioterrorism response, how these sectors interface, and the multidisciplinary challenges involved. Focus is on current biosecurity challenges, including global bio-surveillance, making the medical diagnosis, isolation, containment, hospital surge capacity, stockpiling and distribution of countermeasures, food and agriculture biosecurity, new promising technologies for detection of bio-threats and countermeasures. 2 unit option for class participation and short paper. 4 unit option includes a research paper.

2-4 units, Win (Buchman, M)

#### **PUBLPOL 125. Law and Public Policy**

How lawyers argue and judges decide cases versus other forms of rhetoric and decision making. Legal reasoning and dispute resolution within Anglo-American common law and in comparative perspective across diverse societies. The relationship

between law and public policy on current issues related to culture, technology, race, education, sexuality, abortion, gun control, civil liberties, national security and the environment. Sources include judicial opinions, interdisciplinary legal scholarship, ethnography, literature, and film. GER:DB-SocSci

5 units, Spr (Greenberg, J)

**PUBLPOL 135. Regional Politics and Decision Making in Silicon Valley**

Dynamics of regional leadership and decision making in Silicon Valley, a complex region composed of 40 cities and four counties without any overarching framework for governance. Formal and informal institutions shaping outcomes in the region. Case studies include transportation, workforce development, housing and land use, and climate change.

3 units, Spr (Benest, F; Hancock, R)

**PUBLPOL 154. Politics and Policy in California**

State politics and policy making, including the role of the legislature, legislative leadership, the governor, special interests, campaign finance, the public, ballot initiatives, the state constitution, the media, and the role of research organizations. Case studies include pension reform, health care, term limits and other political reform measures, open primaries, infrastructure improvements, and the budget. Changes in constitutional and in state statutes that can improve policy making in California.

5 units, Win (Nation, J; Crane, D)

**PUBLPOL 156. Health Care Policy and Reform**

Competing health care reform proposals at the state and local levels. Focus is on California including proposals for expanding coverage for children, a single payer system, employer and individual mandates. Recent proposals in other states including Massachusetts, Maine, and Vermont; their relation to national efforts. Attention to local reform efforts, including in San Francisco. Prospects for future policy.

5 units, Spr (Nation, J)

**PUBLPOL 168. Global Organizations: Managing Diversity**

(Same as SOC 168, SOC 268) Analytical tools derived from the social sciences to analyze global organizations and projects, and applied to the tradeoffs between different designs of teams and organizations. Focus is on tribal mentality and how to design effective organizations and projects for policy implementation within and across institutional settings. Recommended: 102, MS&E 180, or SOC 160. GER:DB-SocSci

5 units, Win (Meyersson Milgrom, E)

**PUBLPOL 172. Psychology and Public Policy**

(Same as PSYCH 119) Applications of psychology to public and social policy. Factors that affect the influence of psychological research and individual psychology on the creation of policy, and the influence of policy on attitudes and behavior at the personal and societal levels. Topics include education, health care, and criminal justice.

5 units, not given this year

**PUBLPOL 183. Philanthropy and Social Innovation**

Philanthropy's role in modern society and the translation of its vision and capital into social action. Topics: individual giving; philanthropic landscape and models; foundation mission and infrastructure; philanthropic strategy and grantmaking; accountability and knowledge management; global and corporate philanthropy; and public policy engagement. Readings: business school cases and industry articles. Guest speakers include individual donors and foundation presidents. Mandatory discussion section. Enrollment limited. GER:DB-SocSci

4 units, Spr (Arrillaga, L)

**PUBLPOL 184. Poverty and Policies in Developing Economies**

Economic models of growth and poverty, differences in growth rates among countries, and the persistence of poverty. Models of physical and human capital accumulation, and recent theories of the importance of institutions, social capital, and political factors. The effectiveness of social policies in developing countries, emphasizing India, in the light of theories of growth and poverty, and in terms of immediate goals and long-term consequences. Policies include schooling and health, anti-poverty, banking, and political decentralization. Prerequisites: ECON 1A,B, and ECON 50. GER:DB-SocSci

5 units, Win (Kochar, A)

**PUBLPOL 194. Technology Policy**

(Same as PUBLPOL 294) How the U.S. federal government promotes, uses, and regulates new technologies; how it decides technology policies; and debates over how to use technology to advance national goals. Topics: American attitudes towards technology; technologies for defense, homeland security, energy, health, and economic competitiveness; and when and how to regulate nanotechnology, medical enhancements, government surveillance, and Internet privacy. Recommended: POLISCI 2.

4-5 units, Win (Windham, P)

**PUBLPOL 197. Junior Honors Seminar**

(Same as ECON 198) Primarily for students who expect to write an honors thesis. Weekly sessions discuss writing an honors thesis proposal (prospectus), submitting grant applications, and completing the honors thesis. Readings focus on writing skills and research design. Students select an adviser, outline a program of study for their senior year, and complete a prospectus by the end of the quarter. Enrollment limited to 25.

5 units, Spr (Rothwell, G)

**PUBLPOL 198. Directed Readings in Public Policy**

1-5 units, Aut (Staff), Win (Staff), Spr (Staff)

**PUBLPOL 199. Senior Research**

May be repeated for credit.

1-15 units, Aut (Staff), Win (Staff), Spr (Staff)

**PUBLPOL 200A. Senior Seminar**

Students conduct original research for oral presentations and a paper on a policy-related topic. Topic and methods of analysis determined by student in consultation with instructor. Goal is to improve analytical, research, writing, and communication skills. Prerequisites: core courses in Public Policy or consent of instructor.

3 units, Aut (Ito, K)

**PUBLPOL 200B. Senior Seminar: Conducting Policy Analysis for Local Agencies**

Small student teams conduct policy analyses requested by local policymakers. With guidance from the instructor and policymaker, each team researches a real-world problem and devises implementable policy recommendations to help address it. The project culminates in a professional report and presentation to the policymaker. Prerequisites: core courses in Public Policy or consent of instructor. GER:DB-SocSci

5 units, Win (Sprague, M)

**PUBLPOL 200C. Senior Seminar: Conducting Policy analysis for Local Agencies**

Small student teams conduct policy analyses requested by local policymakers. With guidance from the instructor and policymaker, each team researches a real-world problem and devises implementable policy recommendations to help address it. The project culminates in a professional report and presentation to the policymaker. Prerequisites: core courses in Public Policy or consent of instructor.

5 units, Spr (Windham, P)

**PUBLPOL 307. Justice**

(Same as ETHICSOC 171, IPS 208, PHIL 171, PHIL 271, POLISCI 3P, POLISCI 136S) Focus is on the ideal of a just society, and the place of liberty and equality in it, in light of contemporary theories of justice and political controversies. Topics include protecting religious liberty, financing schools and elections, regulating markets, assuring access to health care, and providing affirmative action and group rights. Issues of global justice including human rights and global inequality. GER:DB-Hum, EC-EthicReas

4-5 units, Aut (Dougherty, T)

**GRADUATE COURSES IN PUBLIC POLICY**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**PUBLPOL 103C. Justice**

(Same as ETHICSOC 171, IPS 208, PHIL 171, PHIL 271, POLISCI 3P, POLISCI 136S) Focus is on the ideal of a just society, and the place of liberty and equality in it, in light of contemporary theories of justice and political controversies. Topics include protecting religious liberty, financing schools and

elections, regulating markets, assuring access to health care, and providing affirmative action and group rights. Issues of global justice including human rights and global inequality.

4-5 units, Aut (Dougherty, T)

#### **PUBLPOL 201. Politics and Public Policy**

(Same as POLISCI 123, PUBLPOL 101) How policies come to be formed. How interests compete within public institutions to turn ideas into policies. Examples of this process from contemporary policy areas, including tax, social welfare, and environmental policy; results evaluated using equity and efficiency criteria. Prerequisite: POLISCI 2 (or equivalent for Public Policy majors).

5 units, Spr (Frisby, T)

#### **PUBLPOL 202. Organizations and Public Policy**

(Same as PUBLPOL 102) Analysis of organizational processes emphasizing organizations that operate in a non-market environment. Prerequisite: ECON 1A.

5 units, Spr (Bendor, J)

#### **PUBLPOL 204. Economic Policy Analysis**

(Same as ECON 150, PUBLPOL 104) The relationship between microeconomic analysis and public policy making. How economic policy analysis is done and why political leaders regard it as useful but not definitive in making policy decisions. Economic rationales for policy interventions, methods of policy evaluation and the role of benefit-cost analysis, economic models of politics and their application to policy making, and the relationship of income distribution to policy choice. Theoretical foundations of policy making and analysis, and applications to program adoption and implementation. Prerequisites: ECON 50, and 102B.

5 units, Win (Rosston, G; Clemens, J)

#### **PUBLPOL 206. Economics of Legal Rules and Institutions**

(Same as ECON 154, PUBLPOL 106) Design and consequences of laws, given alternative policy objectives. Welfarist approach to legal policy; deontological perspectives including Kant, Locke, Mill, and Rawls. Economic efficiency and agent rationality, law as mitigation of market and cognitive failures, effects of law on expectations and incentives, balancing costs of type I and type II legal errors. Empirical studies of law's effects. Applications: property, tort, contract, antitrust, discrimination, crime, legal procedure. Examples chiefly from U.S. law, but analytical tools of general applicability. Prerequisite: ECON 50.

4-5 units, Aut (Owen, B)

#### **PUBLPOL 222. Biosecurity and Bioterrorism Response**

(Same as PUBLPOL 122, SURG 222) Open to medical, graduate, and undergraduate students. Explores the questions of how well the US and global healthcare systems are prepared to withstand a bioterrorism attack, what the parallels are to withstanding a pandemic, what can be done to prevent an attack. How the medical/healthcare field, government, and the technology sectors are involved in biosecurity and bioterrorism response, how these sectors interface, and the multidisciplinary challenges involved. Focus is on current biosecurity challenges, including global bio-surveillance, making the medical diagnosis, isolation, containment, hospital surge capacity, stockpiling and distribution of countermeasures, food and agriculture biosecurity, new promising technologies for detection of bio-threats and countermeasures. 2 unit option for class participation and short paper. 4 unit option includes a research paper.

2-4 units, Win (Buchman, M)

#### **PUBLPOL 231. Health Care Regulation, Finance and Policy**

(Same as HRP 391) (SAME AS LAW 348, MGTECON 331) Provides the legal, institutional, and economic background necessary to understand the financing and production of health services in the U.S. Potential topics include: health reform, health insurance (Medicare and Medicaid, employer-sponsored insurance, the uninsured), medical malpractice and quality regulation, pharmaceuticals, the corporate practice of medicine, regulation of fraud and abuse, and international comparisons.

3 units, Win (Bundorf, M; Kessler, D)

#### **PUBLPOL 236. Law and Public Policy: Issues in Implementation**

(Same as LAW 636). This seminar will focus on issues related to achieving successful implementation of the goals of legislation. It is widely recognized that the goals of legislation often are not realized and that the failure frequently rests in breakdowns in the

implementation process by the agencies and organizations charged with implementing the legislation. In response to problems in implementation, the institutional context of public policy implementation is changing. One category of innovations, known by names such as management-based regulation and evidence-based social service delivery, gives broad discretion to street-level service providers but subjects them to intensive monitoring and disciplined performance comparison. Another category applies market concepts to regulation or social services, for example, by creating tradeable rights (e.g., pollution allowances) or vouchers (for schools, housing, or healthcare). These, and other, new approaches are affecting bo

3 units, Win (Wald, M; Simon, W)

#### **PUBLPOL 294. Technology Policy**

(Same as PUBLPOL 194) How the U.S. federal government promotes, uses, and regulates new technologies; how it decides technology policies; and debates over how to use technology to advance national goals. Topics: American attitudes towards technology; technologies for defense, homeland security, energy, health, and economic competitiveness; and when and how to regulate nanotechnology, medical enhancements, government surveillance, and Internet privacy. Recommended: POLISCI 2.

4-5 units, Win (Windham, P)

#### **PUBLPOL 298. Directed Readings in Public Policy**

1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

#### **PUBLPOL 301A. Microeconomics**

(Same as IPS 204A) Microeconomic concepts relevant to decision making. Topics include: competitive market clearing, price discrimination; general equilibrium; risk aversion and sharing, capital market theory, Nash equilibrium; welfare analysis; public choice; externalities and public goods; hidden information and market signaling; moral hazard and incentives; auction theory; game theory; oligopoly; reputation and credibility. Prerequisites: ECON 50 and MATH 51 or equiv.

4 units, Aut (Bulow, J)

#### **PUBLPOL 301B. Cost-Benefit Analysis and Evaluation**

(Same as IPS 204B) Relationship between microeconomic analysis and public policy making. Economic rationales for policy interventions. Economic models of politics and application to policy making. Relationship of income distribution to policy choice. Welfare evaluation of public and private decisions. Education policy, social security, and health care. Prerequisites: PUBLPOL 301A (for graduate students) or ECON 50, and 102B (for undergraduates).

4-5 units, Spr (Ishii, J)

#### **PUBLPOL 302A. Introduction to American Law**

(Same as AMSTUD 179, POLISCI 122) For undergraduates. The structure of the American legal system including the courts; American legal culture; the legal profession and its social role; the scope and reach of the legal system; the background and impact of legal regulation; criminal justice; civil rights and civil liberties; and the relationship between the American legal system and American society in general.

3-5 units, Aut (Friedman, L)

#### **PUBLPOL 302B. Economic Analysis of Law**

(Same as LAW 277.) This course will provide a broad overview of the scholarly field known as law and economics. The focus will be on how legal rules and institutions can correct market failures. We will discuss the economic function of contracts and, when contracts fail or are not feasible, the role of legal remedies to resolve disputes. We will also discuss at some length the choice between encouraging private parties to initiate legal actions to correct externalities and governmental actors, such as regulatory authorities. Extensive attention will be given to the economics of litigation, and to how private incentives to bring lawsuits differs from the social value of litigation. The economic motive to commit crimes, and the optimal governmental response to crime, will be studied in depth. Specific topics within the preceding broad themes include: the Coase Theorem; the tradeoff between the certainty and severity of punishment; the choice between ex ante and ex post sanctions; neg

4 units, Win (Polinsky, M)

#### **PUBLPOL 303A. Political Methodology I**

(Same as POLISCI 150A, POLISCI 350A) Introduction to



probability and statistical inference, with applications to political science and public policy. Prerequisite: elementary calculus.

5 units, Aut (Grimmer, J)

### **PUBLPOL 303B. Political Methodology II**

(Same as POLISCI 150B, POLISCI 350B) Understanding and using the linear regression model in a social-science context: properties of the least squares estimator; inference and hypothesis testing; assessing model fit; presenting results for publication; consequences and diagnosis of departures from model assumptions; outliers and influential observations, graphical techniques for model fitting and checking; interactions among exploratory variables; pooling data; extensions for binary responses.

5 units, Win (Rivers, D)

### **PUBLPOL 303C. Bayesian Statistics and Econometrics**

(Same as LAW 243.) Linear and nonlinear regression, covariance structures, panel data, qualitative variable models, nonparametric and semiparametric methods, time series, Bayesian model averaging and variable selection. It explores Bayesian methodology including Markov Chain Monte Carlo methods, hierarchical models, model checking, mixture models, empirical Bayes approaches, approximations, and computational issues and gives some attention to foundations. Prerequisite: graduate-level econometrics or equivalent.

5 units, Spr (Strnad, J)

### **PUBLPOL 304A. Comparative Political Economy: Advanced Industrial Societies**

(Same as POLISCI 444) Political economy approaches to key policy outcomes including redistribution, the size of government, fiscal behavior, and pork-barrel politics. Theories related to institutions, interest groups, and geography, focusing on middle- and upper-income countries.

3-5 units, Spr (Cox, G)

### **PUBLPOL 305A. Judgment and Decision Making**

(Same as IPS 207A) (Same as LAW 333.) Theories and research on heuristics and biases in human inference, judgment, and decision making. Experimental and theoretical work in prospect theory emphasizing loss and risk aversion. Challenges that psychology offers to the rationalist expected utility model; attempts to meet this challenge through integration with modern behavioral economics. Decision making biases and phenomena of special relevance to public policy such as group polarization, group think, and collective action.

4 units, Win (Brest, P)

### **PUBLPOL 305B. Social Psychology and Social Change**

(Same as EDUC 371X, PSYCH 265) The course is intended an exploration of the major ideas, theories, and findings of social psychology and their applied status. Special attention will be given to historical issues, classic experiments, and seminal theories, and their implications for topics relevant to education. Contemporary research will also be discussed. Advanced undergraduates and graduate students from other disciplines are welcome.

2-3 units, Spr (Cohen, G)

### **PUBLPOL 306. Writing and Rhetoric for Policy Audiences**

This course offers hands-on learning of effective writing and presentation techniques for audiences that include policy makers, decision and stake-holders, interest groups, the media, and the public. Class time will be spent learning lessons in rhetoric, reviewing different written genres (op-ed, report, memo), editing and peer review using large screens and laptops, as well as analyzing and practicing presentations (PPT, elevator pitch, radio broadcast, board meeting). Sources include policy briefings, memos, model videos, rhetoric handouts, style manual. Students will write and make oral and multimedia arguments, individually and in teams; students will also be responsible for peer review, introducing speakers, and moderating discussions at the colloquia. Enrollment limited. Prerequisite: consent of instructor.

4 units, Win (O'Brien, A; Owen, B)

### **PUBLPOL 309. Practicum**

(Same as IPS 209) Applied policy exercises in various fields. Multidisciplinary student teams apply skills to a contemporary problem in a major policy exercise with a public sector client such as a government agency. Problem analysis, interaction with the client and experts, and presentations. Emphasis is on effective

written and oral communication to lay audiences of recommendations based on policy analysis.

1-10 units, Aut (Nation, J), Win (Nation, J)

### **PUBLPOL 309X. Public Policy Research Project**

Supervised research internship. Individual students perform policy research for outside client, applying analytical skills from core curriculum. Requires permission of program director.

1-10 units, Aut (Staff), Win (Staff), Spr (Staff)

### **PUBLPOL 310. Master of Arts Thesis**

Restricted to students writing a master's thesis in Public Policy. May be repeated for credit.

1-5 units, Aut (Staff), Win (Staff), Spr (Staff)

### **PUBLPOL 311. Public Policy Colloquium**

Weekly colloquia speaker series required for M.P.P. and M.A. in Public Policy students. Themes vary each quarter.

1 unit, Aut (Owen, B; Rosston, G), Win (Owen, B; Rosston, G), Spr (Owen, B; Rosston, G)

### **PUBLPOL 313. Issues in Science Policy**

Lecture series on significant issues in science and technology policy. Guest speakers will discuss issues including but not limited to: who should make science policy, educational dimension of science policy, manufacturing and science policy, California's stem cell policy, immigration and science policy, and the role of industry in science policy.

1 unit, not given this year

### **PUBLPOL 317. Comparing Institutional Forms: Public, Private, and Nonprofit**

(Same as EDUC 377, GSBGEN 346, SOC 377) For students interested in the nonprofit sector, those in the joint Business and Education program, and for Public Policy MA students. The focus is on the missions, functions, and capabilities of nonprofit, public, and private organizations, and the managerial challenges inherent in the different sectors. Focus is on sectors with significant competition among institutional forms, including health care, social services, the arts, and education. Sources include scholarly articles, cases, and historical materials.

4 units

### **PUBLPOL 321. Sentencing and Corrections**

(Same as LAW 621). This introductory course will familiarize students with the history, structure, and performance of America's sentencing and corrections system. Sentencing is the process by which criminal sanctions are imposed in individual cases following criminal convictions. Corrections deals with the implementation and evaluation of criminal sentences after they are handed down. In fact, the two subject areas are inseparable. The course will examine sentencing and corrections from global and historical views, from theoretical and policy perspectives, and with close attention to many problem-specific areas. We will explore sentencing theories and their application, the nature, scope and function of corrections, the impact of mass incarceration on crime and communities, the effectiveness of rehabilitation, the relationship between sanctions and crime, and the consequences of prisoner reentry. These topics will be considered as they play out in current political and policy debates.

3 units, Spr (Petersilia, J)

### **PUBLPOL 353. Science and Technology Policy**

U.S. policies for science and technology, political institutions that create and carry out these policies, processes for conducting science and developing technology, international aspects of science and technology, and the roles of scientists, engineers, and physicians in creating and implementing policy. Assignments: analyzing the politics of particular legislative proposals, assessing options for trying to reach a policy objective, and preparing mock memos and testimony.

4-5 units, Aut (Windham, P; White, R)

### **PUBLPOL 354. Economics of Innovation**

(Same as ECON 113) The modern, knowledge-based economy characterized by: rapid innovation; a dramatic increase in the rate of production of information and decline in the cost of producing it; and pervasive network externalities or increasing returns to scale. Emphasis is on the role of patents and alternative mechanisms for creating incentives for firms to innovate. Topics include: why there may be too much innovative activity; how patent laws may slow rather than help innovation; and the



interaction between public and private sector innovation. Prerequisites: 51,102B.

5 units, *Spr* (Moser, P)

### **PUBLPOL 355. Engineering Risk Analysis**

(Same as MS&E 250A) The techniques of analysis of engineering systems for risk management decisions involving trade-offs (technical, human, environmental aspects). Elements of decision analysis; probabilistic risk analysis (fault trees, event trees, systems dynamics); economic analysis of failure consequences (human safety and long-term economic discounting); and case studies such as space systems, nuclear power plants, and medical systems. Public and private sectors. Prerequisites: probability, decision analysis, stochastic processes, and convex optimization.

3 units, *NEXTYEAR*

## RADIATION ONCOLOGY (RADO) COURSES

### **UNDERGRADUATE COURSES IN RADIATION ONCOLOGY**

Primarily for undergraduates; graduate students may enroll with consent of adviser.

#### **RADO 101. Readings in Radiation Biology**

1-18 units, *Aut* (Staff), *Win* (Staff), *Spr* (Staff), *Sum* (Staff)

#### **RADO 199. Undergraduate Research**

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

1-18 units, *Aut* (Staff), *Win* (Staff), *Spr* (Staff), *Sum* (Staff)

### **GRADUATE COURSES IN RADIATION ONCOLOGY**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

#### **RADO 202. The Basic Science of Radiation Therapy**

For residents or fellows in the training program in the Division of Radiation Therapy, and for interested medical students. Basic processes of radiation biology that underly the treatment of malignant diseases by radiation. Carcinogenesis and mutagenesis by radiation are also covered. Prerequisite: familiarity with cell biology and physiology; consent of instructor.

1 unit, *Spr* (Staff)

#### **RADO 280. Early Clinical Experience in Radiation Oncology**

Provides an observational experience as determined by the instructor and student. Prerequisite: consent of instructor.

1-2 units, *Aut* (Staff), *Win* (Staff), *Spr* (Staff), *Sum* (Staff)

#### **RADO 299. Directed Reading in Radiation Oncology**

Prerequisite: consent of instructor.

1-18 units, *Aut* (Staff), *Win* (Staff), *Spr* (Staff), *Sum* (Staff)

#### **RADO 370. Medical Scholars Research**

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

4-18 units, *Aut* (Staff), *Win* (Staff), *Spr* (Staff), *Sum* (Staff)

#### **RADO 399. Graduate Research**

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

1-18 units, *Aut* (Staff), *Win* (Staff), *Spr* (Staff), *Sum* (Staff)

## RADIOLOGY (RAD) COURSES

### **UNDERGRADUATE COURSES IN RADIOLOGY**

Primarily for undergraduates; graduate students may enroll with consent of adviser.

#### **RAD 72Q. Fluorescence Imaging in Living Cells**

Preference to sophomores. Basic principles of fluorescent probes and their applications for live-cell imaging. Topics include: general classes of fluorescent probes together with their fluorescence mechanisms; strategies and methods for live cell labeling and imaging of specific proteins. Examples of applications of fluorescence imaging are presented. Provides students first-hand experience in fluorescence imaging research, and exploration of cutting edge techniques. Readings include current reviews and key original articles.

2 units, *not given this year*

#### **RAD 101. Readings in Radiology Research**

Prerequisite: consent of instructor.

1-18 units, *Aut* (Staff), *Win* (Staff), *Spr* (Staff), *Sum* (Staff)

#### **RAD 199. Undergraduate Research**

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

1-18 units, *Aut* (Staff), *Win* (Staff), *Spr* (Staff), *Sum* (Staff)

### **GRADUATE COURSES IN RADIOLOGY**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

#### **RAD 200. Imaging Anatomy and Pathology**

Supplements traditional dissection anatomy with modern cross-sectional imaging, and traditional examination of the cadaver with study of live subjects. Chest-abdominal and pelvic anatomy; congenital, traumatic, and neoplastic processes that affect these structures. Preparation for encounters with imaging tests in clinical medicine and surgery. Also open to graduate students in fields related to imaging sciences.

2 units, *not given this year*

#### **RAD 203. Introduction to Interventional Radiology**

Designed to expose pre-clinical and clinical MD students to minimally-invasive procedures using image guidance through a combination of didactics, simulation, and cathlab observation. Weekly organ-based and/or disease-based lectures are followed by simulation and faculty shadowing. Daily case-based presentations by faculty, technical demonstrations, and informal discussions reinforce the learning experience.

1 unit, *Aut* (Staff)

#### **RAD 220. Introduction to Imaging and Image-based Neuro Anatomy**

(Same as BIOE 220) The physics of medical imaging and human neuroanatomy through medical images. Emphasis is on normal anatomy, contrast mechanisms, and relative strengths of each imaging modality. Labs reinforce imaging techniques and anatomy. Prerequisites: basic biology, physics.

3 units, *Win* (Pauly, K; Zaharchuk, G)

#### **RAD 222A. Multimodality Molecular Imaging in Living Subjects I**

(Same as BIOE 222A) Focuses on instruments and chemistries for imaging of cellular and molecular processes in vivo. Basics of instrumentation physics, chemistry of molecular imaging probes, and an introduction to preclinical and clinical molecular imaging modalities.

4 units, *Aut* (Levin, C; Moseley, M)

#### **RAD 222B. Multimodality Molecular Imaging in Living Subjects II**

(Same as BIOE 222B) Focuses on molecular probes that target specific disease mechanisms. The ideal characteristics of molecular probes; how to optimize their design for use as effective imaging reagents that target specific steps in biological pathways and reveal the nature of disease through noninvasive assays.

4 units, *Win* (Levin, C; Moseley, M)

#### **RAD 222C. Multimodality Molecular Imaging in Living Subjects III**

(Same as BIOE 222C) Focuses on emerging chemistries and instruments that address unmet needs for improved diagnosis and disease management in cancer, neurological disease, cardiovascular medicine and musculoskeletal disorders. Objective is to identify problems or controversies in the field, and to resolve them through understanding the relevant primary literature.

4 units, *Spr* (Levin, C; Moseley, M)

**RAD 226. In Vivo Magnetic Resonance Spectroscopy and Imaging**

Collections of identical independent nuclear spins are described by the classical vector model of magnetic resonance imaging (MRI); however, interactions among spins, as occur in many in vivo processes, require a more complete description. Physics and engineering principles of these in vivo magnetic resonance phenomena with emphasis on current research questions and clinical applications. Topics: quantum mechanical description of magnetic resonance, density matrix theory, product operator formalism, relaxation theory and contrast mechanisms, spectroscopic imaging, spectral editing, and multinuclear studies. Prerequisites: EE 369B or familiarity with magnetic resonance, working knowledge of linear algebra.

3 units, Win (Spielman, D)

**RAD 227. Functional MRI Methods**

(Same as BIOPHYS 227) Basics of functional magnetic resonance neuroimaging, including data acquisition, analysis, and experimental design. Journal club sections. Cognitive neuroscience and clinical applications. Prerequisites: basic physics, mathematics; neuroscience recommended.

3 units, Win (Glover, G)

**RAD 228. Magnetic Resonance Imaging Programming Topics**

Primarily for students working on research projects involving MRI pulse sequence programming. Introductory and student-initiated topics in seminars and hands-on labs. Image contrast mechanisms achieved by pulse sequences that control radiofrequency and gradient magnetic fields in real time, while acquiring data in an organized manner for image reconstruction. Prerequisites: EE 369B and consent of instructor.

3 units, Sum (Hargreaves, B)

**RAD 260. Computational Methods for Biomedical Image Analysis and Interpretation**

(Same as BIOMEDIN 260) The latest biological and medical imaging modalities and their applications in research and medicine. Focus is on computational analytic and interpretive approaches to optimize extraction and use of biological and clinical imaging data for diagnostic and therapeutic translational medical applications. Topics include major image databases, fundamental methods in image processing and quantitative extraction of image features, structured recording of image information including semantic features and ontologies, indexing, search and content-based image retrieval. Case studies include linking image data to genomic, phenotypic and clinical data, developing representations of image phenotypes for use in medical decision support and research applications and the role that biomedical imaging informatics plays in new questions in biomedical science. Includes a project. Enrollment for 3 units with reduced project requirements requires instructor consent. Prerequisites: programming ability at the

3-4 units, Spr (Staff)

**RAD 261. Computational Methods for Biomedical Image Analysis and Interpretation: Lectures**

(Same as BIOMEDIN 261) Lecture component of RAD/BIOMEDIN 260. The latest biological and medical imaging modalities and their applications in research and medicine. Focus is on computational analytic and interpretive approaches to optimize extraction and use of biological and clinical imaging data for diagnostic and therapeutic translational medical applications. Topics include major image databases, fundamental methods in image processing and quantitative extraction of image features, structured recording of image information including semantic features and ontologies, indexing, search and content-based image retrieval. Case studies include linking image data to genomic, phenotypic and clinical data, developing representations of image phenotypes for use in medical decision support and research applications and the role that biomedical imaging informatics plays in new questions in biomedical science. Prerequisites: familiarity with statistics, basic biology. Knowledge of Matlab and programming recommended.

2 units, Spr (Staff)

**RAD 280. Early Clinical Experience in Radiology**

Provides an observational experience as determined by the instructor and student. Prerequisite: consent of instructor.

1-2 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**RAD 299. Directed Reading in Radiology**

Prerequisite: consent of instructor.

1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**RAD 370. Medical Scholars Research**

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

4-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**RAD 399. Graduate Research**

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

## RELIGIOUS STUDIES (RELIGST) COURSES

### UNDERGRADUATE COURSES IN RELIGIOUS STUDIES

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**RELIGST 8N. Francis of Assisi: An Exemplary Saint**

Preference to freshmen. The making of a new model of saint at a time of cultural change in the Middle Ages. What Francis as a paradigm of the model self reveals about the ethical and religious imagination, past and present. Texts include Francis' writings and primary documents that chronicle the founding of the Franciscan order. GER:DB-Hum

3 units, not given this year

**RELIGST 10N. The Problem of God: Aquinas to the New Atheism**

Critical inquiry the meaning and credibility of theistic belief through exemplary classic formulations, modern critics, and contemporary defenders. What has the idea of God meant to serious minds in the past? And in the modern or postmodern world? GER:DB-Hum

4 units, not given this year

**RELIGST 11N. The Meaning of Life: Philosophical, Aesthetic, and Religious Perspectives**

(F,Sem) Stanford Introductory Seminar. Raise ultimate questions about life. Yes, the unexamined life is not worth living, but also the un-lived life is not worth examining. Students and professor examine their own lives in the light of questions that the readings and lectures bring up: 1. The big picture: Is there such a thing as the meaning of life? 2. What is entailed in making personal-existential sense of one's own life? 3. What constitutes the good life, lived in society? 4. How can a university education bear upon the search for a meaningful life? 5. What methods for or approaches to life can one learn from studies in the humanities? After introductory lectures, the seminar studies a series of artworks, poems, diverse texts, and a film, all of which bear on the questions mentioned above -- works such: 1. Plato's Allegory of the Cave, from The Republic 2. Manet's A bar at the Folies Bergere 3. A comparison/contrast of Monet's early (1862) Still Life and van Gogh's late (18

3 units, Win (Sheehan, T)

**RELIGST 11SC. Religion in Science Fiction and Fantasy**

How the literature of science fiction and fantasy explores current conceptions about religion. Religious themes such as free will and determinism, immortality, apocalypse, and redemption. How religion figures in the contemporary imagination.

2 units, not given this year

**RELIGST 12. Exploring Hinduism**

Hindu traditions, from approx. 1500 BCE to the present, will be selectively studied through multiple approaches, including texts, practices, rituals, arts, and politics. GER:DB-Hum, EC-GlobalCom

4 units, Aut (Hess, L)

**RELIGST 12N. Perspectives on the Good Life**

(F,Sem) Stanford Introductory Seminar. The question is how to

approach and evaluate different perspectives on the good life, especially when those perspectives are beautifully, and elusively, presented to us as texts. We will consider both classic and modern writers, from the West and from China; some are explicitly religious, some explicitly secular; some literary, some philosophical. Most of the class will revolve around our talk with each other, interpreting and questioning relatively short texts. The works we will read  $\frac{1}{2}$  by Dante, Dickenson, Zhuangzi, Shklar, and others - are not intended to be representative of traditions, of eras, or of disciplines. They do, however, present a range of viewpoint and of style that will help frame and re-frame our views on the good life. They will illustrate and question the role that great texts can play in a modern 'art of living.' Perhaps most important, they will develop and reward the skills of careful reading, attentive listening, and thoughtful disc GER:DB-Hum

3-4 units, Aut (Yearley, L)

#### **RELIGST 14. Exploring Buddhism**

From its beginnings to the 21st century. Principal teachings and practices, institutional and social forms, and artistic and iconographical expressions. GER:DB-Hum, EC-GlobalCom

4 units, not given this year

#### **RELIGST 15A. The Bible and Archaeology**

(Same as CLASSGEN 15, JEWISHST 15A) An introduction to how archaeology has been used to illumine the Bible and biblical history. Did Abraham exist? Was there an Exodus? Did Joshua really conquer Canaan? What does archaeology reveal about ancient Israel beyond what is recorded in the Bible? This course will address such questions as it seeks to introduce biblical archaeology to students with no prior introduction to either the Bible or to archaeology.

4 units, Spr (Lederman, Z)

#### **RELIGST 15N. Travels through the Afterlife**

(F,Sem) (Same as JEWISHST 15N) Stanford Introductory Seminar. Since the beginning of civilization, humans have refused to believe that physical death is the end of life and have sought in various ways to travel into the afterlife. We cannot know what lies beyond death, but there are other kinds of insights to be learned from these otherworldly journeys. The first part of the course will explore the origins and history of the afterlife, going back in time to ancient Egypt, Mesopotamia, Israel, Greece, and medieval Europe to survey these cultures' view of death and what lies beyond it. The second part of the course will investigate what has happened to belief in the afterlife in modern American culture. Our ultimate goal is to confront one of the most difficult aspects of life--our fear of death and oblivion--and also to explore the power of thought and imagination to move beyond the confines of mortality. GER:DB-Hum

4 units, Win (Weitzman, S)

#### **RELIGST 16N. The Story of Human Virtues**

Bravery, Temperance, Generosity, Justice, Wisdom, and Friendship. Plato and Aristotle on human virtues, and select Muslim, Jewish, Christian, and secular appropriations and transformations of that Greek heritage. GER:DB-Hum

4 units, not given this year

#### **RELIGST 16SI. Religion and Spirituality: LGBTQ Perspectives,**

(Same as JEWISHST 16SI) Many lesbian, gay, bisexual, transgender, and queer (LGBTQ) people today are finding that mainstream religious institutions do not meet their unique spiritual needs, and they are looking elsewhere to create meaningful spiritual lives. Examine various ways that LGBTQ people are creating and practicing religion and spirituality in the United States. Explore the diversity of American LGBTQ religious and spiritual traditions, both within and beyond the boundaries of traditional religions. Religious and spiritual practices created by and for LGBTQ people and communities, rather than the responses of religious institutions towards the reality of LGBTQ people in their midst. Students will be required to attend an LGBTQ worship service in a tradition of their choice. By the end of the course, students will have a better understanding of, and appreciation for, the diversity of religious and spiritual traditions within LGBTQ communities.

1-2 units, not given this year

#### **RELIGST 18. Zen Buddhism**

Classical Zen thought in China, and its background, origins, and development. GER:DB-Hum, EC-GlobalCom

4 units, Spr (Bielefeldt, C)

#### **RELIGST 19S. Angels in America: Western Religion and Contemporary Culture**

How religion is presented in the media. Cultural representations that shape and disrupt this image of the relationship between being religious and being modern. How believers and doubters in Islam, Judaism, and Christianity are portrayed in popular culture. Sources include the music of Dar Williams and M.I.A., the plays of Tony Kushner, and the Canadian sitcom Little Mosque on the Prairie. How gay believers, agnostic leaders, terrorists, and born-again children of secular parents complicate the notion of religious belief in today's world.

3 units, not given this year

#### **RELIGST 20. Beyond Good and Evil: A Thematic Introduction to the Zoroastrian Religion**

Introduction to Zoroastrianism through a survey of its defining themes, including an examination of the figure of the prophet Zarathustra, modes of transmitting sacred knowledge, the nature of good and evil, and the importance of ritual practice and practitioners. Discuss how Zoroastrianism views the individual with respect to the body, the life cycle, and issues of gender and sexuality. Also discuss the intersection of religion and ethnicity that has defined Zoroastrianism from its origins in the 2nd millennium BCE in Central Asia up to the present day. GER:DB-Hum

3 units, not given this year

#### **RELIGST 20A. The Sun Also Shines on the Wicked: The Problem of Evil in Religious Thought**

If God is omnipotent, omniscient, and omnibenevolent, then why is there Evil in the world? We will read and discuss the key thinkers and foundational texts from Plato and the Book of Job to Nietzsche and Dostoevsky in order to appreciate the diverse responses to this question. We will survey approaches such as skepticism and theodicy in the works of the Classical authors and among Christian, Jewish, and Islamic thinkers like Augustine, Maimonides, and al-Ghazali. We will also engage with earlier dualist traditions such as Zoroastrianism and Manicheism, and with the responses of Enlightenment thinkers such as Leibniz, Hume, and Kant. We will conclude with the most strident atheistic responses from contemporary philosophers like Richard Dawkins and Daniel Dennett. GER:DB-Hum

3 units, Spr (Vevaina, Y)

#### **RELIGST 21. Religion in Science Fiction and Fantasy**

Science fiction and fantasy create alternate worlds that incorporate religious institutions and beliefs that illuminate how we think about religion now and for the future. Texts work off diverse religious traditions: Islam, Buddhism, Catholic and Protestant forms of Christianity, ancient Sumerian and Mayan religion, and Vodou are some that appear. Themes of free will and determinism, immortality, apocalypse and redemption. Myth, ritual, prophecy, the messianic hero, monasticism and mysticism. Texts like Dune, Snow Crash, Count Zero and the like explore religion in the contemporary imagination. Main assignment: write a short story. GER:DB-Hum

4 units, Spr (Gelber, H)

#### **RELIGST 23. Exploring Judaism**

Introduction to the varied beliefs, ritual practices, and sacred stories of Judaism, moving from foundational texts like the Bible and the Talmud to recent changes in Jewish religious life that have arisen in response to secular and feminist critiques, the Holocaust, and the emergence of the State of Israel. GER:DB-Hum

4 units, not given this year

#### **RELIGST 24. Exploring Christianity**

The historical development of Christian religious thought and practice from Jesus to the present. Emphasis is on the formation of Christianity's major teachings and their transformation and diverse expressions in the medieval, reformation, and modern periods. Readings focus on primary texts. GER:DB-Hum

4 units, not given this year

#### **RELIGST 27. Exploring Islam**

Introduction to Islam, its core beliefs and practices, through

architecture and the arts. Explore the visual language through which these have been expressed across diverse Muslim societies. GER:DB-Hum, EC-GlobalCom

*4 units, Win (Nanji, A)*

**RELIGST 29. Men and Masculinity in Islam: Through the Prism of Texts, Art, and Films**

Explore the meanings of manhood and constructions of masculine identity in Islamic tradition through major texts, art and films produced in Islamic societies and cultures. GER:DB-Hum

*4 units, Spr (Felek, O)*

**RELIGST 35. Introduction to Chinese Religions**

(Formerly 55.) Confucianism, Daoism, Buddhism, and the interchange among these belief systems and institutions. Set against the background of Chinese history, society, and culture, with attention to elite and popular religious forms. GER:DB-Hum, EC-GlobalCom

*4 units, not given this year*

**RELIGST 37. Introduction to Japanese Religions**

Major themes in Japanese religious culture, including gods, religious sites, and specialist and popular practices. Films and readings from literary, ethnographic, and historical sources in translation. GER:DB-Hum

*4 units, not given this year*

**RELIGST 46. Introduction to Daoism**

(Formerly 56.) Historical survey from origins to the present. Main schools, notions, communal rites, and individual practices, and the relation of Daoism to facets of Chinese culture. GER:DB-Hum

*4 units, not given this year*

**RELIGST 54. The Roots of Right and Wrong in Christianity, Judaism, and Islam**

What Christian, Jewish, and premodern Muslim thinkers have to say about these questions: what makes an act right or wrong; can a basis for right and wrong be identified independently of revealed religion; is observing commands and prohibitions sufficient to lead a life of virtue and refinement? Readings in primary texts. GER:DB-Hum

*4 units, not given this year*

**RELIGST 57. Millennium, Messiahs, and Mayhem**

How the apocalypse has captured the imaginations and influenced the behaviors of many Jews and Christians who predict the end of the world during their lifetimes, whether facilitated by the arrival of a human or divine emissary, preceded by a cataclysm, or announced by a renunciation of normative morals. Examples include the Book of Revelations, the Dead Sea Scrolls, the Brotherhood of the Free Spirit, Shabtai Tzvi, Jacob Frank, the Mormons, and Chabad Chasidism.

*4 units, not given this year*

**RELIGST 62. Philosophy of Religion**

Classic and modern questions in the philosophy of religion traced through Western and Eastern traditions: the coherence of theism, relativism, verification and ethics of belief, and mystical experience. Readings from traditional and modern texts. GER:DB-Hum

*4 units, not given this year*

**RELIGST 65. The Future of Christianity**

Developments affecting the world's largest religion in the new millennium: shifting demographics; declining numbers in mainline Christian denominations in North America and Europe; the emergence of global Christianity in Africa, Asia, and South America; Christianity after the baby boomer generation; flash point issues (sexuality, global economic system, politics, bioethics); religious pluralism. Will Christianity have a future? What kind of future? GER:DB-Hum, EC-GlobalCom

*4 units, Spr (Pitkin, B)*

**RELIGST 66SI. Catholic Social Teaching**

Catholic Social Teaching (CST) is a large and rapidly growing corpus of thought generated by the Catholic Church in its ongoing quest to understand and explore the proper role of the human person in society. In developing and promulgating CST, the Church seeks to apply the basic principles of Catholic theology and natural law to the various realms of human thought which touch on human communities and social interaction: political philosophy, economics, labor relations, war & peace, international

trade, and many others. CST seeks to explore this body of knowledge through the lens of the seven key themes of CST popularized by the United States Conference of Catholic Bishops. Study various papal encyclicals and pastoral letters associated with CST, read commentary on and criticism of CST in its various aspects, and discuss the varying interpretations of CST that have emerged over the past decades, especially in the United States. As CST puts great emphasis on engagement with the community

*1 unit, not given this year*

**RELIGST 67SI. Alternative Spring Break: Muslim Matters: Exploring the Muslim-American Identity**

In a post 9-11 world, Muslims in general have been misperceived and stereotyped. Samuel Huntington coined the phrase 'Clash of Civilizations,' when he predicted a conflict between cultures, specifically focusing on the potential clash between Western and Islamic cultures. Many believe that the Muslim American is conflicted in loyalty to the Muslim world and the West. This Alternative Spring Break trip will attempt to provide the students the tools needed to critically examine the Muslim American identity and how it perceives itself within America and the Muslim world. Through the winter course, this trip will focus on dispelling misconceptions about the monolithic nature of Muslims in America. For example, although the media frequently depicts Muslim and Arab people as interchangeable, the majority of Muslims in America and the world are not Arabs. The Muslim-American identity is shaped by a myriad of different political, social, and cultural issues. This trip will explore the social

*1 unit, not given this year*

**RELIGST 82. Approaches to the Study of Religion: Christianity**

Historical and contemporary Christianity from four viewpoints: ritual and prayer; sacred texts and creeds; ethics and life; and community governance. GER:DB-Hum

*4 units, not given this year*

**RELIGST 84. Mystics, Pilgrims, Monks, and Scholars: Religious Devotion in Medieval Christianity**

The variety and vitality of religious expression in medieval Christian Europe. How Christians sought God through mystical encounter, the structure of monastic life, visits to shrines, devotion to the saints, and the study of scripture and ancient Christian wisdom. Readings focus on primary texts. GER:DB-Hum

*4 units, not given this year*

**RELIGST 90. Buddhism and Gender**

In the Buddhist tradition there are contradictory approaches to gender: in some cases, gender is described as an illusion; in others, the female body is an impediment to enlightenment. How do Buddhists - men and women, lay and monastic - interpret these divergent views? Different Buddhist approaches to the category of gender. Values associated with masculinity and femininity in Buddhist philosophy, the gendered symbolism surrounding buddhahood, images of the masculine and feminine in Buddhist texts, and the experiences of lay and monastic men and women.

*4 units, not given this year*

**RELIGST 95. How to Read the Bible**

(Same as JEWISHST 95) What does the Bible mean? Seeks to help students answer this question for themselves by introducing some of the many ways in which the Bible has been read over the ages. The focus will be the book of Genesis, but the real subject is the history of biblical interpretation; how Genesis has been understood by theologians, writers, artists, scholars and others; and the ultimate goal is not merely to engage the Bible itself but to gain a better appreciation of the act of reading, why people read differently and the consequences of that difference for religious history. GER:DB-Hum

*4 units, not given this year*

**RELIGST 101. Who is Allah?**

Introduction to classical Islamic theology. How did notions about God's nature define theological communities? What made some ideas more likely than others to function as markers of group identity? Were the different sects distinguished by different methods of reading scriptures? Did differences in the interpretation of the Qur'an generate the communal divisions, or did differing communal identities generate different interpretations of the Qur'an? God's power (free will versus predestination) the age of

the Universe (pre-eternal world vs coming into being at some point) roots of ethics (what makes an act right or wrong.) Readings of the greatest philosophers and theologians in classical Islam. GER:DB-Hum

3 units, not given this year

#### RELIGST 102. Modern Islam

How Muslims have engaged in diverse ways with the Modern World and with new ethical, social and political challenges from the 19th century on. GER:DB-Hum

5 units, Win (Nanji, A)

#### RELIGST 103. War in Film: Psycho-spiritual Dimensions of Violence

A weekly lecture series - drawing upon experts in various disciplines, departments, and centers on campus and beyond - which seeks to understand and explain religion's renewed, and often violent, public and political relevance for global affairs at the beginning of the 21st century.

2 units, Aut (Hess, L)

#### RELIGST 104. The Daoist Body

The human body as seen in Daoist traditions and related areas, particularly cosmology and medicine. Major sources including images and charts, and the views of the human being that they reflect. GER:DB-Hum, EC-GlobalCom

4 units, not given this year

#### RELIGST 107. Hindus and Muslims in South Asia

The history of Hindus and Muslims living together in S. Asia for over 1,000 years. Peace and conflict, composite cultures, and interdependent social worlds. Partition in 1947 and the creation of separate nations. Religion, arts, society, and politics. GER:DB-Hum, EC-GlobalCom

4 units, not given this year

#### RELIGST 108. The Mahabharata

How the Sanskrit epic and its versions in other languages are interwoven with the history of Hinduism and S. Asian arts, philosophy, and social and political thought. How the text is interpreted through performance, including village ritual dramas, classical dance, and mass market television. GER:DB-Hum

4 units, not given this year

#### RELIGST 108A. Religious Epics of India: The Ramayana

The much-loved Ramayana story, from the ancient Sanskrit epic poem of Valmiki to other avatars through the ages--vernacular and Sanskrit poetry, theater, the chart-busting television serial of the late 1980s, classic comics, animated film. Religion, politics, cultural ideals, gender, media.. Recent battles over Ram's birthplace in Ayodhya and their effects on Hindu-Muslim relations and political power. GER:DB-Hum

4 units, not given this year

#### RELIGST 108C. Digital Codex: Religion, Literary Culture and Technology in South Asia

(Same as COMPLIT 145A) This course seeks to understand Hindu visual and performative culture through one epic Sanskrit narrative, that of the Mahabharata. It begins with the history of the epic's production and circulation in South Asian communities and continues with an exploration of its constructions of faith and duty. The course moves onto a consideration of the Mahabharata's latest avatars, especially in visual culture (paintings, theatre, graphic art, film and television). Lastly, the course explores questions of cannon formation, literary genres and knowledge production in the digital age. GER:DB-Hum

3-5 units, Aut (Tiwari, B)

#### RELIGST 109. Emperor, Explorer, and God: Alexander the Great in the Global Imagination

(Same as CLASSGEN 109) Survey of the image of Alexander the Great from the Hellenistic world to the contemporary. We shall discuss the appropriation of Alexander's life and legend and examine his reception as both a divine and a secular figure in a variety of cultures both East and West. Students will engage with a variety of media including texts (primary and secondary) and images (statues, coins, mosaics, illuminated manuscripts, film, and TV) in the Hellenistic, Roman, Byzantine, Jewish, Islamic, Medieval, Renaissance, and Early Modern contexts. Finally, we will evaluate contemporary representations of Alexander in TV, film and popular culture, such as William Shatner's and Adam West's 1968 TV pilot, Oliver Stone's 2004 film, and Andy

Warhol's Pop art. GER:DB-Hum

3 units, Aut (Vevaina, Y)

#### RELIGST 111. Religions of Mexico

Key issues in the study of religion and religions of Mexico. Sacred cities of the Aztec and Maya, the encounter between Christianity and indigenous religions and contemporary religious performances in Mexico and among Mexican Americans. Theoretical frames of Mircea Eliade, Emile Durkheim, and Victor Turner. Emphasis is on the recently recovered indigenous codex known as the Mapa de Cuauhtinchan #2. GER:DB-Hum

4 units, not given this year

#### RELIGST 112. Handmaids and Harlots: Biblical Women in Jewish and Christian Traditions

Miraculous births, wandering in the wilderness, encounters with angels: stories of Hagar, Sarah, Hannah, and Mary, and how their tales are read and re-told by later Jews and Christians. Sources include the Hebrew Bible and New Testament, Jewish and Christian commentary, and religious iconography. GER:DB-Hum, EC-Gender

4 units, not given this year

#### RELIGST 112D. Sociology of Judaism and Jewish Identity

(Same as JEWISHST 132D, SOC 112D) Examines the place of the Jewish people in society throughout various locales and historical periods to understand how interactions among Jews and with other groups have shaped Jewish identities. Topics include modernism, the Holocaust, Israel/nationhood, race/ethnicity, intermarriage, and assimilation. Uses theoretical, empirical, and historical material from multiple social scientific fields of study and explores the study of Judaism from several major sociological lenses.

5 units, Sum (Staff)

#### RELIGST 113B. Japanese Religion Through Film

Themes in premodern and modern Japanese religion through animations, movies and documentaries GER:DB-Hum

4 units, not given this year

#### RELIGST 114B. Religions of Korea

Religious traditions in Korea from antiquity to the present. An examination of texts including Buddha tales, official histories, spatial representations, popular literature, modern media reports and other primary sources. The impact of imperialism, modernity, and nationalism on the contemporary practice of religion.

1-4 units, not given this year

#### RELIGST 115. Hope and Prophetic Politics: Abraham Joshua Heschel and Martin Luther King, Jr.

The biblically informed prophetic tradition that has long shaped the history of American religious and political thought and that has often clashed with an impulse towards empire and the desire to accumulate power. Focus is on Abraham Joshua Heschel and Martin Luther King, Jr., 20th-century religious intellectuals whose lives and works draw on this tradition to raise and address questions basic to the role of religion in public life. GER:DB-Hum

4 units, not given this year

#### RELIGST 117. The Future of Christianity

Developments affecting the world's largest religion in the new millennium: shifting demographics; declining numbers in mainline Christian denominations in North America and Europe; the emergence of global Christianity; in Africa, Asia, and South America; Christianity after the baby boomer generation; flash point issues (sexuality, global economic system, politics, bioethics); religious pluralism. Will Christianity have a future? What kind of future? GER:DB-Hum

4 units, not given this year

#### RELIGST 118. Gandhi, King, and Nonviolence

(Same as HISTORY 105) Lives, times, theory, and practice of Mohandas Gandhi and Martin Luther King, Jr.; their significance to issues of violence and nonviolence today. GER:DB-Hum

4 units, not given this year

#### RELIGST 119. Violence and Nonviolence: Gandhi and His Legacy

Gandhi's life; his advocacy and practice of nonviolence in political movements in India and S. Africa; Indian religious sources of ahimsa or nonviolence; political interpretations of the Bhagavad Gita; Gandhian theory of nonviolence; adaptations of Gandhian nonviolence for conflict resolution in the world; critiques of

Gandhi. GER:DB-Hum, EC-GlobalCom

*5 units, Win (Hess, L)*

**RELIGST 123. Islam Today**

Case studies from the Muslim world to explore contemporary developments that affect Muslims in maintaining religious identity and continuity. GER:DB-Hum

*4 units, Spr (Nanji, A)*

**RELIGST 124. Sufi Islam**

The complex of Islamic intellectual and social perspectives subsumed under the term Sufism. Sufi mystical philosophies and historical and social evolution. Major examples include: Qushayrī, Rābī'a, Junayd, Hallāj, Sulamī, Ibn al-'Arabī, Rūmī, Nizām al-Dīn Awliyā'. Social and political roles of Sufi saints and communities. Readings include original prose and poetry in translation, secondary discussions, and ethnography. GER:DB-Hum

*4 units, not given this year*

**RELIGST 125. Authority of the Past in Islamic Thought**

(Same as RELIGST 331) How have Muslims thought about the past as a source for contextualizing the present and generating prescriptions for right conduct? What imaginations of time undergird major Islamic intellectual perspectives? A wide-ranging exploration based on readings from the Quran, lives of prophets, chronicles, philosophy of history, hagiography, epic and mythology, and ethnography.

*4 units, not given this year*

**RELIGST 126. Protestant Reformation**

16th-century evangelical reformers (Luther, Calvin, Zwingli) and reform movements (Lutheran, Reformed, Anabaptist) in their medieval context. GER:DB-Hum

*4 units, Aut (Pitkin, B)*

**RELIGST 127A. Kabbalah: The Mystical Teachings of Judaism**

Jewish mystical literature, especially the Zohar. Mystical concepts of the divine: masculine and feminine aspects of the Godhead, divine sonship; eroticism and sexuality; cosmogony and apocalypse; mystical secrecy and popularization, including the contemporary Kabbalah movement in the U.S. and figures such as Madonna and Roseanne. Guest lectures by scholars of Kabbalah including Moshe Idel from Jerusalem and Daniel Matt, the American translator of the Zohar.

*2 units, not given this year*

**RELIGST 129. Modern Jewish Thought**

From the early Enlightenment to the present. Universalism, subjectivity, and redemption within Judaism's encounter with modernity as reflected on by Jewish intellectuals within the Western philosophical tradition; how modern Jewish intellectuals have shaped and been shaped by current debates. Challenges to religious identity by secularism, capitalism, and the nation state. Messianism, mysticism, reactionary romanticism, critical theory, post-Holocaust philosophy, spirituality, and feminism. Thinkers include Spinoza, Marx, Freud, Buber, Strauss, the Frankfurt school, Benjamin, Arendt, and Levinas.

*4 units, not given this year*

**RELIGST 130. Genesis and Gender: Male and Female in Judaism, Christianity, and Islam**

(Same as JEWISHST 120) What does it mean to be a man or a woman? And what role have classical and religious traditions played in shaping understandings of gender differences? Investigation of the construction of gender identities, roles, and differences in Greek and Roman sources and three monotheistic faiths. Interpretation and retellings of the story of Adam and Eve in the Bible and the Qur'an, commentaries, lives and practices of religious communities, religious iconography down to the present. GER:DB-Hum, EC-Gender

*4 units, not given this year*

**RELIGST 132. Jesus the Christ**

How did Jesus of Nazareth, who never claimed to be Christ or divine, become the son of God after his death? Sources include the history of first-century Judaism and Christianity.

*4 units, not given this year*

**RELIGST 132B. Early Christianity, Early Judaism, and Gender**

(Same as CLASSGEN 134, JEWISHST 122B) An exploration of

gender in Early Christianity and Early Judaism. Possible topics include: an examination of Pre-Christian writings which are indicative of the foundational social contexts in which early Christian and Jewish writers operated; how women's preaching was portrayed in Paul's letters and the implications for what was actually going on in the community in Corinth; later interpretations of Paul's attitudes towards women and marriage, which diverge between a pro-marriage and further restrictive understanding of women's involvement in the Church in the pastorals (1 and 2 Timothy and Titus) and a pro-ascetic, cross-dressing, understanding of greater women's freedom in the Acts of Paul and Thecla; female Christian martyrs who had visions of themselves as men entering battle and male Rabbis who understood themselves as female virgins and who hid in warehouses to avoid martyrdom; and a survey of early Rabbinic laws pertaining to men and women and what they reveal about early Jew GER:DB-Hum

*4 units, Win (Copeland, K)*

**RELIGST 132C. The Historical Jesus**

Contemporary historical-critical methods in investigating how one might study Jewish and Christian texts of the 1st century CE. Social contexts including economic realities and elite ideological views. What can be known historically about 1st-century Judaism and Jesus' part in it. How Jewish apocalyptic messianism shaped the birth of Christianity and its trajectory through the 1st century. GER:DB-Hum

*4 units, Spr (Sheehan, T)*

**RELIGST 132D. Early Christian Gospels**

(Same as CLASSGEN 132) An exploration of Christian gospels of the first and second century. Emphasis on the variety of images and interpretations of Jesus and the good news, the broader Hellenistic and Jewish contexts of the gospels, the processes of developing and transmitting gospels, and the creation of the canon. Readings include the Gospel of John, the Gospel of Mark, the Gospel of Thomas, the Gospel of Mary and other canonical and non-canonical gospels. GER:DB-Hum

*4 units, not given this year*

**RELIGST 133. Inventing Christianity in Late Antiquity**

The transformation of an apocalyptic sect into an imperial religion from 200 to 600 C.E. Shifts in structures of authority, worship, and belief mapped against shifts in politics, economics and religion in the larger Roman empire. Cultural visions of this history including Edward Gibbon's Decline and Fall of the Roman Empire, Dan Brown's conspiracy theory in The Da Vinci Code, and Elaine Pagels' The Secret Gospel of Thomas. GER:DB-Hum

*4 units, not given this year*

**RELIGST 136. Buddhist Yoga**

Buddhist models of spiritual practice emphasizing issues in the interpretation of the contemplative path. GER:DB-Hum, EC-GlobalCom

*4 units, Win (Bielefeldt, C)*

**RELIGST 139. Nihilism**

The history of a religious specter. Examine the challenges and promises of nihilistic thinking in the wide context of European moral thought, focusing on the role it played in major 19th/20th century critiques of modernity (notably with the so-called end of metaphysics). Particular emphasis will be on the role of nothing as category of thought, and why so many religious thinkers and philosophers have tried to make something out of it. Readings to include Pascal, Jacobi, Kierkegaard, Nietzsche, Barth, Heidegger, Benjamin, Nishitani, Arendt, and the return to religion in late postmodern thought. Examples from literature/art and culture (Doestoevsky, Dada, contemporary culture critique) to enrich and ground the discussions.

*3-5 units, not given this year*

**RELIGST 144. John Calvin and Christian Faith**

Close reading and analysis of Calvin's Institutes of the Christian Religion as a classic expression of Christian belief. GER:DB-Hum

*4 units, Win (Pitkin, B)*

**RELIGST 146. Religious Mystery and Rational Reflection**

Explores the boundaries of rational knowledge about Christian faith through a careful reading of the transcendental project of Jesuit theologian Karl Rahner. Rahner's thought, informed by various sources (e.g., the mystics, Aquinas, Kant, Hegel and Ignatius Loyola), results in an interpretation of Christian faith that

strives for intellectual honesty in the face of challenges from science, atheism and post-modern culture. Yet it leaves room for a fundamental human openness to the source and goal of self-transcendence, what Rahner calls Holy Mystery. Weekly short position papers will be required to stir both reflection and discussion. GER:DB-Hum

*4 units, not given this year*

**RELIGST 148. From Jesus to Paul**

Jesus considered himself God's definitive prophet, but he did not think he was God, and had no intention of founding a new religion. How did this Jewish prophet become the gentle God and the founder of Christianity? The role of Paul. GER:DB-Hum

*4 units, not given this year*

**RELIGST 148A. St. Paul and the Politics of Religion**

The major letters written by Paul, the Apostle, and his biography, Acts of the Apostles. Historical context in first century Jewish cultural politics. Origins of Christianity, and the split into Judaism and Christianity. The relationship between Jews and non-Jews. The juxtaposition of law and faith. Origins of cultural universalism. Paul as Jewish radical versus Paul, the first Christian thinker and theologian. Recent philosophical readings of Paul (Taubes, Badiou, and Agamben). GER:DB-Hum

*4 units, not given this year*

**RELIGST 150. The Lotus Sutra: History of a Buddhist Book**

The Lotus school of Mahayana, and its Indian sources, Chinese formulation, and Japanese developments. GER:DB-Hum, DB-Hum, EC-GlobalCom

*4 units, not given this year*

**RELIGST 151. Devotion in India: Poetry, Performance, Politics**

In the 6th-18th centuries, Indian poet-singers in the vernacular languages produced passionate poetry focusing on God or Truth, but exploring human feeling and thought in wide-ranging, nuanced ways. Using examples from Tamil, Kannada, Punjabi, Hindi and Bengali, we will explore religious and psycho-spiritual meanings, related spiritual disciplines, performance in music and drama, and social-political issues. GER:DB-Hum

*4 units, Spr (Hess, L)*

**RELIGST 151A. Buddhist Art in a Cosmopolitan Environment**

The Buddhist art of Gandhara, historical Northwest India, was the product of a complex interplay of different cultures, religions and societies in the region. Gandharan art from the historic circumstances that led to its development in the first century AD to its gradual disappearance in its homeland around 500 AD. GER:DB-Hum

*4 units, not given this year*

**RELIGST 154. Buddhism Today: Responses to New Global Challenges**

How do the traditions of Buddhism cope with new social, ethical, and global challenges? Case studies from Sri Lanka, Japan, and the West. The historical position of Buddhist social thought. Buddhism's ascetic and meditative legacy: friend or foe of social engagement? GER:DB-Hum, EC-GlobalCom

*4 units, not given this year*

**RELIGST 156. Goddesses and Gender in Hinduism**

India's tradition of worshiping female forms of the divine, including Kali, Durga, Lakshmi, Saraswati, Radha, Sita, and local deities. The stories, histories, iconographies, theologies, arts, and practices associated with these goddesses. How the worship of goddesses impacts the lives of women. Readings include *Is the Goddess a Feminist?* GER:DB-Hum, EC-Gender

*4 units, not given this year*

**RELIGST 159. Music and Religion in South Asia**

Music and other arts in South Asia are often intertwined with religion. Guest teacher Tara Kini, a Hindustani classical singer from India, will join Prof. Hess in introducing history, theory and practice of music as it relates to religion, especially Hinduism and Islam, in South Asia. How is sound understood as revelation of divinity? How do songs express devotional emotion and theology? How do film songs show popular religious culture? How do musical performance and construction of history become arenas for political ideology? Students will do musical practice along with academic study. Guest artists will appear. No background required.

GER:DB-Hum, EC-GlobalCom

*4-5 units, not given this year*

**RELIGST 159A. Religion and Performance**

(Same as RELIGST 359A) What happens when religion is viewed through the lens of performance? Texts become dramas, songs, recitations, oral commentaries, dances, movies, and political appropriations. Beliefs become embodied enactments; doctrine puts on a costume and indulges in role play. Approaches to performance theory through religious enactments such as ritual, prayer, festival, drama, music, and film. Most examples from S. Asian religions; students may undertake research projects into other cultures and traditions. GER:DB-Hum

*4 units, not given this year*

**RELIGST 161. Religion and Its Modern Critics**

(Same as RELIGST 261) Philosophical critique of religion as it developed in the modern west. Looking primarily at Feuerbach, Marx, Nietzsche and Freud--the so-called masters of suspicion--consider the century-long effort to understand religious consciousness as a form of projection, ideology or illusion. Central concern will be to evaluate the major claim of the critics: that religion fosters a sense of alienation or estrangement within the human condition GER:DB-Hum

*4 units, not given this year*

**RELIGST 162. Spirituality and Nonviolent Urban and Social Transformation**

(Same as URBANST 126) A life of engagement in social transformation is often built on a foundation of spiritual and religious commitments. Case studies of nonviolent social change agents including Rosa Parks in the civil rights movement, César Chávez in the labor movement, and William Sloane Coffin in the peace movement; the religious and spiritual underpinnings of their commitments. Theory and principles of nonviolence. Films and readings. Service learning component includes placements in organizations engaged in social transformation. Service Learning Course (certified by Haas Center). GER:DB-Hum

*5 units, Win (Sanders, J; Karlin-Neumann, P)*

**RELIGST 167. Medieval Religious Philosophy**

(Same as PHIL 101A) (Same as PHIL 101A.) Survey of medieval philosophy, focusing on God, world and words. A pervasive assumption about the structure of the world, that it reflected the categories of God's mind and emerged from an act of divine speech, gave impetus to the interest in the nature of language and its relation to the world. Scripture served as one kind of divine communication to human beings, and The Book of the World as another. The problem of universals, the question of how words relate to God, epistemology, theories of reference, semiotics, are some of the topics discussed. Readings from Augustine, Anselm, Aquinas, Scotus, and Ockham, etc. GER:DB-Hum

*4 units, not given this year*

**RELIGST 170A. Biblical Hebrew, First Quarter**

(Same as JEWISHST 107A, AMELANG 170A) Establish a basic familiarity with the grammar and vocabulary of Biblical Hebrew and will begin developing a facility with the language. This course requires no prior knowledge of Hebrew and will begin with learning the alphabet. By the end of the quarter, students will be able to translate basic biblical texts, will be familiar with common lexica and reference grammars, and will have sufficient foundational knowledge to enable them to continue expanding their knowledge either in a subsequent course or own their own.

*2-4 units, Aut (Weitzman, S; DeBold, R)*

**RELIGST 170C. Reading in Biblical Hebrew**

Third of a three quarter sequence. Readings and translation of biblical narratives emphasizing grammar and literary techniques. Prerequisite: AMELANG 170B.

*4 units, not given this year*

**RELIGST 172. Sex, Body, and Gender in Medieval Religion**

Medieval conceptions of sex, body and of gender were both like and very unlike our own. Religious doctrines of the Incarnation and Eucharist, Virgin Birth and Immaculate Conception, as well as Christ's Passion, the martyrdom of saints, clerical celibacy, ideals of chastity and of ascetic self denial, put all sex, body and gender at the center of salvation and damnation. A variety of literary, monastic, and mystical texts as well as art will provide the context for exploring this cultural and religious intersection. GER:DB-



Hum, EC-Gender  
4 units, Win (Gelber, H)

**RELIGST 173. What is Enlightenment? Religion in the Age of Reason**

Many contemporary attitudes towards religion were forged in 17th- and 18th-century Europe in the midst of heated debates over the meaning and value of Christianity in a world 'come of age': Liberal calls for justice, toleration, and pluralism in matters religious; secular suspicions about religious superstition, fanaticism, and ideology; skepticism regarding the solubility of ultimate questions of meaning and metaphysics. Seminal readings on religion from Descartes, Pascal, Leibniz, Voltaire, Hume, Mendelssohn and Kant. GER:DB-Hum

4 units, not given this year

**RELIGST 174. Martyrdom in the Ancient World**

(Same as CLASSGEN 174) Jewish, pagan and Christian groups under Roman rule all told tales of persecution and resistance. How did they use these stories, and the historical experiences behind them, to form group identity? Emphasis is on ancient documents in translation, and modern scholarly interpretations, to examine the competing agendas of parties involved, group dynamics, individual motivation, symbolic violence, and the body as a locus of power and control. GER:DB-Hum

4 units, not given this year

**RELIGST 174E. Kierkegaard: Existentialism and Religion**

(Same as RELIGST 374E) Kierkegaard is rightly called one of the founders of existentialism. Like Socrates, the one philosopher in the western tradition to whom he felt consciously in debt, Kierkegaard sought to return philosophy to the work of thinking through the human condition in all its uncertainty and finitude. Although 20th century existentialists like Sartre and Camus were self-consciously atheist, Kierkegaard's existentialism has religious origins. Through readings of Kierkegaard's philosophical and religious texts, explore the possibility of an existentialist interpretation of the human condition that is religious in nature. Kierkegaard's development of a 'philosophy of existence' as a response to major trends in modern European thought, particularly in response to the philosophies of German idealism (Kant, Hegel) and romanticism. GER:DB-Hum

4 units, not given this year

**RELIGST 176. Religious Diversity: Theoretical and Practical Issues**

What does it mean for a religion to be true? If one religion is true, what about the truth of other religious possibilities? How, and why, should religious traditions be compared? Readings address tolerance and pluralism, relativism, comparative theory, and new religious virtues. GER:DB-Hum

4 units, not given this year

**RELIGST 182A. In Search of David and Solomon**

(Same as CLASSGEN 182, CLASSGEN 282, JEWISHST 182A, JEWISHST 382A, RELIGST 382A) In recent years, the existence of King David and Solomon has become a hotly contested subject, with some scholars questioning whether they were real-life historical figures and others claiming to have found evidence that corroborates their existence. Drawing on the most recent archaeological research, this course will involve students in the quest for the historical David and Solomon as a way to introduce them to the challenges of using the Bible as an historical source.

4 units, Spr (Lederman, Z)

**RELIGST 183. The Death of God: Between Hegel and Marx**

The radical transformations in Western notions of God between the death of Hegel and the birth of historical materialism, arguing that questions about theism and atheism, humanism, and history formulated in the period 1831-50 are still pertinent today. Texts from Hegel, the young Hegelians, Feuerbach, and Marx on issues of God, history, and the social dimensions of human nature. GER:DB-Hum

4 units, not given this year

**RELIGST 185. Prophetic Voices of Social Critique**

Judges, Samuel, Amos, and Isaiah depict and question power, strong leaders who inevitably fail, the societal inequities and corruption inevitable in prosperity, and the interplay between prophet as representative of God and the human king. How these texts succeed in their scrutiny of human power and societal

arrangements through attention to narrative artistry and poetic force, and condemnation of injustice. Includes service-learning component in conjunction with the Haas Center. GER:DB-Hum

4 units, not given this year

**RELIGST 188A. Issues in Liberation: El Salvador**

Permission of the instructor required. Within the context of US intervention in Central America the course investigates the history of liberation movements in El Salvador (including ¿liberation theology¿), as well as ethical questions relating economic, social, and political issues in that country.

3 units, Win (Sheehan, T)

**RELIGST 199. Individual Work**

Prerequisite: consent of instructor and department. May be repeated for credit.

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**RELIGST 201. Classical Islamic Law**

(Same as RELIGST 301) Emphasis is on methods of textual interpretation. History of premodern Islamic law, including origins, formation of schools of law, and social and political contexts. Laws of sale, marriage, divorce, and the obligation to forbid wrong. GER:DB-Hum

3-5 units, not given this year

**RELIGST 202A. Monsters, Ghosts and Other Fantastic Beings: The Supernatural and the Mysterious in Japanese Culture**

Examine the development of strange and fantastic creatures in Japan. Mysterious creatures in folklore, literature, art, manga and movies. Through them see how the concept of the strange or mysterious have evolved and how they inform Japanese modernity. GER:DB-Hum

4 units, Aut (Lin, I)

**RELIGST 203. Myth, Place, and Ritual in the Study of Religion**

(Same as RELIGST 303) Sources include: ethnographic texts and theoretical writings; the approaches of Charles Long, Jonathan Z. Smith, Victor Turner, Michael D. Jackson, and Wendy Doniger; and lived experiences as recounted in Judith Sherman's Say the Name: A Survivor's Tale in Prose and Poetry, Jackson's At Home in the World, Marie Cardinal's The Words to Say It, and John Phillip Santos's Places Left Unfinished at the Time of Creation. GER:DB-Hum

3-5 units, not given this year

**RELIGST 205. Truthful Fictions: Religion in Popular Narratives**

What do St. Augustine's Confessions, Dante's Divine Comedy, and Joss Whedon's Buffy the Vampire Slayer have in common? What can Cylons tell us about character and free will? Examine how some of today's new mythologies explore religious themes like hope, transcendence, selfhood, ethics, spiritual crisis, and heroism. Materials will include novels, graphic novels, television, and film. GER:DB-Hum

4 units, not given this year

**RELIGST 207A. Modern African Islam through Literature**

(Same as RELIGST 307A) Read the works of Modern Muslim Literature in Africa. Explore the expressions and modes by which Islam and its contemporary condition are represented in African contexts. GER:DB-Hum

4 units, not given this year

**RELIGST 207B. Islam in Central Asia**

(Same as RELIGST 307B) The history and current status of Islam in Central Asia, addressing problems in prevailing approaches to the subject in light of historical patterns and critical analysis; it will consider how the study of religion in Central Asia before the region's incorporation into the Russian/Soviet and Chinese states can help us understand developments in Muslim religious life through the 20th century and today. Issues to be addressed include Islamization and communal identity; religion and national cultures; scales of religiosity and framing Muslim status; religious knowledge and practice in social context; the dichotomies of Sovietology; Sufism, shrines, and popular religion; and Islam and political discourse and practice. GER:DB-Hum

4 units, Aut (DeWeese, D)

**RELIGST 209. Priests, Prophets, and Kings: Religion and**



**Society in Late Antique Iran**

(Same as CLASSGEN 106, CLASSGEN 206, RELIGST 309) From India to the Levant and from the Caspian Sea to the Arabian Peninsula, the Sasanian Empire (224-651 CE) was the dominant power in the Middle East till the advent of Islam. Diverse religious institutions and social practices of the Zoroastrians, Manicheans, Jews, and Christians in late antique Iran. Complex relationships between the Zoroastrian priesthood, the Sasanian monarchs, and these minority religions within the context of imperial rule. Profound religious and social changes that occurred with the Islamic conquests of Iran as well as examine the rich cultural continuities that survived from the Pre-Islamic past. GER:DB-Hum

4-5 units, Aut (*Vevaina, Y*)

**RELIGST 209A. Sugar in the Milk: Modern Zoroastrianism as Race, Religion, and Ethnicity**

(Same as RELIGST 309A) Modern Zoroastrian experience of race, religion, and ethnic identity. Some 60,000 Zoroastrians now live in India and have resided there for a millennium. In the 19th century, these peoples from Persia became colonial elites yet were acutely aware that they were not quite Indian, British, or Persian. Diverse ways this experience of dislocation has served as a defining characteristic in Parsi communal identity and contrast these South Asian experiences with the minority socio-politics of those who remained in Iran. Survey the colonial and post-colonial communities in England, East Africa, Hong Kong, Australia, and North America and examine the expression of these global diasporic experiences in literature and the arts. GER:DB-Hum

4-5 units, Win (*Vevaina, Y*)

**RELIGST 210. Translating the Daode Jing**

One of the most frequently translated works in world literature. Challenges faced by translators, support from commentaries and related sources, and assumptions underlying translations into Western languages. Recommended: classical Chinese. GER:DB-Hum

4 units, not given this year

**RELIGST 212. Chuang Tzu**

The Chuang Tzu (Zhuangzi) in its original setting and as understood by its spiritual progeny. Limited enrollment. GER:DB-Hum

5 units, not given this year

**RELIGST 216. Japanese Buddhism**

Focus on the religious lives of lay people in medieval Japan, as evidenced in collections of Buddhist stories (setsuwashu), narrative picture scrolls (emaki), and related historical materials. All readings are in English, but the instructor will also work with students interested in reading the original Japanese. GER:DB-Hum

4 units, not given this year

**RELIGST 217. Japanese Studies of Religion in China**

(Same as RELIGST 317) (Graduate students register for 317.) Readings in Japanese secondary sources on Chinese religions.

3 units, not given this year

**RELIGST 220. Modern Islamic Thought: Philosophy, Politics, Society**

Focus is on major challenges of the modern period. Historicity and plurality. Questions concerning governance, law, development, and political and social order in majority and minority Muslim contexts. Readings include original works in English and in translation. GER:DB-Hum

5 units, Spr (*Nanji, A*)

**RELIGST 220B. Crypto-Muslim Culture in Early Modern Spain**

(Same as ILAC 214) What is known about the secret religious practice and culture of the Moriscos, Spain's large minority community of Muslim converts to Christianity (1500-1609)? What role did their handwritten literature (largely Islamic texts written in Castilian but copied out in Arabic script) play in the formation and maintenance of their culture? What can these Crypto-Muslim communities teach us regarding the place of Muslim culture in Western Europe today? The course will be taught in English; knowledge of Spanish and/or Arabic script is useful but not necessary.

3-5 units, not given this year

**RELIGST 220C. Islamic Manuscript Illumination: History,****Theory, and Practice**

Comprehensive introduction to the history, theory, and practice of Islamic manuscript illumination (tazhip). The class will begin with a review of this art in general and its relationship with other Islamic book arts, such as binding, miniature painting, and calligraphy, and then move on to study the symbolic language, classical motifs, symbols, and patterns in Islamic manuscript illumination. However, the emphasis will be on actual drawing and painting, employing traditional techniques used in Islamic manuscript illumination. No prerequisite. GER:DB-Hum

4 units, Spr (*Felek, O*)

**RELIGST 221. The Talmud**

(Same as RELIGST 321) Strategies of interpretation, debate, and law making. Historical contexts. Prerequisite: Hebrew. GER:DB-Hum

4 units, not given this year

**RELIGST 221A. Philology of Rabbinic Literature**

(Same as RELIGST 321A) The genesis of rabbinic texts as texts. Evolution from oral stage to manuscript to printed text. Questions of redaction versus edition. Focus on Palestinian and Babylonian Talmud, with excursions into midrashic texts. Prerequisite: strong background in Hebrew. Knowledge of Aramaic preferred.

3-5 units, not given this year

**RELIGST 221B. The Talmud as Literature**

(Same as RELIGST 321B) In what sense can Talmud be studied as literature? Which voices can be identified? Concepts of author, editor, or redactor. The basic textual units of Talmud: sugya, chapter, and tractate. The sugya as literary genre. The aesthetic of talmudic dialectics. Prerequisite: Strong Hebrew, Aramaic preferred. GER:DB-Hum

3-5 units, not given this year

**RELIGST 221C. Aramaic Jewish texts**

(Same as JEWISHST 221C, JEWISHST 321C, RELIGST 321C) Reading of Aramaic Jewish texts with special focus on grammar and syntax. Foundations of classical Aramaic, the two major dialects of rabbinic Aramaic, the Palestinian (Galilean) and the Babylonian. Readings from Midrash, Piyyut, Talmud and Geonic materials and attempt to follow the development of the language through time. The course is intended for students with substantial knowledge of Hebrew. GER:DB-Hum

2-5 units, not given this year

**RELIGST 222. Literature and Society in Medieval Islam**

The development of literary traditions, 600-1500. Major poetic and prose topoi through examples from Arabic, Persian, and Turkish literature in translation. Literature's place in Islamic societies and biographies of significant authors. The religious value of literary forms. Literary canons as unifying agents in different parts of the medieval Muslim world. Comparison between high and folk literatures. The role of aesthetic paradigms in the formation of Islamic religious and cultural identities. GER:DB-Hum

4 units, not given this year

**RELIGST 222B. Sufism Seminar**

(Same as RELIGST 322B) Sufism through original texts and specialized scholarship. Prerequisite: ability to read at least one major language of Islamic religious literature (Arabic, Persian, Turkish, Urdu). GER:DB-Hum

3-5 units, not given this year

**RELIGST 222C. Debauchery and asceticism**

(Same as RELIGST 322C) Arabic texts written by and about early Muslim figures famous either for their limitless self-indulgence or their rigorous self-denial. Language and style of these texts, their implied or explicit dialogue with religious values, and their possible relation to each other. Questions of representation, self-representation, and biographical fallacy. Intended for students with reading knowledge of Arabic.

3-5 units, not given this year

**RELIGST 222D. The Naqshbandi Sufi Tradition**

(Same as RELIGST 322D) History of the Naqshbandi Sufi tradition, from its origins in Central Asia and its spread to other parts of the Muslim world to its contemporary profile, with attention to aspects of Sufi doctrine and practice, modes of organization and succession, patterns of economic and political activity, and issues of continuity and coherence in an international Sufi order. Social and religious context for the

emergence of the Naqshbandiyya and its development in its native region; students will read a shared body of basic works on Naqshbandi history and will pursue individual projects focused on Naqshbandi groups in particular regions or periods. GER:DB-Hum  
4 units, Aut (DeWeese, D)

**RELIGST 223. Studying Islam: History, Methods, Debates**

Islam as a subject of academic inquiry since the 19th century. Origins and critiques of major methodological perspectives in Islamic studies such as philology, religious studies, history, art history, and anthropology. Landmarks in the development of the field and the work of major scholars. Academic debates regarding unity versus diversity, orientalism, fundamentalism and Islamism, Sufism, and gender. Current trends in scholarship on medieval and modern Muslim societies. Prerequisite: course work in Islamic studies or methodology in religious studies. GER:DB-Hum  
4 units, not given this year

**RELIGST 223A. The Arabic Qur'an**

(Same as RELIGST 323A) Early history, language, structure, style, chronology, motifs, themes, and interpretation. Knowledge of Arabic required. GER:DB-Hum  
3-5 units, not given this year

**RELIGST 224. Classical Islamic Texts**

(Same as RELIGST 324) Premodern Islamic scholarship. Genre-specific historical research methods. The hadith literature, tafsir, biographical dictionaries, fiqh, tarikh, and geographical works. Prerequisite: reading knowledge of Arabic. GER:DB-Hum  
3-5 units, not given this year

**RELIGST 224B. Unveiling the Sacred: Explorations in Islamic Religious Imagination**

(Same as RELIGST 324B) Poetry and prose in translation as well as historical studies. Islamic movements invested in the idea that the sensory world has a hidden or esoteric counterpart that can be understood or experienced through following particular religious programs. Various forms of Shi'ism and Sufism, millenarian and apocalyptic movements, the Nation of Islam and its offshoots. Philosophical propositions, historical contexts, and the role of ritual in the construction of religious systems. GER:DB-Hum  
3-5 units, not given this year

**RELIGST 226. Philosophy and Kabbalah in Jewish Society: Middle Ages and Early Modern Period**

(Same as RELIGST 326) Characteristics of religious philosophy from Saadia Gaon to Maimonides, Jewish opposition to and support of philosophy in the medieval Christian and Muslim world, texts from the early development of Kabbalah, the relationship between philosophy and Kabbalah, and conflicting views of Kabbalah from the 16th through 18th centuries.  
5 units, not given this year

**RELIGST 226A. Judaism and Hellenism**

(Same as RELIGST 326A) interactions and conflicts between Jews and Greeks in the centuries following the conquests of Alexander the Great and the cultural/religious repercussions of their encounter. In what ways were Jews influenced by Greek culture? In what ways, and for what reasons, did they resist it? And how the interaction of these cultures shape the subsequent development of Judaism and Christianity? Jewish texts in the Greco-Roman period, including Jewish-Greek writers like Philo of Alexandria, the Apocrypha, the Dead Sea Scrolls, selected writings from the New Testament, and the Passover Haggadah. GER:DB-Hum  
3-5 units, not given this year

**RELIGST 226B. Judaism and Christianity in the Mediterranean World: Contact, Competition, and Conflict**

(Same as CLASSGEN 126, CLASSGEN 226, JEWISHST 226B, JEWISHST 326B, RELIGST 326B) Jewish beginnings of Christianity in the first century C.E.; process of differentiation between various Jewish and Christian groups; effect of Roman-Jewish wars on Jewish and Christian identity formation; Jewish Christians, Christian Jews, and other heretics; rise of the discourse of orthodoxy and heresy; the emergence of the Adversus Iudaeos tradition; theology as a realm of mutual attraction and conflict. Readings include Epistles of Paul in the New Testament, Christian authors from Justin through Augustine, excerpts from Rabbinic Texts (Mishnah, Midrash and Talmud), along with current literature on religion, ethnicity, and identity in the Roman world. GER:DB-Hum

5 units, not given this year

**RELIGST 226C. Mystics and Merry-makers: Innovations in Modern Judaism**

(Same as JEWISHST 226C, JEWISHST 326C, RELIGST 326C) How does a tradition many thousands of years old make a space for itself in the dynamic landscape of contemporary America? Judaism has continually adapted to its surroundings, and in the twentieth century new movements have reconstructed, revised, and renewed Jewish practice. A space within has been claimed by a series of previously disenfranchised Jews including women, queer Jews, and Jews of color. Examine some of the most innovative of these changes from Jewish feminism to the Chabad Hasidic revival. GER:DB-Hum

3-4 units, not given this year

**RELIGST 226D. Jewish-Christian Relations in Antiquity**

(Same as CLASSGEN 126B, JEWISHST 226D) Constructions of identity, community, ethnicity: these considerations frame the investigation of ancient Christian rhetoric and theology contra Iudaeos. This historical project will be set within the larger intellectual and cultural context of a) learned Graeco-Roman traditions of ethnic stereotyping; b) forensic rhetoric; and c) philosophical paideia; and these traditions will be considered within their larger social context of the Mediterranean city (I-III). Specifically, various Christian, and especially Latin traditions contra Iudaeos (IV-VI) will be studied.  
1-2 units, not given this year

**RELIGST 227. The Qur'an**

(Same as RELIGST 327) Early history, themes, structure, chronology, and premodern interpretation. Relative chronology of passages. GER:DB-Hum

5 units, not given this year

**RELIGST 229. Winged Bulls and Sun Disks: Religion and Politics in the Persian Empire**

(Same as CLASSGEN 159, CLASSGEN 259, RELIGST 329) Since Herodotus in the 5th century BCE, the Persian Empire has been represented as the exemplar of oriental despotism and imperial arrogance, a looming presence and worthy foil for the West and Greek democracy. History of the Achaemenid Empire, beginning with the rise of the Medes in the 7th century BCE to the fall of the Achaemenids to Alexander the Great's armies in 331 BCE. Focus on the intimate relationship between religion and empire and will also survey the diverse cultural institutions and religious practices found within the Empire. Evaluate contemporary representations of the Persians in politics and popular culture, such as the recent film 300 and the graphic novel on which it is based, in an attempt to better appreciate the enduring cultural legacy of the Greco-Persian wars. GER:DB-Hum

3 units, not given this year

**RELIGST 230B. Zen Studies**

(Same as RELIGST 330B) Readings in recent English-language scholarship on Chan and Zen Buddhism GER:DB-Hum

4 units, not given this year

**RELIGST 237. Jewish and Christian Rome, 1st to 6th Centuries**

To what extent are Judaism and Christianity products of the Roman Empire, and shaped by its politics? Literature concerning Jewish and Christian perceptions of power, and archaeological and artistic traces of both religions in the imperial city of Rome. What roles did strategies of resistance and accommodation play in the formation of these religious communities; emerging identities? Possible optional field trip to Rome over Spring break. GER:DB-Hum

5 units, not given this year

**RELIGST 238. Christian Neo-Platonism, East and West**

(Same as RELIGST 338) Christianity's shift to neo-Platonic Greek philosophical categories and its significance for contemporary spirituality. Readings from Plotinus, Proclus, Greek fathers such as Pseudo-Dionysius, and from Ambrose and Augustine. GER:DB-Hum

3-5 units, not given this year

**RELIGST 239. Luther and the Reform of Western Christianity**

(Same as RELIGST 339) Luther's theology, ethics, biblical interpretation, and social reforms and their significance for the

remaking of Western Christianity. Readings include Luther's own writings and secondary sources about Luther and his world. GER:DB-Hum

*3-5 units, not given this year*

**RELIGST 241B. Mystics and Mysticism**

(Same as RELIGST 341B) Explore the varieties of meaning and significance the term mysticism takes on in religious studies though an exploration of accounts of mystical experiences: visions, bodily sensations, sense of the sacred, along with practices engaged in and texts written by those claiming such experiences for themselves or others. Focus will be on Medieval/Renaissance Christians but students are invited to explore examples from other times, traditions and places. GER:DB-Hum

*3-5 units, not given this year*

**RELIGST 245. Religion, Reason, and Romanticism**

The late 18th-century European cultural shift from rationalist to romantic modes of thought and sensibility. Debates about religion as catalysts for the new Zeitgeist. Readings include: the Jewish metaphysician, Mendelssohn; the dramatist, Lessing; the philosopher of language and history, Herder; the critical idealist, Kant; and the transcendental idealist, Fichte. GER:DB-Hum

*5 units, not given this year*

**RELIGST 247. Chinese Buddhist Texts**

(Same as RELIGST 347) Chinese Buddhist texts from the Han Dynasty onwards, including sutra translations, prefaces, colophons, story collections and biographies. Prerequisite: reading competence in Chinese. GER:DB-Hum

*3-5 units, Win (Harrison, P)*

**RELIGST 247B. Readings in Chinese Religious Texts: The Lingbao Scriptures**

(Same as RELIGST 347B) A survey of the original Lingbao scriptures. Composed in the late-4th / early 5th century, these texts radically revised Daoist practice, incorporated elements of Buddhist thought and practice, and created liturgies that are still used in Daoist communities today. (Reading knowledge of Literary Chinese 22 required). GER:DB-Hum

*4 units, not given this year*

**RELIGST 248. Chinese Buddhism in World Historical Perspective**

(Same as RELIGST 348) Shared cosmologies, trade routes, and political systems. Prerequisite: background in Chinese or Japanese.

*3-5 units, not given this year*

**RELIGST 248A. Chinese Buddhism Beyond the Great Wall**

(Same as RELIGST 348A) The thought, practice, and cultural resonance of the sorts of originally Chinese Buddhism that flourished to the north and northwest of China proper during the two to three centuries following the fall of the Tang - i.e., under the Khitan Liao (907-1125) and the Tangut Xixia (1032-1227) dynasties - with special emphasis on the later fortunes of the Huayan, Chan, and Mijiao (Esoteric) traditions. Prerequisite: reading knowledge of Chinese. GER:DB-Hum

*3-5 units, not given this year*

**RELIGST 248B. Buddhist Narratives and the Shaping of Medieval Chinese Religiosity**

*3-5 units, Spr (Ho, C)*

**RELIGST 248C. Buddhist Commentary Tradition in 4th Century China**

By focusing on several commentaries Chinese Buddhist exegetes wrote from the 4-8th centuries, one being the commentary on the Weimo Jing (Vimalakirtinirdesa) jointly composed by Kumarajiva (344-413), a translator of the sutra, and two of his most important disciples (Sengzhao [384-414] and Daosheng [360?-434]). This seminar aims at analyzing key characteristics and functions of Chinese Buddhist commentaries and the roles they played in the formation of Chinese Buddhist traditions in early Medieval China. GER:DB-Hum

*3-5 units, Spr (Chen, J)*

**RELIGST 250. Classics of Indian Buddhism**

Texts in English translation including discourses (sutras), philosophical treatises, commentaries, didactic epistles, hymns, biographies, and narratives. GER:DB-Hum

*4 units, not given this year*

**RELIGST 250B. Depictions of the Buddha**

(Same as RELIGST 350B) The image of the Buddha changes relatively little from its earliest conceptions. The role of the image and the notion of the Buddha do change fundamentally with time and place. South Asian depictions of the Buddha from the earliest symbolic representations to the wrathful and peaceful forms found in the esoteric Buddhism of India and the Himalayas, as well as the changing conceptions of the Buddha to which these depictions are related. GER:DB-Hum

*3-5 units, not given this year*

**RELIGST 251. Readings in Indian Buddhist Texts**

(Same as RELIGST 351) (Graduate students register for 351.) Introduction to Buddhist literature through reading original texts in Sanskrit. Prerequisite: Sanskrit. GER:DB-Hum

*3-5 units, Spr (Harrison, P)*

**RELIGST 251A. Buddhist Visions of Paradise**

(Same as RELIGST 351A) Textual and art-historical evidence for the early development in the greater Indian cultural area of the cult of the Buddhas of the present and their paradise worlds (Pure Land Buddhism). GER:DB-Hum

*3-5 units, not given this year*

**RELIGST 253. Mountains, Buddhist Practice, and Religious Studies**

(Same as RELIGST 353) The notion of the sacred mountain. Readings from ethnographic and theoretical works, and primary sources. GER:DB-Hum

*3-5 units, not given this year*

**RELIGST 254. Recent Contributions to Buddhist Studies**

May be repeated for credit.

*4 units, not given this year*

**RELIGST 257. Readings in Daoist Texts**

(Same as RELIGST 357) Readings from primary sources. Prerequisite: classical Chinese.

*4 units, not given this year*

**RELIGST 258. Japanese Buddhist Texts**

(Same as RELIGST 358) Readings in medieval Japanese Buddhist materials. May be repeated for credit. Prerequisite: background in Japanese or Chinese. GER:DB-Hum

*3-5 units, Aut (Bielefeldt, C)*

**RELIGST 261. Religion and Its Modern Critics**

(Same as RELIGST 161) Philosophical critique of religion as it developed in the modern west. Looking primarily at Feuerbach, Marx, Nietzsche and Freud--the so-called masters of suspicion--consider the century-long effort to understand religious consciousness as a form of projection, ideology or illusion. Central concern will be to evaluate the major claim of the critics: that religion fosters a sense of alienation or estrangement within the human condition GER:DB-Hum

*4 units, not given this year*

**RELIGST 263. Judaism and the Body**

Representations and discourses of the body in Jewish culture; theories of body and ritual. Case studies of circumcision, menstrual impurity, and intersexuality. Readings include classical texts in Jewish tradition and current discussions of these textual traditions. GER:DB-Hum, EC-Gender

*4 units, not given this year*

**RELIGST 265. Research Methods and Resources in Jewish Studies**

(Same as JEWISHST 225, JEWISHST 325, RELIGST 365) Enhance students' research skills in the interdisciplinary field of Jewish Studies, emphasizing electronic reference sources, but also archival resources and print publications. Coverage includes: Basic reference sources in Jewish Studies, History and bibliography of the Hebrew book, Hebrew Bible, Talmud, Religious studies (post-Talmudic), Jewish philosophy, Jewish history (by period; by region), Jewish languages, Hebrew literature, Yiddish literature, Zionism and Israel, Sephardic Jewry, women, Holocaust, miscellaneous topics (art, music, folklore and ethnography, sociology, genealogy, geography, pseudonyms, honorifics, abbreviations). Class sessions will also include special workshops on Hebrew / Yiddish / Ladino romanization (transliteration/transcription).

*1-3 units, not given this year*

**RELIGST 271A. Dante's Spiritual Vision**

Poetry, ethics, and theology in Dante's Divine Comedy. Supplementary readings from classical authors such as St. Thomas Aquinas, and from modern writers, such as Jorge Borges. Fulfills capstone seminar requirement for the Philosophy and Literature tracks. Students may take 271A without taking 271B. Consent of the instructor required. GER:DB-Hum

*4-5 units, not given this year*

**RELIGST 271B. Dante's Spiritual Vision**

Poetry, ethics, and theology in Dante's Divine Comedy. Supplementary readings from classical authors such as St. Thomas, and from modern writers, such as Jorge Borges. Fulfills capstone seminar requirement for the Philosophy and Literature tracks. Prerequisite: 271A GER:DB-Hum

*4-5 units, not given this year*

**RELIGST 272. Kant on Religion**

(Same as RELIGST 372) Critical examination of Kant's principle writings on religion against the background of his general theoretical and practical philosophy and guided by the hypothesis that his philosophy of religion continues to offer significant insights and resources to contemporary theories of religion. Recent reassessments of Kant on religion in the secondary literature will also be read and discussed

*3-5 units, not given this year*

**RELIGST 273. Historicism and Its Problems**

(Same as RELIGST 373) The emergence, varieties, and crises of historicism as a world view and approach to the study of religion in the 19th and 20th centuries. The implications of historical reason and historical consciousness for the philosophy of religion, ethics, and theology. GER:DB-Hum

*3-5 units, not given this year*

**RELIGST 274. From Kant to Kierkegaard**

(Same as RELIGST 374) (Graduate students register for 374.) The main currents of religious thought in Germany from Kant's critical philosophy to Kierkegaard's revolt against Hegelianism. Emphasis is on the theories of religion, the epistemological status of religious discourse, the role of history (especially the figure of Jesus), and the problem of alienation/reconciliation in seminal modern thinkers: Kant, Schleiermacher, Hegel, and Kierkegaard. GER:DB-Hum

*3-5 units, not given this year*

**RELIGST 275. Kierkegaard and Religious Existentialism**

(Same as RELIGST 375) (Graduate students register for 375.) Close reading of Kierkegaard's magnum opus, *Concluding Unscientific Postscript to Philosophical Fragments*, in its early 19th-century context. GER:DB-Hum

*3-5 units, not given this year*

**RELIGST 277. The Later Heidegger**

(Same as RELIGST 377) Lectures and seminar discussions of the problematic of the later Heidegger (1930 - 1976) in the light of his entire project. Readings from *Pathmarks*, *Four Seminars*, *On Time and Being*, and other texts. GER:DB-Hum

*3 units, not given this year*

**RELIGST 278. Heidegger: Confronting the Ultimate**

(Same as RELIGST 378) Heidegger's work on meaning, the self, and the sacred. Texts include *Being and Time*, courses and opuscula up to 1933, the *Letter on Humanism*, and *Contributions of Philosophy*. GER:DB-Hum

*3-5 units, not given this year*

**RELIGST 279. Heidegger and the Holy**

(Same as RELIGST 379) Heidegger's philosophy as opening a new door onto the possibility of experiencing the sacred after the collapse of traditional metaphysical theology. A close reading of *Being and Time* as an introduction to the question of the holy.

*4 units, not given this year*

**RELIGST 279A. Heidegger on human being and God**

This lecture-seminar first raises the question of essential characteristics of human being, such as temporality, mortality, hermeneutics and the relation to meaning, and then, via readings from Karl Rahner, asks whether human being is open to a possible relation to a supernatural divinity. GER:DB-Hum

*4 units, Spr (Sheehan, T)*

**RELIGST 280. Schleiermacher: Reconstructing Religion**

(Same as RELIGST 380) Idealist philosopher, Moravian pietist, early German Romantic, co-founder of the University of Berlin, head preacher at Trinity Church, translator of Plato's works, Hegel's opponent, pioneer in modern hermeneutics, father of modern theology. Schleiermacher's controversial reconception of religion and theology in its philosophical context. GER:DB-Hum

*3-5 units, not given this year*

**RELIGST 282. King Solomon and the Search for Wisdom**

(Same as JEWISHST 228, JEWISHST 328, RELIGST 382) What is wisdom according to the Bible? The course addresses this question by surveying various biblical and post-biblical texts associated with King Solomon. Other topics include the on-going debate over the historical existence of a Solomonic kingdom, the origins and history of the Jerusalem Temple, and Solomon's role in Jewish, Christian and Islamic tradition.

*4 units, not given this year*

**RELIGST 290. Majors Seminar**

Required of all majors and joint majors. The study of religion reflects upon itself. Representative modern and contemporary attempts to theorize, and thereby understand, the phenomena of religion in anthropology, psychology, sociology, cultural studies, and philosophy. WIM. WIM

*5 units, Win (Sockness, B)*

**RELIGST 297. Senior Essay/Honors Essay Research**

Guided by faculty adviser. May be repeated for credit. Prerequisite: consent of instructor and department.

*3-5 units, Aut (Staff), Win (Staff), Spr (Staff)*

**RELIGST 298. Senior Colloquium**

For Religious Studies majors writing the senior essay or honors thesis. Students present work in progress, and read and respond to others. Approaches to research and writing in the humanities.

*5 units, Spr (Pitkin, B)*

**GRADUATE COURSES IN RELIGIOUS STUDIES**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**RELIGST 204. Paleography of Medieval and Early Modern Manuscripts**

(Same as ENGLISH 209) Introductory course in the history of writing and of the book, from the late antique period until the advent of printing. Opportunity to learn to read and interpret medieval manuscripts through hands-on examination of original materials in Special Collections of Stanford Libraries as well as through digital images. Offers critical training in the reading of manuscripts for students from departments as diverse as Classics, History, Philosophy, Religious Studies, English, and the Division of Languages Cultures and Literatures.

*3-5 units, Win (Brown, G)*

**RELIGST 219. Buddhism and Death**

The role of pre and post mortem practices in ancient and modern Buddhist traditions; examples from India, China, and Japan. How the clergy and laity conceived of the process of dying, and how those beliefs were transformed into rituals.

*4 units, not given this year*

**RELIGST 301. Classical Islamic Law**

(Same as RELIGST 201) Emphasis is on methods of textual interpretation. History of premodern Islamic law, including origins, formation of schools of law, and social and political contexts. Laws of sale, marriage, divorce, and the obligation to forbid wrong.

*3-5 units, not given this year*

**RELIGST 302. Islamic Studies Proseminar**

Research methods and materials for the study of Islam.

*1-5 units, not given this year*

**RELIGST 303. Myth, Place, and Ritual in the Study of Religion**

(Same as RELIGST 203) Sources include: ethnographic texts and theoretical writings; the approaches of Charles Long, Jonathan Z. Smith, Victor Turner, Michael D. Jackson, and Wendy Doniger; and lived experiences as recounted in Judith Sherman's *Say the*

Name: A Survivor's Tale in Prose and Poetry, Jackson's At Home in the World, Marie Cardinal's The Words to Say It, and John Phillip Santos's Places Left Unfinished at the Time of Creation.

3-5 units, not given this year

**RELIGST 304A. Theories and Methods**

Required of graduate students in Religious Studies. Approaches to the study of religion. Prerequisite: consent of instructor.

4 units, Aut (Gelber, H)

**RELIGST 304B. Theories and Methods**

Required of graduate students in Religious Studies. Approaches to the study of religion. Prerequisite: consent of instructor.

4 units, not given this year

**RELIGST 307A. Modern African Islam through Literature**

(Same as RELIGST 207A) Read the works of Modern Muslim Literature in Africa. Explore the expressions and modes by which Islam and its contemporary condition are represented in African contexts.

4 units, not given this year

**RELIGST 307B. Islam in Central Asia**

(Same as RELIGST 207B) The history and current status of Islam in Central Asia, addressing problems in prevailing approaches to the subject in light of historical patterns and critical analysis; it will consider how the study of religion in Central Asia before the region's incorporation into the Russian/Soviet and Chinese states can help us understand developments in Muslim religious life through the 20th century and today. Issues to be addressed include Islamization and communal identity; religion and national cultures; scales of religiosity and framing Muslim status; religious knowledge and practice in social context; the dichotomies of Sovietology; Sufism, shrines, and popular religion; and Islam and political discourse and practice.

4 units, Aut (DeWeese, D)

**RELIGST 308. Medieval Japanese Buddhism**

Japanese religion and culture, including Buddhism, Shinto, popular religion, and new religions, through the medium of film.

3-5 units, not given this year

**RELIGST 309. Priests, Prophets, and Kings: Religion and Society in Late Antique Iran**

(Same as CLASSGEN 106, CLASSGEN 206, RELIGST 209) From India to the Levant and from the Caspian Sea to the Arabian Peninsula, the Sasanian Empire (224-651 CE) was the dominant power in the Middle East till the advent of Islam. Diverse religious institutions and social practices of the Zoroastrians, Manicheans, Jews, and Christians in late antique Iran. Complex relationships between the Zoroastrian priesthood, the Sasanian monarchs, and these minority religions within the context of imperial rule. Profound religious and social changes that occurred with the Islamic conquests of Iran as well as examine the rich cultural continuities that survived from the Pre-Islamic past.

4-5 units, Aut (Vevaina, Y)

**RELIGST 309A. Sugar in the Milk: Modern Zoroastrianism as Race, Religion, and Ethnicity**

(Same as RELIGST 209A) Modern Zoroastrian experience as race, religion, and ethnic identity. Some 60,000 Zoroastrians now live in India and have resided there for a millennium. In the 19th century, these peoples from Persia became colonial elites yet were acutely aware that they were not quite Indian, British, or Persian. Diverse ways this experience of dislocation has served as a defining characteristic in Parsi communal identity and contrast these South Asian experiences with the minority socio-politics of those who remained in Iran. Survey the colonial and post-colonial communities in England, East Africa, Hong Kong, Australia, and North America and examine the expression of these global diasporic experiences in literature and the arts.

4-5 units, Win (Vevaina, Y)

**RELIGST 312. Buddhist Studies Proseminar**

Research methods and materials for the study of Buddhism. May be repeated for credit. Prerequisite: reading knowledge of Chinese or Japanese.

1-5 units, not given this year

**RELIGST 317. Japanese Studies of Religion in China**

(Same as RELIGST 217) (Graduate students register for 317.) Readings in Japanese secondary sources on Chinese religions.

3 units, not given this year

**RELIGST 321. The Talmud**

(Same as RELIGST 221) Strategies of interpretation, debate, and law making. Historical contexts. Prerequisite: Hebrew.

4 units, not given this year

**RELIGST 321A. Philology of Rabbinic Literature**

(Same as RELIGST 221A) The genesis of rabbinic texts as texts. Evolution from oral stage to manuscript to printed text. Questions of redaction versus edition. Focus on Palestinian and Babylonian Talmud, with excursions into midrashic texts. Prerequisite: strong background in Hebrew. Knowledge of Aramaic preferred.

3-5 units, not given this year

**RELIGST 321B. The Talmud as Literature**

(Same as RELIGST 221B) In what sense can Talmud be studied as literature? Which voices can be identified? Concepts of author, editor, or redactor. The basic textual units of Talmud: sugya, chapter, and tractate. The sugya as literary genre. The aesthetic of talmudic dialectics. Prerequisite: Strong Hebrew, Aramaic preferred.

3-5 units, not given this year

**RELIGST 321C. Aramaic Jewish texts**

(Same as JEWISHST 221C, JEWISHST 321C, RELIGST 221C) Reading of Aramaic Jewish texts with special focus on grammar and syntax. Foundations of classical Aramaic, the two major dialects of rabbinic Aramaic, the Palestinian (Galilean) and the Babylonian. Readings from Midrash, Piyut, Talmud and Geonic materials and attempt to follow the development of the language through time. The course is intended for students with substantial knowledge of Hebrew.

2-5 units, not given this year

**RELIGST 322B. Sufism Seminar**

(Same as RELIGST 222B) Sufism through original texts and specialized scholarship. Prerequisite: ability to read at least one major language of Islamic religious literature (Arabic, Persian, Turkish, Urdu).

3-5 units, not given this year

**RELIGST 322C. Debauchery and asceticism**

(Same as RELIGST 222C) Arabic texts written by and about early Muslim figures famous either for their limitless self-indulgence or their rigorous self-denial. Language and style of these texts, their implied or explicit dialogue with religious values, and their possible relation to each other. Questions of representation, self-representation, and biographical fallacy. Intended for students with reading knowledge of Arabic.

3-5 units, not given this year

**RELIGST 322D. The Naqshbandi Sufi Tradition**

(Same as RELIGST 222D) History of the Naqshbandi Sufi tradition, from its origins in Central Asia and its spread to other parts of the Muslim world to its contemporary profile, with attention to aspects of Sufi doctrine and practice, modes of organization and succession, patterns of economic and political activity, and issues of continuity and coherence in an international Sufi order. Social and religious context for the emergence of the Naqshbandiyya and its development in its native region; students will read a shared body of basic works on Naqshbandi history and will pursue individual projects focused on Naqshbandi groups in particular regions or periods.

4 units, Aut (DeWeese, D)

**RELIGST 323A. The Arabic Qur'an**

(Same as RELIGST 223A) Early history, language, structure, style, chronology, motifs, themes, and interpretation. Knowledge of Arabic required.

3-5 units, not given this year

**RELIGST 324. Classical Islamic Texts**

(Same as RELIGST 224) Premodern Islamic scholarship. Genre-specific historical research methods. The hadith literature, tafsir, biographical dictionaries, fiqh, tarikh, and geographical works. Prerequisite: reading knowledge of Arabic.

3-5 units, not given this year

**RELIGST 324B. Unveiling the Sacred: Explorations in Islamic Religious Imagination**

(Same as RELIGST 224B) Poetry and prose in translation as well as historical studies. Islamic movements invested in the idea that

the sensory world has a hidden or esoteric counterpart that can be understood or experienced through following particular religious programs. Various forms of Shi'ism and Sufism, millenarian and apocalyptic movements, the Nation of Islam and its offshoots. Philosophical propositions, historical contexts, and the role of ritual in the construction of religious systems.

*3-5 units, not given this year*

**RELIGST 326. Philosophy and Kabbalah in Jewish Society: Middle Ages and Early Modern Period**

(Same as RELIGST 226) Characteristics of religious philosophy from Saadia Gaon to Maimonides, Jewish opposition to and support of philosophy in the medieval Christian and Muslim world, texts from the early development of Kabbalah, the relationship between philosophy and Kabbalah, and conflicting views of Kabbalah from the 16th through 18th centuries.

*5 units, not given this year*

**RELIGST 326A. Judaism and Hellenism**

(Same as RELIGST 226A) interactions and conflicts between Jews and Greeks in the centuries following the conquests of Alexander the Great and the cultural/religious repercussions of their encounter. In what ways were Jews influenced by Greek culture? In what ways, and for what reasons, did they resist it? And how the interaction of these cultures shape the subsequent development of Judaism and Christianity? Jewish texts in the Greco-Roman period, including Jewish-Greek writers like Philo of Alexandria, the Apocrypha, the Dead Sea Scrolls, selected writings from the New Testament, and the Passover Haggadah.

*3-5 units, not given this year*

**RELIGST 326B. Judaism and Christianity in the Mediterranean World: Contact, Competition, and Conflict**

(Same as CLASSGEN 126, CLASSGEN 226, JEWISHST 226B, JEWISHST 326B, RELIGST 226B) Jewish beginnings of Christianity in the first century C.E.; process of differentiation between various Jewish and Christian groups; effect of Roman-Jewish wars on Jewish and Christian identity formation; Jewish Christians, Christian Jews, and other heretics; rise of the discourse of orthodoxy and heresy; the emergence of the Adversus Judaeos tradition; theology as a realm of mutual attraction and conflict. Readings include Epistles of Paul in the New Testament, Christian authors from Justin through Augustine, excerpts from Rabbinic Texts (Mishnah, Midrash and Talmud), along with current literature on religion, ethnicity, and identity in the Roman world.

*5 units, not given this year*

**RELIGST 326C. Mystics and Merrymakers: Innovations in Modern Judaism**

(Same as JEWISHST 226C, JEWISHST 326C, RELIGST 226C) How does a tradition many thousands of years old make a space for itself in the dynamic landscape of contemporary America? Judaism has continually adapted to its surroundings, and in the twentieth century new movements have reconstructed, revised, and renewed Jewish practice. A space within has been claimed by a series of previously disenfranchised Jews including women, queer Jews, and Jews of color. Examine some of the most innovative of these changes from Jewish feminism to the Chabad Hasidic revival.

*3-4 units, not given this year*

**RELIGST 327. The Qur'an**

(Same as RELIGST 227) Early history, themes, structure, chronology, and premodern interpretation. Relative chronology of passages.

*5 units, not given this year*

**RELIGST 328S. The Study of the Midrash**

Two-week block seminar; four sessions. Talmudic philology; development and transmission of the Talmudic text and manuscripts. Relationship between Midrash and Mishnah and between Mishnah and Tosefta; development of talmudic sugiot; relationship between the Babylonian and Palestinian Talmud.

*1-2 units, OCCASIONAL*

**RELIGST 329. Winged Bulls and Sun Disks: Religion and Politics in the Persian Empire**

(Same as CLASSGEN 159, CLASSGEN 259, RELIGST 229) Since Herodotus in the 5th century BCE, the Persian Empire has been represented as the exemplar of oriental despotism and imperial arrogance, a looming presence and worthy foil for the

West and Greek democracy. History of the Achaemenid Empire, beginning with the rise of the Medes in the 7th century BCE to the fall of the Achaemenids to Alexander the Great's armies in 331 BCE. Focus on the intimate relationship between religion and empire and will also survey the diverse cultural institutions and religious practices found within the Empire. Evaluate contemporary representations of the Persians in politics and popular culture, such as the recent film 300 and the graphic novel on which it is based, in an attempt to better appreciate the enduring cultural legacy of the Greco-Persian wars.

*3 units, not given this year*

**RELIGST 330B. Zen Studies**

(Same as RELIGST 230B) Readings in recent English-language scholarship on Chan and Zen Buddhism

*4 units, not given this year*

**RELIGST 331. Authority of the Past in Islamic Thought**

(Same as RELIGST 125) How have Muslims thought about the past as a source for contextualizing the present and generating prescriptions for right conduct? What imaginations of time undergird major Islamic intellectual perspectives? A wide-ranging exploration based on readings from the Quran, lives of prophets, chronicles, philosophy of history, hagiography, epic and mythology, and ethnography.

*4 units, not given this year*

**RELIGST 338. Christian Neo-Platonism, East and West**

(Same as RELIGST 238) Christianity's shift to neo-Platonic Greek philosophical categories and its significance for contemporary spirituality. Readings from Plotinus, Proclus, Greek fathers such as Pseudo-Dionysus, and from Ambrose and Augustine.

*3-5 units, not given this year*

**RELIGST 339. Luther and the Reform of Western Christianity**

(Same as RELIGST 239) Luther's theology, ethics, biblical interpretation, and social reforms and their significance for the remaking of Western Christianity. Readings include Luther's own writings and secondary sources about Luther and his world.

*3-5 units, not given this year*

**RELIGST 341. Comparative Perspective on Confucian Texts**

Classical Confucian texts, in prose and poetry, interpreted through comparative perspectives drawn from both inside and outside China. Consent of the instructor required.

*4-5 units, not given this year*

**RELIGST 341B. Mystics and Mysticism**

(Same as RELIGST 241B) Explore the varieties of meaning and significance the term mysticism takes on in religious studies through an exploration of accounts of mystical experiences: visions, bodily sensations, sense of the sacred, along with practices engaged in and texts written by those claiming such experiences for themselves or others. Focus will be on Medieval/Renaissance Christians but students are invited to explore examples from other times, traditions and places.

*3-5 units, not given this year*

**RELIGST 347. Chinese Buddhist Texts**

(Same as RELIGST 247) Chinese Buddhist texts from the Han Dynasty onwards, including sutra translations, prefaces, colophons, story collections and biographies. Prerequisite: reading competence in Chinese.

*3-5 units, Win (Harrison, P)*

**RELIGST 347B. Readings in Chinese Religious Texts: The Lingbao Scriptures**

(Same as RELIGST 247B) A survey of the original Lingbao scriptures. Composed in the late-4th / early 5th century, these texts radically revised Daoist practice, incorporated elements of Buddhist thought and practice, and created liturgies that are still used in Daoist communities today. (Reading knowledge of Literary Chinese *ii* required).

*4 units, not given this year*

**RELIGST 348. Chinese Buddhism in World Historical Perspective**

(Same as RELIGST 248) Shared cosmologies, trade routes, and political systems. Prerequisite: background in Chinese or Japanese.

*3-5 units, not given this year*

**RELIGST 348A. Chinese Buddhism Beyond the Great Wall**

(Same as RELIGST 248A) The thought, practice, and cultural resonance of the sorts of originally Chinese Buddhism that flourished to the north and northwest of China proper during the two to three centuries following the fall of the Tang - i.e., under the Khitan Liao (907-1125) and the Tangut Xixia (1032-1227) dynasties - with special emphasis on the later fortunes of the Huayan, Chan, and Mijiao (Esoteric) traditions. Prerequisite: reading knowledge of Chinese.

*3-5 units, not given this year*

**RELIGST 349. Meditation and Mythology in Chinese Buddhism**

Readings in Chinese texts and English scholarly literature on issues such as specific techniques and hagiographical imagery in Chinese Buddhist traditions of self-cultivation. Prerequisite: background in Chinese or Japanese.

*3-5 units, not given this year*

**RELIGST 350. Modern Western Religious Thought****Proseminar**

Selected topics in recent and contemporary religious thought. May be repeated for credit.

*1-5 units, not given this year*

**RELIGST 350B. Depictions of the Buddha**

(Same as RELIGST 250B) The image of the Buddha changes relatively little from its earliest conceptions. The role of the image and the notion of the Buddha do change fundamentally with time and place. South Asian depictions of the Buddha from the earliest symbolic representations to the wrathful and peaceful forms found in the esoteric Buddhism of India and the Himalayas, as well as the changing conceptions of the Buddha to which these depictions are related.

*3-5 units, not given this year*

**RELIGST 351. Readings in Indian Buddhist Texts**

(Same as RELIGST 251) (Graduate students register for 351.) Introduction to Buddhist literature through reading original texts in Sanskrit. Prerequisite: Sanskrit.

*3-5 units, Spr (Harrison, P)*

**RELIGST 351A. Buddhist Visions of Paradise**

(Same as RELIGST 251A) Textual and art-historical evidence for the early development in the greater Indian cultural area of the cult of the Buddhas of the present and their paradise worlds (Pure Land Buddhism).

*3-5 units, not given this year*

**RELIGST 353. Mountains, Buddhist Practice, and Religious Studies**

(Same as RELIGST 253) The notion of the sacred mountain. Readings from ethnographic and theoretical works, and primary sources.

*3-5 units, not given this year*

**RELIGST 357. Readings in Daoist Texts**

(Same as RELIGST 257) Readings from primary sources. Prerequisite: classical Chinese.

*4 units, not given this year*

**RELIGST 358. Japanese Buddhist Texts**

(Same as RELIGST 258) Readings in medieval Japanese Buddhist materials. May be repeated for credit. Prerequisite: background in Japanese or Chinese.

*3-5 units, Aut (Bielefeldt, C)*

**RELIGST 359A. Religion and Performance**

(Same as RELIGST 159A) What happens when religion is viewed through the lens of performance? Texts become dramas, songs, recitations, oral commentaries, dances, movies, and political appropriations. Beliefs become embodied enactments; doctrine puts on a costume and indulges in role play. Approaches to performance theory through religious enactments such as ritual, prayer, festival, drama, music, and film. Most examples from S. Asian religions; students may undertake research projects into other cultures and traditions.

*4 units, not given this year*

**RELIGST 365. Research Methods and Resources in Jewish Studies**

(Same as JEWISHST 225, JEWISHST 325, RELIGST 265) Enhance students' research skills in the interdisciplinary field of

Jewish Studies, emphasizing electronic reference sources, but also archival resources and print publications. Coverage includes: Basic reference sources in Jewish Studies, History and bibliography of the Hebrew book, Hebrew Bible, Talmud, Religious studies (post-Talmudic), Jewish philosophy, Jewish history (by period; by region), Jewish languages, Hebrew literature, Yiddish literature, Zionism and Israel, Sephardic Jewry, women, Holocaust, miscellaneous topics (art, music, folklore and ethnography, sociology, genealogy, geography, pseudonyms, honorifics, abbreviations). Class sessions will also include special workshops on Hebrew / Yiddish / Ladino romanization (transliteration/transcription).

*1-3 units, not given this year*

**RELIGST 370. Comparative Religious Ethics**

The difference that the word religious makes in religious ethics and how it affects issues of genre. Theoretical analyses with examples from W. and E. Asia. Prerequisite: consent of instructor.

*4 units, not given this year*

**RELIGST 372. Kant on Religion**

(Same as RELIGST 272) Critical examination of Kant's principle writings on religion against the background of his general theoretical and practical philosophy and guided by the hypothesis that his philosophy of religion continues to offer significant insights and resources to contemporary theories of religion. Recent reassessments of Kant on religion in the secondary literature will also be read and discussed

*3-5 units, not given this year*

**RELIGST 373. Historicism and Its Problems**

(Same as RELIGST 273) The emergence, varieties, and crises of historicism as a world view and approach to the study of religion in the 19th and 20th centuries. The implications of historical reason and historical consciousness for the philosophy of religion, ethics, and theology.

*3-5 units, not given this year*

**RELIGST 374. From Kant to Kierkegaard**

(Same as RELIGST 274) (Graduate students register for 374.) The main currents of religious thought in Germany from Kant's critical philosophy to Kierkegaard's revolt against Hegelianism. Emphasis is on the theories of religion, the epistemological status of religious discourse, the role of history (especially the figure of Jesus), and the problem of alienation/reconciliation in seminal modern thinkers: Kant, Schleiermacher, Hegel, and Kierkegaard.

*3-5 units, not given this year*

**RELIGST 374E. Kierkegaard: Existentialism and Religion**

(Same as RELIGST 174E) Kierkegaard is rightly called one of the founders of existentialism. Like Socrates, the one philosopher in the western tradition to whom he felt consciously in debt, Kierkegaard sought to return philosophy to the work of thinking through the human condition in all its uncertainty and finitude. Although 20th century existentialists like Sartre and Camus were self-consciously atheist, Kierkegaard's existentialism has religious origins. Through readings of Kierkegaard's philosophical and religious texts, explore the possibility of an existentialist interpretation of the human condition that is religious in nature. Kierkegaard's development of a 'philosophy of existence' as a response to major trends in modern European thought, particularly in response to the philosophies of German idealism (Kant, Hegel) and romanticism.

*4 units, not given this year*

**RELIGST 375. Kierkegaard and Religious Existentialism**

(Same as RELIGST 275) (Graduate students register for 375.) Close reading of Kierkegaard's magnum opus, *Concluding Unscientific Postscript to Philosophical Fragments*, in its early 19th-century context.

*3-5 units, not given this year*

**RELIGST 377. The Later Heidegger**

(Same as RELIGST 277) Lectures and seminar discussions of the problematic of the later Heidegger (1930 - 1976) in the light of his entire project. Readings from *Pathmarks*, *Four Seminars*, *On Time and Being*, and other texts.

*3 units, not given this year*

**RELIGST 378. Heidegger: Confronting the Ultimate**

(Same as RELIGST 278) Heidegger's work on meaning, the self, and the sacred. Texts include *Being and Time*, courses and



opuscula up to 1933, the Letter on Humanism, and Contributions of Philosophy.

3-5 units, not given this year

**RELIGST 379. Heidegger and the Holy**

(Same as RELIGST 279) Heidegger's philosophy as opening a new door onto the possibility of experiencing the sacred after the collapse of traditional metaphysical theology. A close reading of Being and Time as an introduction to the question of the holy.

4 units, not given this year

**RELIGST 380. Schleiermacher: Reconstructing Religion**

(Same as RELIGST 280) Idealist philosopher, Moravian pietist, early German Romantic, co-founder of the University of Berlin, head preacher at Trinity Church, translator of Plato's works, Hegel's opponent, pioneer in modern hermeneutics, father of modern theology. Schleiermacher's controversial reconception of religion and theology in its philosophical context.

3-5 units, not given this year

**RELIGST 382. King Solomon and the Search for Wisdom**

(Same as JEWISHST 228, JEWISHST 328, RELIGST 282) What is wisdom according to the Bible? The course addresses this question by surveying various biblical and post-biblical texts associated with King Solomon. Other topics include the on-going debate over the historical existence of a Solomonic kingdom, the origins and history of the Jerusalem Temple, and Solomon's role in Jewish, Christian and Islamic tradition.

4 units, not given this year

**RELIGST 382A. In Search of David and Solomon**

(Same as CLASSGEN 182, CLASSGEN 282, JEWISHST 182A, JEWISHST 382A, RELIGST 182A) In recent years, the existence of King David and Solomon has become a hotly contested subject, with some scholars questioning whether they were real-life historical figures and others claiming to have found evidence that corroborates their existence. Drawing on the most recent archaeological research, this course will involve students in the quest for the historical David and Solomon as a way to introduce them to the challenges of using the Bible as an historical source.

4 units, Spr (Lederman, Z)

**RELIGST 385. Research in Buddhist Studies**

Independent study in Buddhism. May be repeated for credit. Prerequisite: consent of instructor.

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**RELIGST 386. Research in Islamic Studies**

Independent study in Islamic Studies. May be repeated for credit. Prerequisite: consent of instructor.

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**RELIGST 387. Research in Jewish Studies**

Independent study in Jewish Studies. May be repeated for credit. Prerequisite: consent of instructor.

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**RELIGST 388. Research in Modern Religious Thought, Ethics, and Philosophy**

Independent study in Modern Religious Thought, Ethics, and Philosophy. May be repeated for credit. Prerequisite: consent of instructor.

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**RELIGST 389. Individual Work for Graduate Students**

May be repeated for credit. Prerequisite: consent of instructor.

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**RELIGST 390. Teaching Internship**

Required supervised internship for PhDs.

3-5 units, not given this year

**RELIGST 391. Teaching Religious Studies**

Workshop/seminar for doctoral students in Religious Studies and adjacent fields designed to cultivate methods for teaching Religious Studies in an academic setting.

3 units, Spr (Weitzman, S)

**RELIGST 392. Paper in the Field**

Prerequisite: consent of graduate director. May be repeated for credit.

1-15 units, Aut (Staff), Win (Staff), Spr (Staff)

**RELIGST 395. Master of Arts Thesis**

2-9 units, Aut (Staff), Win (Staff), Spr (Staff)

**RELIGST 399. Recent Works in Religious Studies**

Readings in secondary literature for Religious Studies doctoral students. May be repeated for credit.

1-2 units, Spr (Sokness, B)

**RELIGST 801. TGR Project**

(Staff)

0 units, Aut (Staff), Win (Staff), Spr (Staff)

**RELIGST 802. TGR Dissertation**

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

## RUSSIAN, EAST EUROPEAN, AND EURASIAN STUDIES (REES) COURSES

### UNDERGRADUATE COURSES IN RUSSIAN, EAST EUROPEAN, AND EURASIAN STUDIES

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**REES 18. Understanding the Jews of Russia and Poland**

A preparatory course, for field trip to Moscow and Warsaw, that would cover Russian and Polish History, former Soviet Jewry, international relations, and current social realities

1 unit, not given this year

**REES 23. Issues in International Public Health**

Activity course features Stanford faculty and researchers who lecture weekly on their experiences working international health issues. Focus this year will be on the global region including Russia, East Europe, Central Asia.

1-3 units, Win (Staff)

**REES 35. Films of Central Asia**

Films with English subtitles from Tajikistan, Uzbekistan, Kazakhstan, Kyrgyzstan, and Turkmenistan. May be repeated once for credit. (AU)

1-2 units, Win (Kunanbaeva, A), Spr (Kunanbaeva, A)

**REES 100. Current Issues in Russian, East European, and Eurasian Studies**

Enrollment limited to REES students. Scholars present analyses of methodologies, challenges, and current issues in the study of Russia, E. Europe, and Eurasia.

1 unit, Win (Crews, R; Wessling, R), Spr (Crews, R; Wessling, R)

**REES 105. Central and East European Politics**

(Same as REES 205) Focus is on how the states of Central and East Europe, including the Baltic states, have moved from communism and the Soviet Bloc to democracy, NATO and the EU. Topics include the communist legacy, transitions and their legacies, ethnic issues, and the evolution of economic and social policies, and the comparison of democratization processes in these countries to democracies in other regions, such as Latin America and southern Europe. GER:DB-SocSci

5 units, not given this year

**REES 119. The Russian Economy**

(Same as ECON 119, REES 219) Brief introduction to the economic history of Russia, general overview of the modern Russian economy with analysis of its macroeconomic features and dynamics, industrial structure, and the major institutional features that are important for understanding Russian economic development. The period of transition from Soviet-type planned economy to a market economy and market reforms (1991-1998), the period of economic growth (1999-2007), and the economic development of Russia during the current global crisis of 2008-2010. Analysis of Russia's social structure and social policy, labor markets, the regional structure of the economy, the role of the state, and major Russian industries (oil, metals, machinery). Emphasis on the specific institutional aspects that have shaped Russia's economic development.

4-5 units, not given this year



**REES 130. With God in Russia: Orthodox Christianity in the 19th and 20th Centuries**

(Same as REES 330) The experience of religion, particularly Orthodoxy, under tsars and commissars. Religion as a lived experience; practice and belief in the provinces and villages, intertwining of religion and folk customs (the so-called double faith); condition of the Church before and after the Revolutions of 1917; religion under Soviet control; and liberation of the Church since the collapse of the Soviet Union.

4-5 units, not given this year

**REES 330. With God in Russia: Orthodox Christianity in the 19th and 20th Centuries**

(Same as REES 130) The experience of religion, particularly Orthodoxy, under tsars and commissars. Religion as a lived experience; practice and belief in the provinces and villages, intertwining of religion and folk customs (the so-called double faith); condition of the Church before and after the Revolutions of 1917; religion under Soviet control; and liberation of the Church since the collapse of the Soviet Union.

4-5 units, not given this year

**GRADUATE COURSES IN RUSSIAN, EAST EUROPEAN, AND EURASIAN STUDIES**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**REES 200. Current Issues in Russian, East European, and Eurasian Studies**

Enrollment limited to REES students. Scholars present analyses of methodologies, challenges, and current issues in the study of Russia, E. Europe, and Eurasia.

1 unit, *Win (Crews, R; Wessling, R), Spr (Crews, R; Wessling, R)*

**REES 205. Central and East European Politics**

(Same as REES 105) Focus is on how the states of Central and East Europe, including the Baltic states, have moved from communism and the Soviet Bloc to democracy, NATO and the EU. Topics include the communist legacy, transitions and their legacies, ethnic issues, and the evolution of economic and social policies, and the comparison of democratization processes in these countries to democracies in other regions, such as Latin America and southern Europe.

5 units, not given this year

**REES 207A. St. Petersburg, a Cultural Biography: Architecture, Urban Planning, the Arts**

(Same as ARTHIST 107A) The most premeditated city in the whole world, according to Dostoevsky; created in 1703 by Peter the Great as a counterpoise to Moscow and old Russian culture; planned as a rational, west-European-appearing capital city of the Russian Empire. St. Petersburg's history through works of its artists, architects, urban planners, writers, and composers.

4 units, *Spr (Kollmann, J)*

**REES 219. The Russian Economy**

(Same as ECON 119, REES 119) Brief introduction to the economic history of Russia, general overview of the modern Russian economy with analysis of its macroeconomic features and dynamics, industrial structure, and the major institutional features that are important for understanding Russian economic development. The period of transition from Soviet-type planned economy to a market economy and market reforms (1991-1998), the period of economic growth (1999-2007), and the economic development of Russia during the current global crisis of 2008-2010. Analysis of Russia's social structure and social policy, labor markets, the regional structure of the economy, the role of the state, and major Russian industries (oil, metals, machinery). Emphasis on the specific institutional aspects that have shaped Russia's economic development.

4-5 units, not given this year

**REES 247A. Folklore, Mythology, and Islam in Central Asia**

(Same as ANTHRO 147A) Central Asian cults, myths, and beliefs from ancient time to modernity. Life crisis rites, magic ceremonies, songs, tales, narratives, taboos associated with childbirth, marriage, folk medicine, and calendrical transitions. The nature and the place of the shaman in the region. Sources

include music from the fieldwork of the instructor and the Kyrgyz epoch Manas. The cultural universe of Central Asian peoples as a symbol of their modern outlook.

3-5 units, *Spr (Kunanbaeva, A)*

**REES 299. Directed Reading**

1-12 units, *Aut (Staff), Win (Staff), Spr (Staff)*

**REES 301. An Introduction to Russian, East European and Eurasian Studies**

This seminar investigates the origins and evolution of the field and exposes students to major debates about the history, geography, politics, societies, economies, cultures, and languages of the region.

5 units, *Aut (Crews, R)*

**REES 320. State and Nation Building in Central Asia**

Issues of identity, development, and security following the dissolution of the Soviet Union and the emergence of independent states in Central Asia and the Southern Caucasus. Topics include the impact of 9/11, the spread of radical Islamist movements in the region, its growing role as a transit route for drugs, weapons, and possibly nuclear materials, the impact of the Soviet legacy, the nature of political and economic transformations, relations with neighboring countries, security challenges, and options facing U.S. policy makers.

5 units, *Win (Lapidus, G)*

**REES 340. The Comparative Political Economy of Post-Communist Transitions**

(Same as POLISCI 240C) Dominant theoretical perspectives of comparative democratization and marketization; focus is on the political economy of transition in Eastern Europe and Eurasia while comparing similar processes in Latin America and Asia. Topics include: meanings of democracy, synergy between democracies and markets, causes of the collapse of communism, paths to political liberalization and democracy, civil society, constitutions, parliaments, presidents, the rule of law, electoral systems, market requirements, strategies of reform, the Russian experience of market building, exporting democracy and the market, and foreign aid and assistance.

3-4 units, *Aut (Staff)*

**SCIENCE, TECHNOLOGY, AND SOCIETY (STS) COURSES****UNDERGRADUATE COURSES IN SCIENCE, TECHNOLOGY, AND SOCIETY**

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**STS 101. Science, Technology, and Contemporary Society**

(Same as ENGR 130, STS 201) Key social, cultural, and values issues raised by contemporary scientific and technological developments; distinctive features of science and engineering as sociotechnical activities; major influences of scientific and technological developments on 20th-century society, including transformations and problems of work, leisure, human values, the fine arts, and international relations; ethical conflicts in scientific and engineering practice; and the social shaping and management of contemporary science and technology. GER:DB-SocSci

4-5 units, *Aut (McGinn, R)*

**STS 101Q. Technology in Contemporary Society**

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Introduction to the STS field. The natures of science and technology and their relationship, what is most distinctive about these forces today, and how they have transformed and been affected by contemporary society. Social, cultural, and ethical issues raised by recent scientific and technological developments. Case studies from areas such as information technology and biotechnology, with emphasis on the contemporary U.S. Unexpected influences of science and technology on contemporary society and how social forces shape scientific and technological enterprises and their products. Enrollment limited to 12. GER:DB-SocSci

4 units, Aut (McGinn, R)

### STS 110. Ethics and Public Policy

(Same as MS&E 197, PUBLPOL 103B) Ethical issues in science- and technology-related public policy conflicts. Focus is on complex, value-laden policy disputes. Topics: the nature of ethics and morality; rationales for liberty, justice, and human rights; and the use and abuse of these concepts in policy disputes. Case studies from biomedicine, environmental affairs, technical professions, communications, and international relations. GER:DB-Hum, EC-EthicReas, WIM

5 units, Win (McGinn, R)

### STS 112. Ten Things: An Archaeology of Design

(Same as CLASSART 113, CLASSART 213) Connections among science, technology, society and culture by examining the design of a prehistoric hand axe, Egyptian pyramid, ancient Greek perfume jar, medieval castle, Wedgwood teapot, Edison's electric light bulb, computer mouse, Sony Walkman, supersonic aircraft, and BMW Mini. Interdisciplinary perspectives include archaeology, cultural anthropology, science studies, history and sociology of technology, cognitive science, and evolutionary psychology. GER:DB-SocSci

3-5 units, Aut (Shanks, M)

### STS 115. Ethical Issues in Engineering

(Same as ENGR 131) Moral rights and responsibilities of engineers in relation to society, employers, colleagues, and clients; cost-benefit-risk analysis, safety, and informed consent; the ethics of whistle blowing; ethical conflicts of engineers as expert witnesses, consultants, and managers; ethical issues in engineering design, manufacturing, and operations; ethical issues arising from engineering work in foreign countries; and ethical implications of the social and environmental contexts of contemporary engineering. Case studies, guest practitioners, and field research. Limited enrollment. GER:DB-Hum

4 units, Spr (McGinn, R)

### STS 144. Game Studies: Issues in Design, Technology, and Player Creativity

What can be learned about innovation from digital games? Digital game technologies, communities, and cultures. Topics include game design, open source ideas and modding, technology studies, player/consumer-driven innovation, fan culture, transgressive play, and collaborative co-creation drawn from virtual worlds and online games.

4 units, not given this year

### STS 150. Car Culture

(Same as ANTHRO 146) Since at least the 50s, the U.S. has been notorious as a nation in love with the car. An examination of this premise, analyzing new methods of production brought by automobile manufacture, how automobiles shaped urban growth, debates about pollution and environmental degradation, and debates around auto safety. How the car has influenced American practices including courting, eating out, and suburban living.

5 units, not given this year

### STS 152. Nuclear Weapons, Risk and Hope

Recent research indicates that depending on nuclear weapons for our security is thousands of times riskier than society will tolerate with respect to nuclear power plants. This seminar explores methods for estimating the risk, why society ignores the danger, and what can be done to correct that imbalance. No prerequisites, and at a level understandable to non-majors, including in the humanities.

1 unit, Aut (Hellman, M)

### STS 190. STS Junior Seminar

Wired Space & Green Space: The Politics of Design. The technological development and social impact of design in the modern period, with a focus on California. Topics include transportation grids, information systems, wireless networks, urban parks, community gardens, and green buildings. Project-based course that introduces students to primary research methods. Open to both STS majors and non-majors with junior standing. A required course section will be determined at the first day of class.

4 units, Win (Carruth, A)

### STS 199. Individual Work

1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### STS 200. STS Senior Colloquium

Food Studies: Science, Technology, and Social Change. The interplay of scientific research, technological innovation, and social movements within the global food system. Case studies on the Green Revolution, genetically-modified seeds, fast food, slow food, and fair trade. Writing-intensive course required of all STS majors. Prerequisite: STS major with senior standing and four STS core courses, or consent of instructor.

4 units, Aut (Carruth, A), Spr (Carruth, A)

### STS 210. Ethics, Science, and Technology

Ethical issues raised by advances in science and technology. Topics: biotechnology including agriculture and reproduction, the built environment, energy technologies, and information technology. Prerequisite: 110 or another course in ethics. Limited enrollment. GER:DB-Hum

4 units, not given this year

## GRADUATE COURSES IN SCIENCE, TECHNOLOGY, AND SOCIETY

Primarily for graduate students; undergraduates may enroll with consent of instructor.

### STS 201. Science, Technology, and Contemporary Society

(Same as ENGR 130, STS 101) Key social, cultural, and values issues raised by contemporary scientific and technological developments; distinctive features of science and engineering as sociotechnical activities; major influences of scientific and technological developments on 20th-century society, including transformations and problems of work, leisure, human values, the fine arts, and international relations; ethical conflicts in scientific and engineering practice; and the social shaping and management of contemporary science and technology.

4-5 units, Aut (McGinn, R)

### STS 299. Advanced Individual Work

1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

## SLAVIC GENERAL (SLAVGEN) COURSES

### UNDERGRADUATE COURSES IN SLAVIC GENERAL

Primarily for undergraduates; graduate students may enroll with consent of adviser.

#### SLAVGEN 13N. Russia and the Russian Experience

Preference to freshmen. The political and cultural history of Russia and the Russians: prominent persons, prominent events, and how they shape current attitudes and society. Short works by Russian authors. GER:DB-Hum

3-4 units, not given this year

#### SLAVGEN 77Q. Russia's Weird Classic: Nikolai Gogol

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. The work and life of Nikolai Gogol, the eccentric founder of Fantastic Realism. The relationship between romanticism and realism in Russian literature, and between popular Ukrainian culture and high Russian and W. European traditions in Gogol's oeuvre. The impact of his work on 20th-century modernist literature, music, and art, including Nabokov, literature of the absurd, Shostakovich, Meyerhold, and Chagall. GER:DB-Hum

3-4 units, Win (Fleishman, L)

#### SLAVGEN 78N. Poetry to Prose: The Birth of the Great Russian Novel in Alexander Pushkin's Eugene Onegin

(F,Sem) Stanford Introductory Seminar. This course will be devoted to a close reading and detailed discussion of Alexander Pushkin's masterpiece, Eugene Onegin, in the context of nineteenth-century Russian and continental literary history. We will discuss major theoretical and literary-historical questions: What is realism in literature? How does it differ from other literary epochs, movements and styles? What is the novel and how does it relate to other genres? In what way does the novel in verse differ from the novel in prose? We will also explore the relationships

between the narrator and the author and between the narrator and the characters in the text. Through examination of the constituent elements of verse language, we will see Pushkin's inventive contributions to world literature. GER:IHUM-3

4 units, Spr (Fleishman, L)

**SLAVGEN 110. The Gogol Bordello: Ukraine as a Meeting House of Cultures**

(Same as SLAVGEN 210) The cohabitation of authors and cultural geography in multiethnic Ukraine. Comparison of Ukrainian texts, images of Ukraine and Ukrainians by their Polish, Jewish, German, and Russian cohabitants. Possible authors include : Andrukhovych, Aleichem, Babel, Celan, Franko, Gogol, Lewycka, Mickiewicz, Shevchenko, Pushkin, Schulz, Ukraina, and Zabuzhko. GER:DB-Hum

3-5 units, not given this year

**SLAVGEN 122. Yiddish Story**

(Same as SLAVGEN 222) The humor, drama, anger, and artistry of modern E. European and American Yiddish writers including Sholem Aleichem, I. L. Peretz, Isaac Bashevis Singer, Chaim Grade, and Yankev Glatshteyn. In English. GER:DB-Hum, EC-GlobalCom

5 units, not given this year

**SLAVGEN 123. The Yiddish Novel**

(Same as SLAVGEN 223) How Yiddish novels reveal changes in modern Jewish life and literature in Europe and the U.S. The influences of folklore, traditional Jewish culture, and European literature. Works by Isaac and Joshua Singer, Joseph Opatoshu, Der Nister, Chava Rosenfarb, Sholem Asch, and David Bergelson. Readings in English; optional sessions for close readings in Yiddish. GER:DB-Hum

3-4 units, not given this year

**SLAVGEN 133. Poles and Others: Literature and History in Modern Poland**

(Same as SLAVGEN 233) The physical and cultural territories of the former Polish-Lithuanian Commonwealth have long been objects of contest. The 20th century witnessed two or three rebirths of Poland and one or two deaths; a belated modernization of Polish society; the final inclusion of Polish-speaking peasants and burghers in a Polish national identity; and the exclusion of Jews, Germans, Lithuanians, Belarusians, Ukrainians, and others from the state and participation in a partially shared culture. GER:DB-Hum

3-4 units, not given this year

**SLAVGEN 141. Staging the Revolution: Russian Theater and Society, 1917-1937**

(Same as SLAVGEN 241) Between 1917 and 1937, artistic experimentation in the Russian theater coincided with political and social changes in Russian society. Modernist artists interpreted the revolution as an artistic possibility to demolish conventions of representation. Mass festivals, circus, and street performances replaced the old theater. In the time of the Great Terror and staged trials, theater and opera remained among the leading arts, but state patronage caused a major reorientation of artistic practices. Readings include plays by Mayakovsky, Bulgakov, Babel, Tretyakov, and Erdman. Readings in English. GER:DB-Hum

4 units, not given this year

**SLAVGEN 145. Age of Experiment: Russian Experiments in Short Fiction (1820-1905)**

(Same as SLAVGEN 245) Russian literature is identified with its great 19th c. novels, baggy monsters of 600-1200 pages. In this course we will instead investigate an array of short fictional forms (stories, novellas, tales, plays, and journalistic sketches) by Pushkin, Gogol, Lermontov, Tolstoy, Turgenev, Dostoevsky and Chekhov, in light of their competitive redefinitions of the tasks of art and consciousness, as well as their continuing technical and philosophical impact on modern narrative. No prerequisites. Course conducted in English. Students with Russian competence will have opportunity to read and work with texts in original GER:DB-Hum, EC-GlobalCom

3-5 units, Aut (Greenleaf, M)

**SLAVGEN 148. Dissent and Disenchantment: Russian Literature and Culture since the Death of Stalin**

(Same as SLAVGEN 248) Russian culture and society since 1953 through literature (in English translation). Topics: opposition and dissent; generational conflict; modernization; everyday life,

gender, ethnicity, class, citizenship, exit from communism. Literature of the Thaw, state-published and samizdat, village and cosmopolitan, the new emigration, Sots-Art, and the Russian post-modern. Solzhenistyn, Shalamov, Trifonov, Siniavsky-Tertz, Erofeev, Dovlatov, Brodsky, Petrushevskaya, Pelevin, Ulitskaya, Sorokin. Requirements: three reaction papers and final exam (UG); research paper for graduate credit (extra section for graduate students; may register for SLAVLIT 399) GER:DB-Hum, EC-GlobalCom

3-5 units, Spr (Freidin, G)

**SLAVGEN 150. Countercultures in Conversation: Russian and American Rock Music and Protest Poetry**

(Same as SLAVGEN 250) Non-conformist protest movements in contemporary Russian poetry; historical and cultural context; and comparison with similar processes in American social and cultural life. Sources include Russian and American poetry, songs, and DVDs. Fourth unit for readings in Russian. GER:DB-Hum

3-4 units, not given this year

**SLAVGEN 153. Russian Jewish Literature**

(Same as SLAVGEN 253) Russian Jewish experience inspired books and films in Hebrew, Yiddish, Russian and English that reveal a world of conflict, humor and beauty. From the mid-19th century to the 21st century. Authors include Haim Nahman Bialik, Sholem Aleichem, Isaac Babel, Osip Mandelstam, Joseph Brodsky, Leonid Tsypkin, Ludmila Ulitskaya, Gary Shteyngardt. GER:DB-Hum

3-4 units, not given this year

**SLAVGEN 156. Nabokov in the Transnational Context**

(Same as COMPLIT 115, COMPLIT 215, SLAVGEN 256) Nabokov's techniques of migration and camouflage as he inhabits the literary and historical contexts of St. Petersburg, Berlin, Paris, America, and Switzerland. His early and late stories, last Russian novel *The Gift*, *Lolita* (the novel and screenplay), and *Pale Fire*. Readings in English. Russian speakers will be encouraged to read Russian texts in original. GER:DB-Hum

3-5 units, Aut (Greenleaf, M)

**SLAVGEN 162. Gender Images in Film**

(Same as SLAVGEN 262) Film creates permanent new images of femininity. One of its conscious prerequisites is the notion of social stereotypes. The development of enduring images of the film heroine, 1914-90, through a comparison of the Russian, American, and W. European cinema, and analytical approaches to them from feminist film theory. GER:EC-Gender

3 units, not given this year

**SLAVGEN 163. Gender in Postwar Russian Culture**

(Same as SLAVGEN 263) Issues of femininity and masculinity in Russian literature, film, and popular culture from the 40s to the present. Readings include fiction, memoirs, poetry, drama, and theoretical works in gender studies. GER:EC-Gender

3-4 units, not given this year

**SLAVGEN 165. Poetry, Painting, and Music of the Russian Avant Garde**

(Same as SLAVGEN 265) Interrelationships between poetry and other arts in Russia, 1905-30. The pursuit of synthesis of arts and the modernist agenda of life creation and immortality. Parallel developments in literature, painting, and music, and style and poetics. Russian modernist poetry in the context of changes in the language of visual arts and music). Women poets and artists. Native sources and Western influences; non-Russian elements and transnational tendencies. The impact of scientific discoveries and technological inventions on artistic experimentation.

3-4 units, not given this year

**SLAVGEN 181. Philosophy and Literature**

(Same as CLASSGEN 81, COMPLIT 181, ENGLISH 81, FRENCH 181, ITALGEN 181, GERGEN 181) Required gateway course for Philosophical and Literary Thought; crosslisted in departments sponsoring the Philosophy and Literature track: majors should register in their home department; non-majors may register in any sponsoring department. Introduction to major problems at the intersection of philosophy and literature. Issues may include authorship, selfhood, truth and fiction, the importance of literary form to philosophical works, and the ethical significance of literary works. Texts include philosophical analyses of literature, works of imaginative literature, and works of both

philosophical and literary significance. Authors may include Plato, Montaigne, Nietzsche, Borges, Beckett, Barthes, Foucault, Nussbaum, Walton, Nehamas, Pavel, and Pippin. GER:DB-Hum

4-5 units, *Win (Staff)*

### SLAVGEN 185. CINEMATO-GRAPH

(Same as FILMSTUD 131, FILMSTUD 331, SLAVGEN 285) The term cinematography, which literally means inscribing motion, tends to lose the graphic part in modern use. However, several influential film-makers not only practiced the art of inscribing motion but also wrote texts discussing the aesthetic premises of cinematographic art. This course explores theories of cinema as propagated by the following film-makers: Vertov, Eisenstein, Godard, Bresson, Antonioni, Pasolini, Tarkovsky, Greenaway, and Lynch. Selected key texts will be supplemented by screenings of classic films, indicative of each director's work.

3-5 units, *Aut (Skakov, N)*

### SLAVGEN 190. Tolstoy's Anna Karenina in Dialogue with Contemporary Philosophical, Social, and Ethical Thought

(Same as COMPLIT 190, COMPLIT 290, SLAVGEN 290) Anna Karenina, the novel as a case study in the contest between modernity and tradition, their ethical order, ideology, cultural codes, and philosophies. Images of society, women and men in Tolstoy v. those of his contemporaries: Marx, Mill, Nietzsche, Weber, Durkheim, Freud. Open to juniors, seniors and graduate students. Requirements: three interpretive essays (500-1000 words each). Analysis of a passage from the novel; AK refracted through a philosophical prism and vice versa (30% each); class discussion and Forum (10%). GER:DB-Hum, DB-Hum, EC-EthicReas

3-5 units, *Win (Freidin, G)*

### SLAVGEN 195. RUSSIAN THEATER

(Same as SLAVGEN 295) Reading plays in juxtaposition with clips from performances and famous directors' writings (Stanislavsky, Meyerhold, and beyond). Evolution of Russian theatrical theory and practice, with particular attention to the present. Some knowledge of Russian desirable. GER:DB-Hum

3-4 units, *not given this year*

### SLAVGEN 196. Incarceration as Inspiration: Russian and American Prison Narratives

(Same as COMPLIT 196) This course will employ a multitude of prison-related texts (letters, memoirs, short stories, historical accounts, films, and theoretical criticism) to explore the connection between incarceration and inspiration. Together we will examine the following questions: what is the link between creativity and the penitentiary? What is the allure of crime and the function of prison? What effect does the restriction of space have on the mind? How does life-writing versus fictional writing capture the prison experience? The quarter will culminate with a visit to an area correctional facility. GER:DB-Hum

3-5 units, *Win (Draskoczy, J)*

## GRADUATE COURSES IN SLAVIC GENERAL

Primarily for graduate students; undergraduates may enroll with consent of instructor.

### SLAVGEN 210. The Gogol Bordello: Ukraine as a Meeting House of Cultures

(Same as SLAVGEN 110) The cohabitation of authors and cultural geography in multiethnic Ukraine. Comparison of Ukrainian texts, images of Ukraine and Ukrainians by their Polish, Jewish, German, and Russian cohabitants. Possible authors include: Andrukhovych, Aleichem, Babel, Celan, Franko, Gogol, Lewycka, Mickiewicz, Shevchenko, Pushkin, Schulz, Ukraina, and Zabuzhko.

3-5 units, *not given this year*

### SLAVGEN 221. Modernism and the Jewish Voice in Europe

(Same as COMPLIT 247, GERGEN 221A) Some of the most haunting literary voices of the 20th century emerged from the Jewish communities of Eastern and Central Europe. The Jewishness of the modernists is thematized, asking whether it contributed to shared attitudes toward text, history, or identity. Their works are situated in specific linguistic traditions: Yiddish, Hebrew, Russian, Polish, or German. Primary readings from Ansky, Bialik, Mandelstam, Babel, Schulz, Kafka, Celan;

secondary readings in history, E. European literature, and theory, including Marx, Freud, Benjamin, and Arendt.

3-4 units, *not given this year*

### SLAVGEN 222. Yiddish Story

(Same as SLAVGEN 122) The humor, drama, anger, and artistry of modern E. European and American Yiddish writers including Sholem Aleichem, I. L. Peretz, Isaac Bashevis Singer, Chaim Grade, and Yankev Glatshteyn. In English.

5 units, *not given this year*

### SLAVGEN 223. The Yiddish Novel

(Same as SLAVGEN 123) How Yiddish novels reveal changes in modern Jewish life and literature in Europe and the U.S. The influences of folklore, traditional Jewish culture, and European literature. Works by Isaac and Joshua Singer, Joseph Opatoshu, Der Nister, Chava Rosenfarb, Sholem Asch, and David Bergelson. Readings in English; optional sessions for close readings in Yiddish.

3-4 units, *not given this year*

### SLAVGEN 233. Poles and Others: Literature and History in Modern Poland

(Same as SLAVGEN 133) The physical and cultural territories of the former Polish-Lithuanian Commonwealth have long been objects of contest. The 20th century witnessed two or three rebirths of Poland and one or two deaths; a belated modernization of Polish society; the final inclusion of Polish-speaking peasants and burghers in a Polish national identity; and the exclusion of Jews, Germans, Lithuanians, Belarusians, Ukrainians, and others from the state and participation in a partially shared culture.

3-4 units, *not given this year*

### SLAVGEN 241. Staging the Revolution: Russian Theater and Society, 1917-1937

(Same as SLAVGEN 141) Between 1917 and 1937, artistic experimentation in the Russian theater coincided with political and social changes in Russian society. Modernist artists interpreted the revolution as an artistic possibility to demolish conventions of representation. Mass festivals, circus, and street performances replaced the old theater. In the time of the Great Terror and staged trials, theater and opera remained among the leading arts, but state patronage caused a major reorientation of artistic practices. Readings include plays by Mayakovsky, Bulgakov, Babel, Tretyakov, and Erdman. Readings in English.

4 units, *not given this year*

### SLAVGEN 245. Age of Experiment: Russian Experiments in Short Fiction (1820-1905)

(Same as SLAVGEN 145) Russian literature is identified with its great 19th c. novels, baggy monsters of 600-1200 pages. In this course we will instead investigate an array of short fictional forms (stories, novellas, tales, plays, and journalistic sketches) by Pushkin, Gogol, Lermontov, Tolstoy, Turgenev, Dostoevsky and Chekhov, in light of their competitive redefinitions of the tasks of art and consciousness, as well as their continuing technical and philosophical impact on modern narrative. No prerequisites. Course conducted in English. Students with Russian competence will have opportunity to read and work with texts in original

3-5 units, *Aut (Greenleaf, M)*

### SLAVGEN 248. Dissent and Disenchantment: Russian Literature and Culture since the Death of Stalin

(Same as SLAVGEN 148) Russian culture and society since 1953 through literature (in English translation). Topics: opposition and dissent; generational conflict; modernization; everyday life, gender, ethnicity, class, citizenship, exit from communism. Literature of the Thaw, state-published and samizdat, village and cosmopolitan, the new emigration, Sots-Art, and the Russian post-modern. Solzhenistyn, Shalamov, Trifonov, Siniavsky-Tertz, Erofeev, Dovlatov, Brodsky, Petrushevskaya, Pelevin, Ulitskaya, Sorokin. Requirements: three reaction papers and final exam (UG); research paper for graduate credit (extra section for graduate students; may register for SLAVLIT 399)

3-5 units, *Spr (Freidin, G)*

### SLAVGEN 250. Countercultures in Conversation: Russian and American Rock Music and Protest Poetry

(Same as SLAVGEN 150) Non-conformist protest movements in contemporary Russian poetry; historical and cultural context; and comparison with similar processes in American social and cultural

life. Sources include Russian and American poetry, songs, and DVDs. Fourth unit for readings in Russian.

*3-4 units, not given this year*

#### **SLAVGEN 253. Russian Jewish Literature**

(Same as SLAVGEN 153) Russian Jewish experience inspired books and films in Hebrew, Yiddish, Russian and English that reveal a world of conflict, humor and beauty. From the mid-19th century to the 21st century. Authors include Haim Nahman Bialik, Sholem Aleichem, Isaac Babel, Osip Mandelstam, Joseph Brodsky, Leonid Tsygkin, Ludmila Ulitskaya, Gary Shteyngardt.

*3-4 units, not given this year*

#### **SLAVGEN 256. Nabokov in the Transnational Context**

(Same as COMPLIT 115, COMPLIT 215, SLAVGEN 156) Nabokov's techniques of migration and camouflage as he inhabits the literary and historical contexts of St. Petersburg, Berlin, Paris, America, and Switzerland. His early and late stories, last Russian novel *The Gift*, *Lolita* (the novel and screenplay), and *Pale Fire*. Readings in English. Russian speakers will be encouraged to read Russian texts in original.

*3-5 units, Aut (Greenleaf, M)*

#### **SLAVGEN 262. Gender Images in Film**

(Same as SLAVGEN 162) Film creates permanent new images of femininity. One of its conscious prerequisites is the notion of social stereotypes. The development of enduring images of the film heroine, 1914-90, through a comparison of the Russian, American, and W. European cinema, and analytical approaches to them from feminist film theory.

*3 units, not given this year*

#### **SLAVGEN 263. Gender in Postwar Russian Culture**

(Same as SLAVGEN 163) Issues of femininity and masculinity in Russian literature, film, and popular culture from the 40s to the present. Readings include fiction, memoirs, poetry, drama, and theoretical works in gender studies.

*3-4 units, not given this year*

#### **SLAVGEN 265. Poetry, Painting, and Music of the Russian Avant Garde**

(Same as SLAVGEN 165) Interrelationships between poetry and other arts in Russia, 1905-30. The pursuit of synthesis of arts and the modernist agenda of life creation and immortality. Parallel developments in literature, painting, and music, and style and poetics. Russian modernist poetry in the context of changes in the language of visual arts and music). Women poets and artists. Native sources and Western influences; non-Russian elements and transnational tendencies. The impact of scientific discoveries and technological inventions on artistic experimentation.

*3-4 units, not given this year*

#### **SLAVGEN 285. CINEMATOGRAPH**

(Same as FILMSTUD 131, FILMSTUD 331, SLAVGEN 185) The term cinematography, which literally means inscribing motion, tends to lose the graphic part in modern use. However, several influential film-makers not only practiced the art of inscribing motion but also wrote texts discussing the aesthetic premises of cinematographic art. This course explores theories of cinema as propagated by the following film-makers: Vertov, Eisenstein, Godard, Bresson, Antonioni, Pasolini, Tarkovsky, Greenaway, and Lynch. Selected key texts will be supplemented by screenings of classic films, indicative of each director's work.

*3-5 units, Aut (Skakov, N)*

#### **SLAVGEN 290. Tolstoy's Anna Karenina in Dialogue with Contemporary Philosophical, Social, and Ethical Thought**

(Same as COMPLIT 190, COMPLIT 290, SLAVGEN 190) Anna Karenina, the novel as a case study in the contest between modernity and tradition, their ethical order, ideology, cultural codes, and philosophies. Images of society, women and men in Tolstoy v. those of his contemporaries: Marx, Mill, Nietzsche, Weber, Durkheim, Freud. Open to juniors, seniors and graduate students. Requirements: three interpretive essays (500-1000 words each). Analysis of a passage from the novel; AK refracted through a philosophical prism and vice versa (30% each); class discussion and Forum (10%).

*3-5 units, Win (Freidin, G)*

#### **SLAVGEN 295. RUSSIAN THEATER**

(Same as SLAVGEN 195) Reading plays in juxtaposition with clips from performances and famous directors' writings

(Stanislavsky, Meyerhold, and beyond). Evolution of Russian theatrical theory and practice, with particular attention to the present. Some knowledge of Russian desirable.

*3-4 units, not given this year*

#### **SLAVGEN 313. Visuality and Literacy Workshop**

Relationships among visual arts, theater, and literature in the culture of modernity.

*1-2 units, not given this year*

## SLAVIC LANGUAGE (SLAVLANG) COURSES

### UNDERGRADUATE COURSES IN SLAVIC LANGUAGE

Primarily for undergraduates; graduate students may enroll with consent of adviser.

#### **SLAVLANG 1. First-Year Russian, First Quarter**

Functionally-based communicative approach, including essential Russian grammar. Discussions of Russian culture and the Russian view of reality.

*5 units, Aut (Cieply, J)*

#### **SLAVLANG 2. First-Year Russian, Second Quarter**

Continuation of 1. Functionally-based communicative approach, including essential Russian grammar. Discussions of Russian culture and the Russian view of reality. Prerequisite: placement test, 1 or consent of instructor.

*5 units, Win (Staff)*

#### **SLAVLANG 3. First-Year Russian, Third Quarter**

Continuation of 2. Functionally-based communicative approach, including essential Russian grammar. Discussions of Russian culture and the Russian view of reality. Prerequisite: placement test, 2 or consent of instructor.

*5 units, Spr (Khassina, E)*

#### **SLAVLANG 6. Russian for Native Speakers, Second Quarter**

Self-paced. Reading and writing skills and communicating in formal and informal settings. Does not fulfill the University foreign language requirement. Prerequisite 5 or consent of instructor.

*2 units, Win (Staff)*

#### **SLAVLANG 7. Russian for Native Speakers, Third Quarter**

Continuation of 6. Self-paced. Reading and writing skills and communicating in formal and informal settings. Does not fulfill the University foreign language requirement. Prerequisite: 6 or consent of instructor.

*2 units, Spr (Khassina, E)*

#### **SLAVLANG 51. Second-Year Russian, First Quarter**

Proficiency development at the intermediate level, including more difficult grammar such as numbers, verb conjugation, and aspect. Vocabulary, speaking skills. Prerequisite: placement test, 3 or consent of instructor.

*5 units, Aut (Khassina, E)*

#### **SLAVLANG 52. Second-Year Russian, Second Quarter**

Continuation of 51. Proficiency development at the intermediate level, including more difficult grammar such as numbers, verb conjugation, and aspect. Vocabulary, speaking skills. Prerequisite: placement test, 51 or consent of instructor.

*5 units, Win (Khassina, E)*

#### **SLAVLANG 53. Second-Year Russian, Third Quarter**

Continuation of 52. Proficiency development at the intermediate level, including more difficult grammar such as numbers, verb conjugation, and aspect. Vocabulary, speaking skills. Prerequisite: placement test, 52 or consent of instructor.

*5 units, Spr (Khassina, E)*

#### **SLAVLANG 55. Intermediate Russian Conversation**

May be repeated for credit. Prerequisite: first-year Russian or equivalent placement.

*2 units, Win (Greenhill, R), Spr (Greenhill, R)*

#### **SLAVLANG 60A. Beginning Russian Conversation**

*1 unit, Win (Safran, G)*

**SLAVLANG 60B. Intermediate Russian Conversation***1 unit, Spr (Staff)***SLAVLANG 60C. Advanced Russian Conversation***1 unit, Spr (Staff)***SLAVLANG 60D. East European Breweries and Brewing***1 unit, Win (Safran, G), Spr (Staff)***SLAVLANG 60E. Russian Cooking***1 unit, Spr (Staff)***SLAVLANG 60F. Slavic Films Series***1 unit, Aut (Safran, G)***SLAVLANG 60H. Tour of Bulgaria***1 unit, Win (Safran, G), Spr (Staff)***SLAVLANG 60P. Slav Dom Theme Projects***1 unit, Aut (Safran, G), Win (Safran, G), Spr (Staff)***SLAVLANG 60T. Teaching Slavic Conversation***1 unit, Aut (Safran, G), Win (Safran, G), Spr (Safran, G)***SLAVLANG 99. Language Specials**

Prerequisite: consent of instructor.

*1-5 units, Aut (Staff), Win (Staff), Spr (Staff)***SLAVLANG 111. Third-Year Russian, First Quarter**

A snapshot of Russian life. Reading comprehension, conversational competence, grammatical accuracy, and cultural sophistication. Prerequisite: placement test, 53 or consent of instructor.

*4 units, Aut (Greenhill, R)***SLAVLANG 112. Third-Year Russian, Second Quarter**

Continuation of 111. A snapshot of Russian life. Reading comprehension, conversational competence, grammatical accuracy, and cultural sophistication. Prerequisite: placement test, 111 or consent of instructor.

*4 units, Win (Greenhill, R)***SLAVLANG 113. Third-Year Russian, Third Quarter**

Continuation of 112. A snapshot of Russian life. Reading comprehension, conversational competence, grammatical accuracy, and cultural sophistication. Prerequisite: placement test, 112 or consent of instructor.

*4 units, Spr (Staff)***SLAVLANG 177. Fourth-Year Russian, First Quarter**

Culture, history, and current events. Films, classical and contemporary writers, newspaper articles, documentaries, radio and TV programs, and music. Review and fine-tuning of grammar and idiomatic usage. Prerequisite: placement test, 113 or consent of instructor.

*3 units, Aut (Greenhill, R)***SLAVLANG 178. Fourth-Year Russian, Second Quarter**

Continuation of 177. Culture, history, and current events. Films, classical and contemporary writers, newspaper articles, documentaries, radio and TV programs, and music. Review and fine-tuning of grammar and idiomatic usage. Prerequisite: placement test, 177 or consent of instructor.

*3 units, Win (Greenhill, R)***SLAVLANG 179. Fourth-Year Russian, Third Quarter**

Continuation of 178. Culture, history, and current events. Films, classical and contemporary writers, newspaper articles, documentaries, radio and TV programs, and music. Review and fine-tuning of grammar and idiomatic usage. Prerequisite: placement test, 178 or consent of instructor.

*3 units, Spr (Greenhill, R)***SLAVLANG 181. Fifth-Year Russian, First Quarter**

Language proficiency maintenance; appropriate for majors and non-majors with significant language experience overseas. Discussions, oral presentations, and writing essays on contemporary Russia. Prerequisite: placement test, 179 or consent of instructor

*3 units, Aut (Khassina, E)***SLAVLANG 182. Fifth-Year Russian, Second Quarter**

Continuation of 181. Language proficiency maintenance; appropriate for majors and non-majors with significant language experience overseas. Discussions, oral presentations, and writing essays on contemporary Russia. Prerequisite: placement test, 181 or consent of instructor.

*3 units, Win (Khassina, E)***SLAVLANG 183. Fifth-Year Russian, Third Quarter**

Continuation of 182. Language proficiency maintenance; appropriate for majors and non-majors with significant language experience overseas. Discussions, oral presentations, and writing essays on contemporary Russia. Prerequisite: placement test, 182 or consent of instructor.

*3 units, Spr (Khassina, E)***SLAVLANG 184A. Russian Reading Conversation and Composition**

Proficiency in reading, spoken and written Russian through literary and non-literary texts, movies, and contemporary media. Emphasis is on debate, oral presentations, and essay writing.

*2-3 units, not given this year***SLAVLANG 184A. Russian Reading Conversation and Composition**

Proficiency in reading, spoken and written Russian through literary and non-literary texts, movies, and contemporary media. Emphasis is on debate, oral presentations, and essay writing.

*2-3 units, not given this year***SLAVLANG 184B. Russian Advanced Conversation and Composition**

Proficiency in spoken and written Russian through literary and non-literary texts, movies, and contemporary media. Emphasis is on debate, oral presentations, and essay writing.

*2-3 units, Win (Greenhill, R)***SLAVLANG 184C. Russian Advanced Conversation and Composition**

Proficiency in spoken and written Russian through literary and non-literary texts, movies, and contemporary media. Emphasis is on debate, oral presentations, and essay writing.

*2-3 units, not given this year***SLAVLANG 199. Individual Work**

Prerequisite: consent of instructor.

*1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)***GRADUATE COURSES IN SLAVIC LANGUAGE**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**SLAVLANG 299. Independent Study***1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)***SLAVLANG 394. Graduate Studies in Russian Conversation***1-3 units, Aut (Staff), Win (Staff), Spr (Staff)***SLAVLANG 395. Graduate Studies in Russian**

Prerequisite: consent of instructor. (Staff)

*2-5 units, Aut (Staff), Win (Staff), Spr (Staff)***SLAVIC LITERATURE (SLAVLIT) COURSES****UNDERGRADUATE COURSES IN SLAVIC LITERATURE**

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**SLAVLIT 129. Poetry as System: Introduction to Theory and Practice of Russian Verse**

(Same as SLAVLIT 229) The history and theory of Russian versification from the 17th to the 20th century. Prerequisite: reading knowledge of Russian. GER:DB-Hum

*4 units, not given this year***SLAVLIT 167. Introduction to Russian Cultural Studies**

The fundamentals of literary analysis of poetics and rhetoric, as well as concepts and topics in Russian intellectual history. Goal is to improve students' comprehension and expression in Russian while building a conceptual vocabulary for understanding Russian literature and historical thought. In Russian. Prerequisite: third-

year Russian or equivalent. GER:DB-Hum

3-5 units, not given this year

**SLAVLIT 169. Advanced Russian Seminar: Reading Pushkin's Evgenii Onegin**

A close reading of Pushkin's masterpiece in the context of the changes that were taking place in literary life of his times. Eugene Onegin and the birth of modern Russian novel. The evolution of Pushkin's literary style and narrative techniques. Final paper. In Russian. Prerequisites: three years of Russian or consent of instructor.

2-4 units, not given this year

**SLAVLIT 182. Pushkin's Eugene Onegin**

Russian literature's central masterpiece. In Russian. (Fleishman)

4 units, not given this year

**SLAVLIT 183. Readings in the Russian Press**

(Same as SLAVLIT 283) For students at the fifth-year Russian level. Advanced language training based on Russian newspapers and magazines. Discussion of issues regarding the Russian media and reading articles of a typical Russian press format.

4 units, not given this year

**SLAVLIT 184. The History of the Russian Literary Language**

(Same as SLAVLIT 284) Major structural and semantic changes from the 10th to the 19th centuries. Recommended: 211, 212.

4-5 units, not given this year

**SLAVLIT 187. Russian Poetry of the 18th and 19th Centuries**

(Same as SLAVLIT 287) Required of majors in Russian language and literature; open to undergraduates who have completed three years of Russian, and to graduate students. The major poetic styles of the 19th century as they intersected with late classicism, the romantic movement, and the realist and post-realist traditions. Representative poems by Lomonosov, Derzhavin, Zhukovskii, Pushkin, Baratynskii, Lermontov, Tiutchev, Nekrasov, Fet, Soloviev. In Russian.

3-4 units, not given this year

**SLAVLIT 188. Russian Poetry**

Required of majors in Russian literature. Developments in 19th- and 20th-century Russian poetry including symbolism, acmeism, futurism, and literature of the absurd. Emphasis is on close readings of individual poems. Discussions in Russian.

3-5 units, Win (Fleishman, L)

**SLAVLIT 189A. Honors Research**

Senior honors students enroll for 5 units in Winter while writing the honors thesis, and may enroll in 189B for 2 units in Spring while revising the thesis. Prerequisite: DLCL 189.

5 units, Win (Staff), Spr (Staff)

**SLAVLIT 189B. Honors Research**

Open to juniors with consent of adviser while drafting honors proposal. Open to senior honors students while revising honors thesis. Prerequisites for seniors: 189A, DLCL 189.

2 units, Aut (Staff), Spr (Staff)

**SLAVLIT 198. Writing Between Languages: The Case of Eastern European Jewish Literature**

(Same as JEWISHST 148, JEWISHST 248, SLAVLIT 298) Eastern European Jews spoke and read Hebrew, Yiddish, and their co-territorial languages (Russian, Polish, etc.). In the modern period they developed secular literatures in all of them, and their writing reflected their own multilinguality and evolving language ideologies. We focus on major literary and sociolinguistic texts. Reading and discussion in English; students should have some reading knowledge of at least one relevant language as well. GER:DB-Hum

3-5 units, Spr (Safran, G)

**SLAVLIT 199. Individual Work for Undergraduates**

Open to Russian majors or students working on special projects. May be repeated for credit. Prerequisite: consent of instructor.

1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

## GRADUATE COURSES IN SLAVIC LITERATURE

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**SLAVLIT 200. Proseminar in Literary Theory and Study of**

### Russian Literature

Required for graduate students and honors undergraduates in Slavic; first-year Slavic graduate students must enroll during their first quarter. Introduction to advanced study in Russian literature and culture: profession, discipline, scholarly method, and theoretical perspectives. Variety of approaches to the study of literature and culture. Practical exercises in the analysis of verse, narrative, and forms of visual representation. Four short papers (800 words), including the final (a review of a recent monograph of Russian Literatures and culture).

3-5 units, Aut (Freidin, G)

**SLAVLIT 200A. Introduction to Russian Literary Scholarship: Russian Formalism and Structuralism**

Required of first-year Slavic graduate students and honors students. Elements of literary work and principles of literary history. 20th-century Russian literary scholarship emphasizing Russian formalism and structuralism. The relationship of literary studies with the other areas of humanistic research such as linguistics, history, art criticism, semiotics, and cultural studies. Bibliographic and archival research.

3-4 units, not given this year

**SLAVLIT 200B. Research Tools and Professionalization Workshop for Slavic Graduate Students**

This course introduces graduate students in Slavic Studies to library, archival, and web resources for research, grant opportunities, publication strategies, and professional timelines. Open to PhD students in the Slavic Department and other departments and to MA students in CREEES.

1 unit, Aut (Safran, G)

**SLAVLIT 212. Old Russian and Old Church Slavic**

Continuation of 211. Readings in additional canonical Old Church Slavic texts, following the Church Slavic tradition as it develops in early Rus (Kiev, Novgorod). Selections from the Primary Chronicle, Boris and Gleb, The Life of Theodosius. The general issues of writing and the reception of Byzantine culture in early Rus.

3 units, not given this year

**SLAVLIT 215. Russian Poetry after Brodsky**

The Bronze Age of Russian poetry in the 70s-80s as a time of enthusiasm for poetic diction and achievement, attempts to reclaim connections with Russian and European traditions, and avant garde experimentation. The new metaphysics, the problem of the poet's self, new forms, and the limitations of the poetic domain. Poets include Leonid Aronzon, Victor Krivulin, Elena Shvartz, Ivan Zhdanov, Petr Cheigin, Gennadii Aigui, and Leonid Gubanov. Readings in Russian. Undergraduates require consent of instructor.

3-4 units, not given this year

**SLAVLIT 225. Readings in Russian Realism**

Open to graduate students and advanced undergraduates. Russian realist and naturalist prose emerged in a historical context that fostered specific ideas about the function and form of the literary word. Readings from Turgenev, Goncharov, Leskov, Saltykov-Shchedrin, Dostoevsky, Garshin, Tolstoy, Chekhov, Gorky, Bunin. Discussions in English.

4 units, not given this year

**SLAVLIT 226. Bakhtin and His Legacy**

(Same as COMPLIT 210) ¿Quests for my own word are in fact quests for a word that is not my own, a word that is more than myself,¿ writes Mikhail Bakhtin towards the end of his life. It was this ceaseless pursuit of another word that allowed Bakhtin, one of the most distinguished literary critics of the twentieth century, to author several influential literary theory concepts, many of which deal with the ideas of multiplicity, diversity and unfinalizability. The seminar explores these core concepts through close reading of key texts in English and investigates their reverberations in the writings of other thinkers such as Kristeva, de Man and Derrida

3-5 units, Spr (Skakov, N)

**SLAVLIT 229. Poetry as System: Introduction to Theory and Practice of Russian Verse**

(Same as SLAVLIT 129) The history and theory of Russian versification from the 17th to the 20th century. Prerequisite: reading knowledge of Russian.

4 units, not given this year

**SLAVLIT 251. Dostoevsky: Narrative Performance and**



**Literary Theory**

(Same as COMPLIT 219) This course is an in-depth engagement with a range of Dostoevsky's genres: early works (epistolary novella *Poor Folk* and experimental *Double*), major novels (*Crime and Punishment*, *The Idiot*), less-read shorter works (*A Faint Heart*, *Bobok* and *The Meek One*), and genre-bending *House of the Dead* and *Diary of a Writer*. We will apply recent theory of autobiography, performance, repetition and narrative gaps, to Dostoevsky's transformations of genre, philosophical and dramatic discourse, and narrative performance. For graduate students. Slavic students will read primary texts in Russian, other participants in translation. Course conducted in English. Undergraduates with advanced linguistic and critical competence may apply.

3-5 units, *Win (Greenleaf, M; Erman, I)*

**SLAVLIT 269. Pushkin and the Golden Age**

Graduate seminar. The formation of a simultaneously imperial and Enlightenment culture under Catherine the Great, and how Pushkin and his contemporaries realized its potentials and contradictions. Literary texts in light of other verbal discourses and artistic media; the field of 18th-century and imperial studies in Russia. Undergraduates require consent of instructor.

3 units, *not given this year*

**SLAVLIT 270. Pushkin**

Major poems and prose with detailed examination of his cultural milieu. Emphasis is on changes in the understanding of literary concepts relevant to this period of Russian literature (poetic genres, the opposition between poetry and prose, romanticism). (Staff)

2-3 units, *not given this year*

**SLAVLIT 283. Readings in the Russian Press**

(Same as SLAVLIT 183) For students at the fifth-year Russian level. Advanced language training based on Russian newspapers and magazines. Discussion of issues regarding the Russian media and reading articles of a typical Russian press format.

4 units, *not given this year*

**SLAVLIT 284. The History of the Russian Literary Language**

(Same as SLAVLIT 184) Major structural and semantic changes from the 10th to the 19th centuries. Recommended: 211, 212.

4-5 units, *not given this year*

**SLAVLIT 287. Russian Poetry of the 18th and 19th Centuries**

(Same as SLAVLIT 187) Required of majors in Russian language and literature; open to undergraduates who have completed three years of Russian, and to graduate students. The major poetic styles of the 19th century as they intersected with late classicism, the romantic movement, and the realist and post-realist traditions. Representative poems by Lomonosov, Derzhavin, Zhukovskii, Pushkin, Baratynskii, Lermontov, Tiutchev, Nekrasov, Fet, Soloviev. In Russian.

3-4 units, *not given this year*

**SLAVLIT 298. Writing Between Languages: The Case of Eastern European Jewish Literature**

(Same as JEWISHST 148, JEWISHST 248, SLAVLIT 198) Eastern European Jews spoke and read Hebrew, Yiddish, and their co-territorial languages (Russian, Polish, etc.). In the modern period they developed secular literatures in all of them, and their writing reflected their own multilinguality and evolving language ideologies. We focus on major literary and sociolinguistic texts. Reading and discussion in English; students should have some reading knowledge of at least one relevant language as well.

3-5 units, *Spr (Safran, G)*

**SLAVLIT 299. Individual Work for Graduate Students**

For graduate students in Slavic working on theses or engaged in special work. Prerequisite: written consent of instructor.

1-12 units, *Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**SLAVLIT 310. Civilizing Process: Paradigms of Society and Culture in Modern Russian Literature and Film**

Texts representing theoretical models of society and culture in confrontation with works of Russian fiction and film. Emphasis is on Norbert Elias's civilizing process and related theories. Topics: body and desire (Freud, Bakhtin); manners and civilizing process (Elias, Cuddihy, Lotman); symbolic forms, ritual, and systems (Geertz, Zorin); identities and practices (de Certeau, Bourdieu); subcultures (Hebdidge). Authors include Mayakovsky, Babel, Mandelstam, Bulgakov, Platonov, Zoshchenko, Erofeev, Pelevin,

Trifonov, and Petrushevskaja; film makers: Mamin and Rogozhkin. Recommended: knowledge of Russian.

2-4 units, *not given this year*

**SLAVLIT 349. LITERARY THEORY**

(Same as COMPLIT 349, DLCL 349, ILAC 349) Advanced survey course of key schools in literary theory, from formalism onwards. Emphasis is on the discussion of primary sources. Topics include structuralism, ideology critique, psychoanalysis, reception aesthetics, deconstruction, feminism, and post-colonialism. Readings by Barthes, Bakhtin, Benjamin, Borges, Derrida, de Man, Foucault, Freud, Iser, Lacan, Shklovsky, and Spivak, among others.

3-5 units, *Aut (Hoyos, H; Skakov, N)*

**SLAVLIT 349. LITERARY THEORY**

(Same as COMPLIT 349, DLCL 349, ILAC 349) Advanced survey course of key schools in literary theory, from formalism onwards. Emphasis is on the discussion of primary sources. Topics include structuralism, ideology critique, psychoanalysis, reception aesthetics, deconstruction, feminism, and post-colonialism. Readings by Barthes, Bakhtin, Benjamin, Borges, Derrida, de Man, Foucault, Freud, Iser, Lacan, Shklovsky, and Spivak, among others.

3-5 units, *Aut (Staff)*

**SLAVLIT 359. Cultural Critique & Cultural Construction in Soviet Russian Literature & Culture in the 1920s & 30s**

Introduction to the study of the literature and culture of the Soviet era from the heyday of the NEP, with its contesting view of the Revolution, everyday life, and high culture (e.g., debates around Formalism), through the Stalin revolution and the establishment of the Soviet cultural system in the landmark events of the 1930s (The First Congress of Soviet Writers, Campaign against Formalism, Pushkin Centenary, the fall and rehabilitation of Sergey Eisenstein). Two presentations and an essay (~3000 words).

3-5 units, *Win (Freidin, G)*

**SLAVLIT 399. Advanced Research Seminar in Russian Literature**

Follow-up to 200- or 300-series seminars, as needed. May be repeated for credit.

2-4 units, *Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**SLAVLIT 801. TGR Project**

0 units, *Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**SLAVLIT 802. TGR Dissertation**

0 units, *Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**SOCIOLOGY (SOC) COURSES****UNDERGRADUATE COURSES IN SOCIOLOGY**

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**SOC 1. Introduction to Sociology**

Concepts, methods, and theoretical orientations. Sociological imagination illustrated by recent theory and research. Possible topics: the persistence of class cleavages; ethnic, racial, and gender inequalities; religious beliefs and the process of secularization; functions and dysfunctions of educational institutions; criminology and social deviance; social movements and social protest; production and reproduction of culture; rise of organizational society. GER:DB-SocSci

5 units, *Spr (Snipp, C)*

**SOC 15N. The Transformation of Socialist Societies**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. The impact of societal organization on the lives of ordinary people in socialist societies and in the new societies arising through the processes of political, economic, and social transformation. Do the concepts of democratization and marketization suffice to characterize ongoing changes? Enrollment limited to 16. GER:DB-SocSci, EC-GlobalCom

3 units, *Win (Tuma, N)*



**SOC 16N. African Americans and Social Movements**

(F,Sem) (Same as AFRICAAM 16N, CSRE 16N) Stanford Introductory Seminar. Theory and research on African Americans' roles in post-Civil Rights, US social movements. Topics include women's right, LGBT rights, environmental movement, and contemporary political conservatism. GER:DB-SocSci

3 units, Aut (Fields, C)

**SOC 22N. The Roots of Social Protest**

Preference to freshmen. The conditions under which social protest occurs and the emergence, success, and viability of contemporary social movements. Examples include women's civil rights, ecology, and antiwar and anti-globalization movements in the U.S. and elsewhere. Sociological theories to explain the timing, location, and causes of mobilization; how researchers evaluate these theories. Comparison of tactics, trajectories, and outcomes. GER:DB-SocSci, EC-GlobalCom

3 units, not given this year

**SOC 25N. Understanding the Sixties**

(F,Sem) (Same as AMSTUD 25N) Stanford Introductory Seminar. Preference to freshmen. The tendency of critics to view the 60s through ideological lenses as either the best or worst of times has made a balanced perspective difficult to achieve. Goal is to provide a sociological explanation for the political and cultural turbulence that marked the era. The confluence of demographic, political, economic, and cultural trends that date back to at least the 30s. The ambiguous legacy of the 60s. Using the 60s to shed light on the 80s and 90s. Enrollment limited to 16. GER:DB-SocSci

3 units, Win (Staff)

**SOC 45Q. Understanding Race and Ethnicity in American Society**

(S,Sem) (Same as CSRE 45Q) Stanford Introductory Seminar. Preference to sophomores. Historical overview of race in America, race and violence, race and socioeconomic well-being, and the future of race relations in America. Enrollment limited to 16. GER:DB-SocSci

5 units, Aut (Snipp, C)

**SOC 46N. Race, Ethnic, and National Identities: Imagined Communities**

Preference to freshmen. How new identities are created and legitimated. What does it mean to try on a different identity? National groups and ethnic groups are so large that one individual can know only an infinitesimal fraction of other group members. What explains the seeming coherence of groups? If identities are a product of the imagination, why are people willing to fight and die for them? Enrollment limited to 16. GER:DB-SocSci

3 units, not given this year

**SOC 100ASB. Pre-field Course for Alternative Spring Break**

Limited to students participating in the Alternative Spring Break program. See <http://asb.stanford.edu> for more information.

1 unit, not given this year

**SOC 100SI. Student Initiated Course**

1 unit, not given this year

**SOC 104. Economic Foundations of Everyday Life**

(Same as SOC 204) How the economy impacts other aspects of everyday life. Market as emancipatory, market as alienating, and critiques dualisms. How theories inform case studies of think tanks, reactionary movements, cultural authenticity, romantic relationships, and elite college admissions.

5 units, Spr (Staff)

**SOC 106. Political Sociology**

(Same as SOC 206) The body of state rules and institutions that work in generating legitimate and illegitimate policy claims. Interests and identities that challenged the capacity of the national state to produce effective policies. Economic processes above the national level have that undermine the role of the state as the arena for the composition of disparate interests. GER:DB-SocSci

5 units, Win (Parigi, P)

**SOC 107. China After Mao**

(Same as SOC 207) China's post-1976 recovery from the late Mao era; its reorientation toward an open market-oriented economy; the consequences of this new model and runaway economic growth for standards of living, social life, inequality, and local governance; the political conflicts that have accompanied these changes.

GER:DB-SocSci

5 units, not given this year

**SOC 108. Political & Historical Sociology**

(Same as SOC 208) The differences between historical and sociological analysis of past events. The difference between constructing sociological explanations and describing past events. Topics include: the rise of Christianity, the mafia in a Sicilian village, the trade network of the East India Company. GER:DB-SocSci

5 units, not given this year

**SOC 110. Politics and Society**

(Same as SOC 210) (Graduate students register for 210.) Themes of political sociology, conceptions of power and state structures throughout history, the origins and expansion of the modern state, linkages between state and society, impact of the modern world system on national policies, internal distribution of power and authority, structure of political group formation and individual participation in modern states, and future trends of politics and society in a globalized world. Emphasis is on developing conceptual understandings of state, society, and politics in the modern world. GER:DB-SocSci

5 units, not given this year

**SOC 111. State and Society in Korea**

(Same as SOC 211) 20th-century Korea from a comparative historical perspective. Colonialism, nationalism, development, state-society relations, democratization, and globalization with reference to the Korean experience. GER:DB-SocSci, EC-GlobalCom

5 units, Spr (Shin, G)

**SOC 111D. Social-Psychology and Economics**

Prediction of human behavior derived from economic theory versus social-psychological research. Topics include: decision-making, irrationality, happiness, attractiveness, the persistence of inequality, evaluation of outputs, motivation. Brief overview of economic theory. Seminar with focus on discussion and critical thinking.

5 units, Sum (Staff)

**SOC 112D. Sociology of Judaism and Jewish Identity**

(Same as JEWISHST 132D, RELIGST 112D) Examines the place of the Jewish people in society throughout various locales and historical periods to understand how interactions among Jews and with other groups have shaped Jewish identities. Topics include modernism, the Holocaust, Israel/nationhood, race/ethnicity, intermarriage, and assimilation. Uses theoretical, empirical, and historical material from multiple social scientific fields of study and explores the study of Judaism from several major sociological lenses.

5 units, Sum (Staff)

**SOC 114. Economic Sociology**

(Same as SOC 214) (Graduate students register for 214.) The sociological approach to production, distribution, consumption, and markets, emphasizing the impact of norms, power, social structure, and institutions on the economy. Comparison of classic and contemporary approaches to the economy among the social science disciplines. Topics: consumption, labor markets, organization of professions such as law and medicine, the economic role of informal networks, industrial organization, including the structure and history of the computer and popular music industries, business alliances, capitalism in non-Western societies, and the transition from state socialism in E. Europe and China. GER:DB-SocSci

5 units, Aut (Granovetter, M)

**SOC 115. Topics in Economic Sociology**

(Same as SOC 315) (Graduate students register for 315.) Discussion of topics initially explored in 114/214, with emphasis on countries and cultures outside N. America. Possible topics: families and ethnic groups in the economy, corporate governance and control, corporate strategy, relations among firms in industrial districts and business groups, the impact of national institutions and cultures on economic outcomes, transitions from state socialism and the role of the state in economic development. Possible case studies: the U.S., Germany, Italy, Britain, France, Brazil, Korea, India, Japan, and China. Prerequisite: 114/214 or 314. GER:DB-SocSci

5 units, Win (Granovetter, M)

**SOC 117A. China Under Mao**

(Same as SOC 217A) (Graduate students register for 217A.) The transformation of Chinese society from the 1949 revolution to the eve of China's reforms in 1978: creation of a socialist economy, reorganization of rural society and urban workplaces, emergence of new inequalities of power and opportunity, and new forms of social conflict during Mao's Cultural Revolution of 1966-69 and its aftermath. GER:DB-SocSci, EC-GlobalCom

5 units, Aut (Walder, A)

**SOC 118. Social Movements and Collective Action**

(Same as SOC 218) Why social movements arise, who participates in them, the obstacles they face, the tactics they choose, and how to gauge movement success or failure. Theory and empirical research. Application of concepts and methods to social movements such as civil rights, environmental justice, antiglobalization, and anti-war. GER:DB-SocSci

5 units, Spr (McAdam, D)

**SOC 119. Understanding Large-Scale Societal Change: The Case of the 1960s**

(Same as SOC 219) The demographic, economic, political, and cultural roots of social change in the 60s; its legacy in the present U.S. GER:DB-SocSci

5 units, not given this year

**SOC 120. Interpersonal Relations**

(Same as SOC 220) (Graduate students register for 220.) Forming ties, developing norms, status, conformity, deviance, social exchange, power, and coalition formation; important traditions of research have developed from the basic theories of these processes. Emphasis is on understanding basic theories and drawing out their implications for change in a broad range of situations, families, work groups, and friendship groups. GER:DB-SocSci

5 units, Win (Ridgeway, C)

**SOC 121. The Individual in Social Structure: Foundations in Sociological Social Psychology**

Dynamics of the relationship between the individual and social structure, the relationship between the individual and immediate social context, and relationships between individuals. Focus is on the dominant theoretical perspectives in sociological social psychology: social structure and personality, structural social psychology, and symbolic interactionism.

5 units, not given this year

**SOC 123. Sex and Love in Modern Society**

(Same as SOC 223) Social influences on private intimate relations involving romantic love and sexuality. Topics include the sexual revolution, contraception, dating, hook-ups, cohabitation, sexual orientation, and changing cultural meanings of marriage, gender, and romantic love. GER:DB-SocSci, EC-Gender

5 units, not given this year

**SOC 126. Introduction to Social Networks**

(Same as SOC 226) (Graduate students register for 226.) Theory, methods, and research. Concepts such as density, homogeneity, and centrality; applications to substantive areas. The impact of social network structure on individuals and groups in areas such as communities, neighborhoods, families, work life, and innovations. GER:DB-SocSci

5 units, not given this year

**SOC 127. Bargaining, Power, and Influence in Social Interaction**

(Same as SOC 227) (Graduate students register for 227.) Research and theoretical work on bargaining, social influence, and issues of power and justice in social settings such as teams, work groups, and organizations. Theoretical approaches to the exercise of power and influence in social groups and related issues in social interaction such as the promotion of cooperation, effects of competition and conflict, negotiation, and intergroup relations. Enrollment limited to 40. GER:DB-SocSci

5 units, not given this year

**SOC 128. Introduction to Social Network Analysis**

(Same as SOC 228) (Graduate students register for SOC 228.) Theory and methods of network analysis in sociology (with an emphasis on social movements), anthropology, history, social psychology, economics, political science, and public health.

Prerequisite: basic mathematics.

5 units, not given this year

**SOC 129X. Urban Education**

(Same as AFRICAAM 112, EDUC 112X, EDUC 212X, SOC 229X) (Graduate students register for EDUC 212X or SOC 229X). Combination of social science and historical perspectives trace the major developments, contexts, tensions, challenges, and policy issues of urban education. GER:DB-SocSci

3-4 units, Spr (Ball, A)

**SOC 130. Education and Society**

(Same as EDUC 120C, EDUC 220C, SOC 230) The effects of schools and schooling on individuals, the stratification system, and society. Education as socializing individuals and as legitimizing social institutions. The social and individual factors affecting the expansion of schooling, individual educational attainment, and the organizational structure of schooling. GER:DB-SocSci

4-5 units, NEXTYEAR

**SOC 132. Sociology of Education: The Social Organization of Schools**

(Same as EDUC 110, EDUC 310, SOC 332) Seminar. Key sociological theories and empirical studies of the links between education and its role in modern society, focusing on frameworks that deal with sources of educational change, the organizational context of schooling, the impact of schooling on social stratification, and the relationships between the educational system and other social institutions such as families, neighborhoods, and the economy. GER:DB-SocSci

4 units, Spr (Carter, P)

**SOC 133. Law and Wikinomics: The Economic and Social Organization of the Legal Profession**

(Same as SOC 333) (Graduate and Law students enroll in 333.) Seminar. Emphasis is on the labor market for large-firm lawyers, including the market for entry-level lawyers, attorney retention and promotion practices, lateral hiring of partners, and increased use of forms of employment such as the non-equity form of partnership. Race and gender discrimination and occupational segregation; market-based pressure tactics for organizational reform. Students groups collect and analyze data about the profession and its markets. Multimedia tools for analysis and for producing workplace reforms. May be repeated for credit. Prerequisite: consent of instructor.

1-5 units, Spr (Dauber, M)

**SOC 134. Education, Gender, and Development**

(Same as EDUC 197) Theories and perspectives from the social sciences relevant to the role of education in changing, modifying, or reproducing structures of gender differentiation and hierarchy. Cross-national research on the status of girls and women and the role of development organizations and processes. (SSPEP) GER:EC-Gender

4 units, Spr (Wotipka, C)

**SOC 135. Poverty, Inequality, and Social Policy in the United States**

(Same as SOC 235) Causes and consequences. Effects of antipoverty policies, and debates over effective social policies. Focus is on how poverty and inequality are experienced by families, children, and communities. Topics include welfare reform and labor market policies, education, and community-based antipoverty strategies. GER:DB-SocSci

5 units, Spr (Young, C)

**SOC 136. Sociology of Law**

(Same as SOC 236) (Graduate students register for 236) Major issues and debates. Topics include: historical perspectives on the origins of law; rationality and legal sanctions; normative decision making and morality; cognitive decision making; crime and deviance; the law in action versus the law on the books; organizational responses to law in the context of labor and employment; the roles of lawyers, judges, and juries; and law and social change emphasizing the American civil rights movement. GER:DB-SocSci

5 units, Spr (Dauber, M)

**SOC 136A. Law and Society**

(Same as SOC 236A) Law and social inequality. Major sociological perspectives on where the law comes from, what law and justice systems do, and how they work.

5 units, not given this year

**SOC 136B. Advanced Topics in Sociology of Law**

(Same as SOC 236B) (Same as LAW 538.) Historical perspectives on the origins of law, rationality and legal sanctions, law on the books versus the law in action, crime and deviance, school desegregation, privatization of prisons, American civil rights, file sharing, jury decision making, the role of lawyers and judges, and cynicism about the American legal system.

5 units, not given this year

**SOC 138. American Indians in Comparative Historical Perspective**

(Same as NATIVEAM 138, SOC 238) (Graduate students register for 238.) Demographic, political, and economic processes and events that shaped relations between Euro-Americans and American Indians, 1600-1890. How the intersection of these processes affected the outcome of conflicts between these two groups, and how this conflict was decisive in determining the social position of American Indians in the late 19th century and the evolution of the doctrine of tribal sovereignty. GER:DB-SocSci, EC-AmerCul

5 units, Win (Staff)

**SOC 139. American Indians in Contemporary Society**

(Same as NATIVEAM 139, SOC 239) (Graduate students register for 239.) The social position of American Indians in contemporary American society, 1890 to the present. The demographic resurgence of American Indians, changes in social and economic status, ethnic identification and political mobilization, and institutions such as tribal governments and the Bureau of Indian Affairs. Recommended: 138 or a course in American history. GER:DB-SocSci, EC-AmerCul

5 units, not given this year

**SOC 140. Introduction to Social Stratification**

(Same as SOC 240) (Graduate students register for 240.) The main classical and modern explanations of the causes of social, economic, and political inequality. Issues include: power; processes that create and maintain inequality; the central axes of inequality in contemporary societies (race, ethnicity, class, and gender); the consequences of inequality for individuals and groups; and how social policy can mitigate and exacerbate inequality. Cases include technologically simple groups, the Indian caste system, and the modern U.S. GER:DB-SocSci

5 units, Aut (Grusky, D)

**SOC 141. Controversies about Inequality**

(Same as SOC 241) (Graduate students register for 241.) Debate format involving Stanford and guest faculty. Forms of inequality including racial, ethnic, and gender stratification; possible policy interventions. Topics such as welfare reform, immigration policy, affirmative action, discrimination in labor markets, sources of income inequality, the duty of rich nations to help poor nations, and causes of gender inequality. GER:DB-SocSci

5 units, not given this year

**SOC 142. Sociology of Gender**

(Same as SOC 242) (Graduate students register for 242.) Gender inequality in contemporary American society and how it is maintained. The social and relative nature of knowledge and the problems this poses for understanding sex differences and gendered behavior in society. Analytical levels of explanation for gender inequalities: socialization, interaction processes, and socioeconomic processes; arguments and evidence for each approach. The social consequences of gender inequality such as the feminization of poverty, and problems of interpersonal relations. GER:EC-Gender

5 units, Win (Correll, S)

**SOC 144. Inequality and the Workplace**

(Same as SOC 244) How characteristics of workplaces, such as hiring practices, workforce diversity, organizational policies and legal mandates, produce variation in inequality. Examines the sources, extent, and consequences of workplace inequality across gender, racial and ethnic lines. Topics include earnings, social status, geographical location, and opportunities for people in the workforce.

5 units, not given this year

**SOC 145. Race and Ethnic Relations**

(Same as SOC 245) (Graduate students register for 245.) Race and

ethnic relations in the U.S. and elsewhere. The processes that render ethnic and racial boundary markers, such as skin color, language, and culture, salient in interaction situations. Why only some groups become targets of ethnic attacks. The social dynamics of ethnic hostility and ethnic/racial protest movements. GER:DB-SocSci, EC-AmerCul

5 units, Spr (Snipp, C)

**SOC 146. Introduction to Comparative Studies in Race and Ethnicity**

(Same as CSRE 196C, ENGLISH 172D, PSYCH 155) How different disciplines approach topics and issues central to the study of ethnic and race relations in the U.S. and elsewhere. Lectures by senior faculty affiliated with CSRE. Discussions led by CSRE teaching fellows. GER:DB-SocSci, EC-AmerCul

5 units, not given this year

**SOC 147. Race and Ethnicity Around the World**

(Same as SOC 247) How race and ethnicity has been used to justify segregation, domination and genocide but also be used to create a sense of community, shared responsibility and belonging. Where do divisions come from? Are they hard-wired, or easy to manipulate for political or economic gain? Should governments use these divisions to categorize their citizens? Examining how the definitions, categories and consequences of race and ethnicity differ across time and place.

5 units, Spr (Saperstein, A)

**SOC 147A. Comparative Ethnic Conflict**

(Same as SOC 247A) Causes and consequences of racial and ethnic conflict, including nationalist movements, ethnic genocide, civil war, ethnic separatism, politics, indigenous peoples' movements, and minority rights movements around the world. GER:DB-SocSci, EC-GlobalCom

5 units, not given this year

**SOC 148. Racial Identity**

(Same as SOC 248) The construction and meanings of racial identities in the U.S. Attention to multiracial identities and the shifting boundaries of racial categories in contemporary America. GER:DB-SocSci, EC-AmerCul

5 units, not given this year

**SOC 149. The Urban Underclass**

(Same as SOC 249, URBANST 112) (Graduate students register for 249.) Recent research and theory on the urban underclass, including evidence on the concentration of African Americans in urban ghettos, and the debate surrounding the causes of poverty in urban settings. Ethnic/racial conflict, residential segregation, and changes in the family structure of the urban poor. GER:DB-SocSci, EC-AmerCul

5 units, Spr (Rosenfeld, M)

**SOC 150. Race and Political Sociology**

(Same as CSRE 150, SOC 250) How race informs the theories and research within political sociology. The state's role in creation and maintenance of racial categories, the ways in which racial identity motivates political actors, how race is used to legitimate policy decisions, comparisons across racial groups. Emphasis on understanding the ways race operates in the political arena. GER:DB-SocSci

5 units, Aut (Fields, C)

**SOC 152. The Social Determinants of Health**

(Same as SOC 252) How social differences, such as where we live, whether and how we work, or how much money we make, and our gender, race or ethnicity, also play a role in who gets sick and who does not.

5 units, Spr (Saperstein, A)

**SOC 155. The Changing American Family**

(Same as SOC 255) Family change from historical, social, demographic, and legal perspectives. Extramarital cohabitation, divorce, later marriage, interracial marriage, and same-sex cohabitation. The emergence of same-sex marriage as a political issue. Are recent changes in the American family really as dramatic as they seem? Theories about what causes family systems to change. GER:DB-SocSci, EC-AmerCul

5 units, not given this year

**SOC 160. Formal Organizations**

(Same as SOC 260) (Graduate students register for 260.) The roles

of formal organizations in production processes, market transactions, and social movements; and as sources of income and ladders of mobility. Relationships of modern organizations to environments and internal structures and processes. Concepts, models, and tools for analyzing organizational phenomena in contemporary societies. Sources include the literature and case studies. GER:DB-SocSci

5 units, Spr (Zhou, X)

#### **SOC 161. The Social Science of Entrepreneurship**

(Same as SOC 261) (Graduate students register for 261.) Who is likely to become an entrepreneur and where is entrepreneurship likely to occur? Classic and contemporary theory and research. Interaction with expert practitioners in creating entrepreneurial opportunities including venture and corporate capitalists. The role of culture, markets, hierarchies, and networks. Market creation and change, and factors that affect success of new organizations. Field projects on entrepreneurial environments such as technology licensing offices, entrepreneurial development organizations, venture capital firms, and corporate venturing groups. GER:DB-SocSci

5 units, not given this year

#### **SOC 162. Markets and Governance**

(Same as SOC 262) Social and political forces that shape market outcomes. The emergence and creation of markets, how markets go wrong, and the roles of government and society in structuring market exchange. Applied topics include development, inequality, globalization, and economic meltdown. GER:DB-SocSci

5 units, Spr (Young, C)

#### **SOC 163. Foundations of Organizational Theory**

(Same as SOC 263) Foundational material in organizational theory literature. GER:DB-SocSci

5 units, OCCASIONAL

#### **SOC 164. Immigration and the Changing United States**

(Same as CHICANST 164, CSRE 164, SOC 264) The role of race and ethnicity in immigrant group integration in the U.S. Topics include: theories of integration; racial and ethnic identity formation; racial and ethnic change; immigration policy; intermarriage; hybrid racial and ethnic identities; comparisons between contemporary and historical waves of immigration. GER:DB-SocSci

5 units, Aut (Jimenez, T)

#### **SOC 165. Seminar on the Everyday Lives of Immigrants**

(Same as SOC 265) Everyday experience of immigrants and the immigrant second generation through the ethnographic lens. Ethnographies that focus on the immigrant experience. Limited enrollment.

5 units, not given this year

#### **SOC 166. Mexicans, Mexican Americans, and Chicanos in American Society**

(Same as CHICANST 166, SOC 266) Contemporary sociological issues affecting Mexican-origin people in the U.S. Topics include: the immigrant experience, immigration policy, identity, socioeconomic integration, internal diversity, and theories of incorporation. GER:DB-SocSci

5 units, not given this year

#### **SOC 167A. Asia-Pacific Transformation**

(Same as SOC 267A) Post-WW II transformation in the Asia-Pacific region, with focus on the ascent of Japan, the development of newly industrialized capitalist countries (S. Korea and Taiwan), the emergence of socialist states (China and N. Korea), and the changing relationship between the U.S. and these countries. GER:DB-SocSci, EC-GlobalCom

5 units, not given this year

#### **SOC 168. Global Organizations: Managing Diversity**

(Same as PUBLPOL 168, SOC 268) Analytical tools derived from the social sciences to analyze global organizations and projects, and applied to the tradeoffs between different designs of teams and organizations. Focus is on tribal mentality and how to design effective organizations and projects for policy implementation within and across institutional settings. Recommended: 102, MS&E 180, or SOC 160. GER:DB-SocSci

5 units, Win (Meyersson Milgrom, E)

#### **SOC 170. Classics of Modern Social Theory**

(Same as SOC 270) (Graduate students register for 270). Preference to Sociology majors. Contributions of Marx, Weber, and Durkheim to contemporary sociology. Topics: the problem of social order and the nature of social conflict; capitalism and bureaucracy; the relationship between social structure and politics; the social sources of religion and political ideology; and the evolution of modern societies. Examples from contemporary research illustrate the impact of these traditions. Limited enrollment. GER:DB-SocSci

5 units, Win (Staff)

#### **SOC 180A. Foundations of Social Research**

(Same as SOC 280A) Formulating a research question, developing hypotheses, probability and non-probability sampling, developing valid and reliable measures, qualitative and quantitative data, choosing research design and data collection methods, challenges of making causal inference, and criteria for evaluating the quality of social research. Emphasis is on how social research is done, rather than application of different methods. Limited enrollment; preference to Sociology and Urban Studies majors, and Sociology coterms. GER:DB-SocSci

5 units, Aut (Parigi, P), Spr (Cook, B)

#### **SOC 180B. INTRODUCTION TO DATA ANALYSIS**

(Same as SOC 280B) Methods for analyzing and evaluating data in sociological research: comparative historical methods, ethnographic observation, quantitative analysis of survey data, experimentation, and simulation. Emphasis is on application of these methods through small data analysis projects. Limited enrollment; preference to Sociology majors. GER:DB-SocSci

5 units, Win (Cumberworth, E)

#### **SOC 181B. Sociological Methods: Statistics**

(Same as SOC 281B) (Graduate students register for 281B.) Statistical methods of relevance to sociology: contingency tables, correlation, and regression.

5 units, not given this year

#### **SOC 190. Undergraduate Individual Study**

Prior arrangement required.

1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

#### **SOC 191. Undergraduate Directed Research**

Work on a project of student's choice under supervision of a faculty member. Prior arrangement required.

1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

#### **SOC 192. Undergraduate Research Apprenticeship**

Work in an apprentice-like relationship with faculty on an on-going research project. Prior arrangement required.

1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

#### **SOC 193. Undergraduate Teaching Apprenticeship**

Prior arrangement required.

1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

#### **SOC 196. Senior Thesis**

Work on an honors thesis project under faculty supervision (see description of honors program). Must be arranged early in the year of graduation or before.

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

#### **SOC 200. Junior/Senior Seminar for Majors**

For Sociology majors. Capstone course in which sociological problems are framed, linked to theories, and answers pursued through research designs. Independent research. How to formulate a research question; how to integrate theory and methods. Prerequisites: SOC 170, 180B.

5 units, Aut (Jimenez, T)

#### **SOC 201. Preparation for Senior Project**

(Same as URBANST 201) First part of capstone experience for Urban Studies majors pursuing an internship-based research project or honors thesis. Assignments culminate in a research proposal, which may be submitted for funding. Students also identify and prepare for a related internship, normally to begin in Spring Quarter in URBANST 201B or in Summer. Research proposed in the final assignment may be carried out in Spring or Summer Quarter; consent required for Autumn Quarter research. Service Learning Course (certified by Haas Center).

5 units, not given this year

**SOC 202. Preparation for Senior Research**

(Same as URBANST 202) Primarily for juniors in Sociology; sophomores who plan to be off-campus Winter Quarter of their junior year may register with consent of instructor. Students write a research prospectus and grant proposal, which may be submitted for funding. Research proposal in final assignment may be carried out in Spring or Summer Quarter; consent required for Autumn Quarter research. WIM

5 units, Win (McAdam, D)

**SOC 234. Research Seminar on Access to Justice**

(Same as SOC 334) The functions and dysfunctions of modern legal systems. Topics include: official statements of the U.S. and the EU about the rights of parties to civil disputes; the roles of lawyers as gatekeepers and facilitators; the filtering process by which injuries and experiences become the basis for legal claims; access to and use of courts; the balance of power and advantage between individual persons and organizations in disputes. Prerequisite: advanced undergraduate or graduate standing, or consent of instructor.

1-5 units, not given this year

**GRADUATE COURSES IN SOCIOLOGY**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**SOC 204. Economic Foundations of Everyday Life**

(Same as SOC 104) How the economy impacts other aspects of everyday life. Market as emancipatory, market as alienating, and critiques dualisms. How theories inform case studies of think tanks, reactionary movements, cultural authenticity, romantic relationships, and elite college admissions.

5 units, Spr (Staff)

**SOC 206. Political Sociology**

(Same as SOC 106) The body of state rules and institutions that work in generating legitimate and illegitimate policy claims. Interests and identities that challenged the capacity of the national state to produce effective policies. Economic processes above the national level have that undermine the role of the state as the arena for the composition of disparate interests.

5 units, Win (Parigi, P)

**SOC 207. China After Mao**

(Same as SOC 107) China's post-1976 recovery from the late Mao era; its reorientation toward an open market-oriented economy; the consequences of this new model and runaway economic growth for standards of living, social life, inequality, and local governance; the political conflicts that have accompanied these changes.

5 units, not given this year

**SOC 208. Political & Historical Sociology**

(Same as SOC 108) The differences between historical and sociological analysis of past events. The difference between constructing sociological explanations and describing past events. Topics include: the rise of Christianity, the mafia in a Sicilian village, the trade network of the East India Company.

5 units, not given this year

**SOC 210. Politics and Society**

(Same as SOC 110) (Graduate students register for 210.) Themes of political sociology, conceptions of power and state structures throughout history, the origins and expansion of the modern state, linkages between state and society, impact of the modern world system on national policies, internal distribution of power and authority, structure of political group formation and individual participation in modern states, and future trends of politics and society in a globalized world. Emphasis is on developing conceptual understandings of state, society, and politics in the modern world.

5 units, not given this year

**SOC 211. State and Society in Korea**

(Same as SOC 111) 20th-century Korea from a comparative historical perspective. Colonialism, nationalism, development, state-society relations, democratization, and globalization with reference to the Korean experience.

5 units, Spr (Shin, G)

**SOC 214. Economic Sociology**

(Same as SOC 114) (Graduate students register for 214.) The

sociological approach to production, distribution, consumption, and markets, emphasizing the impact of norms, power, social structure, and institutions on the economy. Comparison of classic and contemporary approaches to the economy among the social science disciplines. Topics: consumption, labor markets, organization of professions such as law and medicine, the economic role of informal networks, industrial organization, including the structure and history of the computer and popular music industries, business alliances, capitalism in non-Western societies, and the transition from state socialism in E. Europe and China.

5 units, Aut (Granovetter, M)

**SOC 216. Chinese Organizations and Management**

Seminar for advanced undergraduates and all graduate students.

5 units, Win (Zhou, X)

**SOC 217A. China Under Mao**

(Same as SOC 117A) (Graduate students register for 217A.) The transformation of Chinese society from the 1949 revolution to the eve of China's reforms in 1978: creation of a socialist economy, reorganization of rural society and urban workplaces, emergence of new inequalities of power and opportunity, and new forms of social conflict during Mao's Cultural Revolution of 1966-69 and its aftermath.

5 units, Aut (Walder, A)

**SOC 218. Social Movements and Collective Action**

(Same as SOC 118) Why social movements arise, who participates in them, the obstacles they face, the tactics they choose, and how to gauge movement success or failure. Theory and empirical research. Application of concepts and methods to social movements such as civil rights, environmental justice, antiglobalization, and anti-war.

5 units, Spr (McAdam, D)

**SOC 219. Understanding Large-Scale Societal Change: The Case of the 1960s**

(Same as SOC 119) The demographic, economic, political, and cultural roots of social change in the 60s; its legacy in the present U.S.

5 units, not given this year

**SOC 220. Interpersonal Relations**

(Same as SOC 120) (Graduate students register for 220.) Forming ties, developing norms, status, conformity, deviance, social exchange, power, and coalition formation; important traditions of research have developed from the basic theories of these processes. Emphasis is on understanding basic theories and drawing out their implications for change in a broad range of situations, families, work groups, and friendship groups.

5 units, Win (Ridgeway, C)

**SOC 223. Sex and Love in Modern Society**

(Same as SOC 123) Social influences on private intimate relations involving romantic love and sexuality. Topics include the sexual revolution, contraception, dating, hook-ups, cohabitation, sexual orientation, and changing cultural meanings of marriage, gender, and romantic love.

5 units, not given this year

**SOC 224A. Traditions of Microsociology**

(Same as EDUC 312A) The educational applications of sociological and social psychological theory and research to interaction processes in schools. Readings include: foundational works by Mead, Schutz, and Simmel; contemporary work by Goffman, Homans, Merton, Blau, and Harold. Readings span empirical settings such as work, classrooms, gangs, primate societies, and children's games. Topics: processes of influence, role differentiation, identity formation, social mechanisms, and intra/inter group dynamics of peer relations. Methods for observation and analysis of small groups. (SSPEP)

4 units, not given this year

**SOC 224B. Microsociology: Social Structure and Interaction**

(Same as EDUC 312B) How to interpret interpersonal situations using microsociological theories. Focuses on the role of intention, identity, routines, scripts, rituals, conceptual frameworks, talk and emotions in social interaction. Processes by which interactions reverberate outward to transform groups and social structures. Special consideration will be placed on organizational contexts like schools, workplaces and policy decision arenas.

4 units, not given this year

**SOC 226. Introduction to Social Networks**

(Same as SOC 126) (Graduate students register for 226.) Theory, methods, and research. Concepts such as density, homogeneity, and centrality; applications to substantive areas. The impact of social network structure on individuals and groups in areas such as communities, neighborhoods, families, work life, and innovations.

5 units, not given this year

**SOC 227. Bargaining, Power, and Influence in Social Interaction**

(Same as SOC 127) (Graduate students register for 227.) Research and theoretical work on bargaining, social influence, and issues of power and justice in social settings such as teams, work groups, and organizations. Theoretical approaches to the exercise of power and influence in social groups and related issues in social interaction such as the promotion of cooperation, effects of competition and conflict, negotiation, and intergroup relations. Enrollment limited to 40.

5 units, not given this year

**SOC 228. Introduction to Social Network Analysis**

(Same as SOC 128) (Graduate students register for SOC 228.) Theory and methods of network analysis in sociology (with an emphasis on social movements), anthropology, history, social psychology, economics, political science, and public health. Prerequisite: basic mathematics.

5 units, not given this year

**SOC 229X. Urban Education**

(Same as AFRICAAM 112, EDUC 112X, EDUC 212X, SOC 129X) (Graduate students register for EDUC 212X or SOC 229X.) Combination of social science and historical perspectives trace the major developments, contexts, tensions, challenges, and policy issues of urban education.

3-4 units, Spr (Ball, A)

**SOC 230. Education and Society**

(Same as EDUC 120C, EDUC 220C, SOC 130) The effects of schools and schooling on individuals, the stratification system, and society. Education as socializing individuals and as legitimizing social institutions. The social and individual factors affecting the expansion of schooling, individual educational attainment, and the organizational structure of schooling.

4-5 units, NEXTYEAR

**SOC 231. World, Societal, and Educational Change: Comparative Perspectives**

(Same as EDUC 136, EDUC 306D) Theoretical perspectives and empirical studies on the structural and cultural sources of educational expansion and differentiation, and on the cultural and structural consequences of educational institutionalization. Research topics: education and nation building; education, mobility, and equality; education, international organizations, and world culture.

4-5 units, Win (Ramirez, F)

**SOC 235. Poverty, Inequality, and Social Policy in the United States**

(Same as SOC 135) Causes and consequences. Effects of antipoverty policies, and debates over effective social policies. Focus is on how poverty and inequality are experienced by families, children, and communities. Topics include welfare reform and labor market policies, education, and community-based antipoverty strategies.

5 units, Spr (Young, C)

**SOC 236. Sociology of Law**

(Same as SOC 136) (Graduate students register for 236) Major issues and debates. Topics include: historical perspectives on the origins of law; rationality and legal sanctions; normative decision making and morality; cognitive decision making; crime and deviance; the law in action versus the law on the books; organizational responses to law in the context of labor and employment; the roles of lawyers, judges, and juries; and law and social change emphasizing the American civil rights movement.

5 units, Spr (Dauber, M)

**SOC 236A. Law and Society**

(Same as SOC 136A) Law and social inequality. Major sociological perspectives on where the law comes from, what law

and justice systems do, and how they work.

5 units, not given this year

**SOC 236B. Advanced Topics in Sociology of Law**

(Same as SOC 136B) (Same as LAW 538.) Historical perspectives on the origins of law, rationality and legal sanctions, law on the books versus the law in action, crime and deviance, school desegregation, privatization of prisons, American civil rights, file sharing, jury decision making, the role of lawyers and judges, and cynicism about the American legal system.

5 units, not given this year

**SOC 238. American Indians in Comparative Historical Perspective**

(Same as NATIVEAM 138, SOC 138) (Graduate students register for 238.) Demographic, political, and economic processes and events that shaped relations between Euro-Americans and American Indians, 1600-1890. How the intersection of these processes affected the outcome of conflicts between these two groups, and how this conflict was decisive in determining the social position of American Indians in the late 19th century and the evolution of the doctrine of tribal sovereignty.

5 units, Win (Staff)

**SOC 239. American Indians in Contemporary Society**

(Same as NATIVEAM 139, SOC 139) (Graduate students register for 239.) The social position of American Indians in contemporary American society, 1890 to the present. The demographic resurgence of American Indians, changes in social and economic status, ethnic identification and political mobilization, and institutions such as tribal governments and the Bureau of Indian Affairs. Recommended: 138 or a course in American history.

5 units, not given this year

**SOC 240. Introduction to Social Stratification**

(Same as SOC 140) (Graduate students register for 240.) The main classical and modern explanations of the causes of social, economic, and political inequality. Issues include: power; processes that create and maintain inequality; the central axes of inequality in contemporary societies (race, ethnicity, class, and gender); the consequences of inequality for individuals and groups; and how social policy can mitigate and exacerbate inequality. Cases include technologically simple groups, the Indian caste system, and the modern U.S.

5 units, Aut (Grusky, D)

**SOC 241. Controversies about Inequality**

(Same as SOC 141) (Graduate students register for 241.) Debate format involving Stanford and guest faculty. Forms of inequality including racial, ethnic, and gender stratification; possible policy interventions. Topics such as welfare reform, immigration policy, affirmative action, discrimination in labor markets, sources of income inequality, the duty of rich nations to help poor nations, and causes of gender inequality.

5 units, not given this year

**SOC 242. Sociology of Gender**

(Same as SOC 142) (Graduate students register for 242.) Gender inequality in contemporary American society and how it is maintained. The social and relative nature of knowledge and the problems this poses for understanding sex differences and gendered behavior in society. Analytical levels of explanation for gender inequalities: socialization, interaction processes, and socioeconomic processes; arguments and evidence for each approach. The social consequences of gender inequality such as the feminization of poverty, and problems of interpersonal relations.

5 units, Win (Correll, S)

**SOC 244. Inequality and the Workplace**

(Same as SOC 144) How characteristics of workplaces, such as hiring practices, workforce diversity, organizational policies and legal mandates, produce variation in inequality. Examines the sources, extent, and consequences of workplace inequality across gender, racial and ethnic lines. Topics include earnings, social status, geographical location, and opportunities for people in the workforce.

5 units, not given this year

**SOC 245. Race and Ethnic Relations**

(Same as SOC 145) (Graduate students register for 245.) Race and ethnic relations in the U.S. and elsewhere. The processes that

render ethnic and racial boundary markers, such as skin color, language, and culture, salient in interaction situations. Why only some groups become targets of ethnic attacks. The social dynamics of ethnic hostility and ethnic/racial protest movements.

5 units, Spr (Snipp, C)

### **SOC 247. Race and Ethnicity Around the World**

(Same as SOC 147) How race and ethnicity has been used to justify segregation, domination and genocide but also be used to create a sense of community, shared responsibility and belonging. Where do divisions come from? Are they hard-wired, or easy to manipulate for political or economic gain? Should governments use these divisions to categorize their citizens? Examining how the definitions, categories and consequences of race and ethnicity differ across time and place.

5 units, Spr (Saperstein, A)

### **SOC 247A. Comparative Ethnic Conflict**

(Same as SOC 147A) Causes and consequences of racial and ethnic conflict, including nationalist movements, ethnic genocide, civil war, ethnic separatism, politics, indigenous peoples' movements, and minority rights movements around the world.

5 units, not given this year

### **SOC 248. Racial Identity**

(Same as SOC 148) The construction and meanings of racial identities in the U.S. Attention to multiracial identities and the shifting boundaries of racial categories in contemporary America.

5 units, not given this year

### **SOC 249. The Urban Underclass**

(Same as SOC 149, URBANST 112) (Graduate students register for 249.) Recent research and theory on the urban underclass, including evidence on the concentration of African Americans in urban ghettos, and the debate surrounding the causes of poverty in urban settings. Ethnic/racial conflict, residential segregation, and changes in the family structure of the urban poor.

5 units, Spr (Rosenfeld, M)

### **SOC 250. Race and Political Sociology**

(Same as CSRE 150, SOC 150) How race informs the theories and research within political sociology. The state's role in creation and maintenance of racial categories, the ways in which racial identity motivates political actors, how race is used to legitimate policy decisions, comparisons across racial groups. Emphasis on understanding the ways race operates in the political arena.

5 units, Aut (Fields, C)

### **SOC 252. The Social Determinants of Health**

(Same as SOC 152) How social differences, such as where we live, whether and how we work, or how much money we make, and our gender, race or ethnicity, also play a role in who gets sick and who does not.

5 units, Spr (Saperstein, A)

### **SOC 255. The Changing American Family**

(Same as SOC 155) Family change from historical, social, demographic, and legal perspectives. Extramarital cohabitation, divorce, later marriage, interracial marriage, and same-sex cohabitation. The emergence of same-sex marriage as a political issue. Are recent changes in the American family really as dramatic as they seem? Theories about what causes family systems to change.

5 units, not given this year

### **SOC 257. Causal Inference in Quantitative Educational and Social Science Research**

(Same as EDUC 255B) Quantitative methods to make causal inferences in the absence of randomized experiment including the use of natural and quasi-experiments, instrumental variables, regression discontinuity, matching estimators, longitudinal methods, fixed effects estimators, and selection modeling. Assumptions implicit in these approaches, and appropriateness in research situations. Students develop research proposals relying on these methods. Prerequisites: exposure to quantitative research methods; multivariate regression.

3-5 units, Win (Reardon, S)

### **SOC 258. Applied Quasi-Experimental Research in Education**

(Same as EDUC 255C) Course will provide hands-on practice in analysis of data from experimental and quasi-experimental research designs, including a) instrumental variables estimators; b)

regression discontinuity estimators; c) difference-in-difference estimators; d) matching estimators; e) fixed effects estimators; and f) panel data methods (including individual fixed effects models, lagged covariate adjustment models, growth models, etc.). Prerequisites: satisfactory completion of EDUC 255B, EDUC 257C or SOC 257.

3-5 units, Spr (Reardon, S)

### **SOC 260. Formal Organizations**

(Same as SOC 160) (Graduate students register for 260.) The roles of formal organizations in production processes, market transactions, and social movements; and as sources of income and ladders of mobility. Relationships of modern organizations to environments and internal structures and processes. Concepts, models, and tools for analyzing organizational phenomena in contemporary societies. Sources include the literature and case studies.

5 units, Spr (Zhou, X)

### **SOC 261. The Social Science of Entrepreneurship**

(Same as SOC 161) (Graduate students register for 261.) Who is likely to become an entrepreneur and where is entrepreneurship likely to occur? Classic and contemporary theory and research. Interaction with expert practitioners in creating entrepreneurial opportunities including venture and corporate capitalists. The role of culture, markets, hierarchies, and networks. Market creation and change, and factors that affect success of new organizations. Field projects on entrepreneurial environments such as technology licensing offices, entrepreneurial development organizations, venture capital firms, and corporate venturing groups.

5 units, not given this year

### **SOC 262. Markets and Governance**

(Same as SOC 162) Social and political forces that shape market outcomes. The emergence and creation of markets, how markets go wrong, and the roles of government and society in structuring market exchange. Applied topics include development, inequality, globalization, and economic meltdown.

5 units, Spr (Young, C)

### **SOC 263. Foundations of Organizational Theory**

(Same as SOC 163) Foundational material in organizational theory literature.

5 units, OCCASIONAL

### **SOC 264. Immigration and the Changing United States**

(Same as CHICANST 164, CSRE 164, SOC 164) The role of race and ethnicity in immigrant group integration in the U.S. Topics include: theories of integration; racial and ethnic identity formation; racial and ethnic change; immigration policy; intermarriage; hybrid racial and ethnic identities; comparisons between contemporary and historical waves of immigration.

5 units, Aut (Jimenez, T)

### **SOC 265. Seminar on the Everyday Lives of Immigrants**

(Same as SOC 165) Everyday experience of immigrants and the immigrant second generation through the ethnographic lens. Ethnographies that focus on the immigrant experience. Limited enrollment.

5 units, not given this year

### **SOC 266. Mexicans, Mexican Americans, and Chicanos in American Society**

(Same as CHICANST 166, SOC 166) Contemporary sociological issues affecting Mexican-origin people in the U.S. Topics include: the immigrant experience, immigration policy, identity, socioeconomic integration, internal diversity, and theories of incorporation.

5 units, not given this year

### **SOC 267A. Asia-Pacific Transformation**

(Same as SOC 167A) Post-WW II transformation in the Asia-Pacific region, with focus on the ascent of Japan, the development of newly industrialized capitalist countries (S. Korea and Taiwan), the emergence of socialist states (China and N. Korea), and the changing relationship between the U.S. and these countries.

5 units, not given this year

### **SOC 268. Global Organizations: Managing Diversity**

(Same as PUBLPOL 168, SOC 168) Analytical tools derived from the social sciences to analyze global organizations and projects, and applied to the tradeoffs between different designs of teams and



organizations. Focus is on tribal mentality and how to design effective organizations and projects for policy implementation within and across institutional settings. Recommended: 102, MS&E 180, or SOC 160.

5 units, Win (Meyersson Milgrom, E)

**SOC 270. Classics of Modern Social Theory**

(Same as SOC 170) (Graduate students register for 270). Preference to Sociology majors. Contributions of Marx, Weber, and Durkheim to contemporary sociology. Topics: the problem of social order and the nature of social conflict; capitalism and bureaucracy; the relationship between social structure and politics; the social sources of religion and political ideology; and the evolution of modern societies. Examples from contemporary research illustrate the impact of these traditions. Limited enrollment.

5 units, Win (Staff)

**SOC 273. Gender and Higher Education: National and International Perspectives**

(Same as EDUC 273) The effects of interactions between gender and the structures of higher education; policies seeking changes in those structures. Topics: undergraduate and graduate education, faculty field of specialization, rewards and career patterns, sexual harassment, and the development of feminist scholarship and pedagogy.

4 units, not given this year

**SOC 280A. Foundations of Social Research**

(Same as SOC 180A) Formulating a research question, developing hypotheses, probability and non-probability sampling, developing valid and reliable measures, qualitative and quantitative data, choosing research design and data collection methods, challenges of making causal inference, and criteria for evaluating the quality of social research. Emphasis is on how social research is done, rather than application of different methods. Limited enrollment; preference to Sociology and Urban Studies majors, and Sociology coterms.

5 units, Aut (Parigi, P), Spr (Cook, B)

**SOC 280B. INTRODUCTION TO DATA ANALYSIS**

(Same as SOC 180B) Methods for analyzing and evaluating data in sociological research: comparative historical methods, ethnographic observation, quantitative analysis of survey data, experimentation, and simulation. Emphasis is on application of these methods through small data analysis projects. Limited enrollment; preference to Sociology majors.

5 units, Win (Cumberworth, E)

**SOC 281B. Sociological Methods: Statistics**

(Same as SOC 181B) (Graduate students register for 281B.) Statistical methods of relevance to sociology: contingency tables, correlation, and regression.

5 units, not given this year

**SOC 300. Workshop: Teaching Development**

For first-year Sociology doctoral students only. The principles for becoming an effective instructor, adviser, and mentor to undergraduates. Topics: ethics, course organization and syllabus development, test construction and grading, conflict resolution, common classroom problems, and University policies related to matters such as sexual harassment. Technologies and other topics related to making effective presentations, and campus resources to improve classroom performance. Roundtable discussions with faculty and advanced graduate students known for teaching excellence. Students may be asked to give a demonstration lecture.

2 units, Spr (Seo, P)

**SOC 305. Graduate Proseminar**

For first-year Sociology doctoral students only. Introduction and orientation to the field of Sociology.

1 unit, Aut (Olzak, S)

**SOC 308. Social Demography**

For graduate students and advanced undergraduates. Topics: models of fertility behavior, migration models, stable population theory, life table analysis, data sources, and measurement problems. How population behavior affects social processes, and how social processes influence population dynamics. Recommended: sociological research methods; basic regression analysis and log linear models.

4-5 units, Aut (Snipp, C)

**SOC 309. Nations and Nationalism**

The nation as a form of collective identity in the modern era. Major works in the study of nations and nationalism from comparative perspectives with focus on Europe and E. Asia.

4-5 units, Win (Shin, G)

**SOC 310. Political Sociology**

Theory and research on the relationship between social structure and politics. Social foundations of political order, the generation and transformation of ideologies and political identities, social origins of revolutionary movements, and social consequences of political revolution. Prerequisite: doctoral student.

4-5 units, not given this year

**SOC 311A. Workshop: Comparative Studies of Educational and Political Systems**

(Same as EDUC 387A) Analysis of quantitative and longitudinal data on national educational systems and political structures. May be repeated for credit. Prerequisite: consent of instructor. (SSPEP/ICE)

1-5 units, Aut (Ramirez, F; Meyer, J)

**SOC 311B. Workshop: Comparative Systems of Educational and Political Systems**

(Same as EDUC 387B) Analysis of quantitative and longitudinal data on national educational systems and political structures. May be repeated for credit. Prerequisite: consent of instructor. (SSPEP/ICE)

1-5 units, Win (Ramirez, F; Meyer, J)

**SOC 311C. Workshop: Comparative Studies of Educational and Political Systems**

(Same as EDUC 387C) Analysis of quantitative and longitudinal data on national educational systems and political structures. Prerequisite: consent of instructor. May be repeated for credit. (SSPEP/ICE)

1-5 units, Spr (Ramirez, F; Meyer, J)

**SOC 312W. Workshop: Political Sociology, Social Movements, and Collective Action**

Faculty and student presentations of ongoing research on topics including: social movement and organizations, and the relationship between them; democracy movements; legislative and policy outcomes; and collective action tactics, strategies, and trajectories. May be repeated for credit. Restricted to Sociology doctoral students; others by consent of instructor.

1-2 units, Aut (McAdam, D; Olzak, S; Walder, A), Win (McAdam, D; Olzak, S; Walder, A), Spr (McAdam, D; Olzak, S; Walder, A)

**SOC 314. Economic Sociology**

Classical and contemporary literature covering the sociological approach to markets and the economy, and comparing it to other disciplines. Topics: consumption, labor, professions, industrial organization, and the varieties of capitalism; historical and comparative perspectives on market and non-market provision of goods and services, and on transitions among economic systems. The relative impact of culture, institutions, norms, social networks, technology, and material conditions. Prerequisite: doctoral student status or consent of instructor.

4-5 units, Aut (Granovetter, M)

**SOC 315. Topics in Economic Sociology**

(Same as SOC 115) (Graduate students register for 315.) Discussion of topics initially explored in 114/214, with emphasis on countries and cultures outside N. America. Possible topics: families and ethnic groups in the economy, corporate governance and control, corporate strategy, relations among firms in industrial districts and business groups, the impact of national institutions and cultures on economic outcomes, transitions from state socialism and the role of the state in economic development. Possible case studies: the U.S., Germany, Italy, Britain, France, Brazil, Korea, India, Japan, and China. Prerequisite: 114/214 or 314.

5 units, Win (Granovetter, M)

**SOC 315W. Workshop: Economic Sociology and Organizations**

Theory, methods, and research in the sociology of the economy and of formal organizations, through presentations of ongoing work by students, faculty, and guest speakers, and discussion of



recent literature and controversies. May be repeated for credit. Restricted to Sociology doctoral students; others by consent of instructor.

*1-2 units, Aut (Granovetter, M; Zhou, X; Parigi, P), Win (Granovetter, M; Zhou, X; Parigi, P), Spr (Granovetter, M; Zhou, X; Parigi, P)*

### **SOC 316. Historical and Comparative Sociology**

Theory and research on macro-historical changes of sociological significance such as the rise of capitalism, the causes and consequences of revolutions, and the formation of the modern nation state and global world system. Methodological issues in historical and comparative sociology.

*4-5 units, not given this year*

### **SOC 317W. Workshop: Networks, Histories, and Theories of Action**

(Same as EDUC 317X) Yearlong workshop where doctoral students are encouraged to collaborate with peers and faculty who share an interest in researching the network dynamics, histories and theories of action that help explain particular social phenomena. Students present their own research and provide helpful feedback on others' work. Presentations may concern dissertation proposals, grants, article submissions, book proposals, datasets, methodologies and other texts. Repeatable for credit.

*1-2 units, Aut (McFarland, D; Parigi, P), Win (McFarland, D; Parigi, P), Spr (McFarland, D; Parigi, P)*

### **SOC 318. Social Movements and Collective Action**

Topics: causes, dynamics, and outcomes of social movements; organizational dimensions of collective action; and causes and consequences of individual activism.

*4-5 units, not given this year*

### **SOC 320. Foundations of Social Psychology**

Major theoretical perspectives, and their assumptions and problems, in interpersonal processes and social psychology. Techniques of investigation and methodological issues. Perspectives: symbolic interaction, social structure and personality, and cognitive and group processes.

*4-5 units, Win (Ridgeway, C)*

### **SOC 321W. Workshop: Social Psychology and Social Structure**

Advanced graduate student workshop in social psychology. Current theories and research agendas, recent publications, and presentations of ongoing research by faculty and students. May be repeated for credit. Prerequisite: consent of instructor.

*1-2 units, Aut (Cook, K; Ridgeway, C; Correll, S), Win (Cook, K; Ridgeway, C; Correll, S), Spr (Cook, K; Ridgeway, C; Correll, S)*

### **SOC 322. Social Interaction, Social Structure, and Social Exchange**

Current theory and research on topics such as social cognition and identity, group processes, bargaining and negotiation, social justice, social dilemmas and exchange, and networks and collective action. The social exchange approach.

*4-5 units, Aut (Cook, K)*

### **SOC 323. Sociology of the Family**

Sociological research on changing family forms. Topics include courtship, marriage, fertility, divorce, conflict, relationship skills and satisfaction, gender patterns, power relations within the family, and class and race differences in patterns.

*4-5 units, Spr (Rosenfeld, M)*

### **SOC 324. Social Networks**

How the study of social networks contributes to sociological research. Application of core concepts to patterns of relations among actors, including connectivity and clusters, duality of categories and networks, centrality and power, balance and transitivity, structural equivalence, and blockmodels. Friendship and kinship networks, diffusion of ideas and infectious diseases, brokerage in markets and organizations, and patronage and political influence in historical contexts.

*3-5 units, not given this year*

### **SOC 327. Frontiers of Social Psychology**

Advanced topics, current developments, theory, and empirical research. Possible topics include social identity processes, status beliefs and processes, social exchange, affect and social cohesion, legitimacy, social difference and inequality, norms, and social

dilemmas.

*1-5 units, not given this year*

### **SOC 330. Sociology of Knowledge Creation**

(Same as EDUC 120X, EDUC 320X) The sociology of knowledge creation explores systematic relationships between thought and social structure in order to examine how human beings construct, interpret, and view reality. How knowledge is socially constructed, patterned, and used, and how everyday and tacit forms of knowledge are achieved. Emphasis is on the creation and patterning of scientific paradigms, social science disciplines, and the field of education.

*3-4 units, Aut (McFarland, D)*

### **SOC 331. The Conduct of Qualitative Inquiry**

(Same as EDUC 327A) Two quarter sequence for doctoral students to engage in research that anticipates, is a pilot study for, or feeds into their dissertations. Prior approval for dissertation study not required. Students engage in common research processes including: developing interview questions; interviewing; coding, analyzing, and interpreting data; theorizing; and writing up results. Participant observation as needed. Preference to students who intend to enroll in 327C.

*3-4 units, not given this year*

### **SOC 332. Sociology of Education: The Social Organization of Schools**

(Same as EDUC 110, EDUC 310, SOC 132) Seminar. Key sociological theories and empirical studies of the links between education and its role in modern society, focusing on frameworks that deal with sources of educational change, the organizational context of schooling, the impact of schooling on social stratification, and the relationships between the educational system and other social institutions such as families, neighborhoods, and the economy.

*4 units, Spr (Carter, P)*

### **SOC 333. Law and Wikinomics: The Economic and Social Organization of the Legal Profession**

(Same as SOC 133) (Graduate and Law students enroll in 333.) Seminar. Emphasis is on the labor market for large-firm lawyers, including the market for entry-level lawyers, attorney retention and promotion practices, lateral hiring of partners, and increased use of forms of employment such as the non-equity form of partnership. Race and gender discrimination and occupational segregation; market-based pressure tactics for organizational reform. Students groups collect and analyze data about the profession and its markets. Multimedia tools for analysis and for producing workplace reforms. May be repeated for credit. Prerequisite: consent of instructor.

*1-5 units, Spr (Dauber, M)*

### **SOC 334. Research Seminar on Access to Justice**

(Same as SOC 234) The functions and dysfunctions of modern legal systems. Topics include: official statements of the U.S. and the EU about the rights of parties to civil disputes; the roles of lawyers as gatekeepers and facilitators; the filtering process by which injuries and experiences become the basis for legal claims; access to and use of courts; the balance of power and advantage between individual persons and organizations in disputes. Prerequisite: advanced undergraduate or graduate standing, or consent of instructor.

*1-5 units, not given this year*

### **SOC 336. Sociology of Law**

Sociological examination of law as a mechanism of social regulation and as a field of knowledge. Explores classical and contemporary theoretical and empirical contributions to the sociology of law. Law and social control, law and social change, social reality of the law, the profession and practice of law, legal mobilization, and the influence of race, gender, and social status in legal decisions and processes.

*3-5 units, not given this year*

### **SOC 338W. Workshop: Sociology of Law**

(Same as LAW 581.) Required for joint degree J.D./Ph.D. students in Sociology in the first three years of program; open to Ph.D. students in Sociology and related disciplines. Empirical, sociological study of law and legal institutions. Topics such as the relation of law to inequality and stratification, social movements, organizations and institutions, political sociology and state

development, and the social construction of disputes and dispute resolution processes. Research presentations. Career development issues. May be repeated for credit.

*1-5 units, Win (Dauber, M)*

**SOC 339. Gender Meanings and Processes**

Current theories and research on the social processes, such as socialization, status processes, stereotyping, and cognition, that produce gender difference and inequality. Intersections of gender with race, class, and bodies. Applications to workplaces, schools, families, and intimate relationships. Prerequisite: Sociology doctoral student or consent of instructor

*1-5 units, not given this year*

**SOC 340. Social Stratification**

Classical and contemporary approaches to the unequal distribution of goods, status, and power. Modern analytic models of the effects of social contact, cultural capital, family background, and luck in producing inequality. The role of education in stratification. The causes and consequences of inequality by race and gender. The structure of social classes, status groupings, and prestige hierarchies in various societies. Labor markets and their role in inequality. The implications of inequality for individual lifestyles. The rise of the new class, the underclass, and other emerging forms of stratification. Prerequisite: Ph.D. student or consent of instructor.

*4-5 units, Spr (Grusky, D)*

**SOC 341W. Workshop: Inequality**

Causes, consequences, and structure of inequality; how inequality results from and shapes social classes, occupations, professions, and other aspects of the economy. Research presentations by students, faculty, and guest speakers. Discussion of controversies, theories, and recent writings. May be repeated for credit. Restricted to Sociology doctoral students; others by consent of instructor.

*1-2 units, Aut (Grusky, D; Correll, S), Win (Grusky, D; Correll, S; Tuma, N), Spr (Grusky, D; Correll, S)*

**SOC 342B. Gender and Social Structure**

The role of gender in structuring contemporary life. Social forces affecting gender at the psychological, interactional, and structural levels. Gender inequality in labor markets, education, the household, and other institutions. Theories and research literature.

*4-5 units, not given this year*

**SOC 345. Seminar in Comparative Race and Ethnic Relations**

Restricted to doctoral students. Factors that create, maintain, and diminish the salience of race and ethnic boundaries. Theoretical debates surrounding the emergence, persistence, and change in racial and ethnic boundaries, nationalism and sovereignty, and mobilization. Empirical evidence on race and ethnic tensions, conflict, and warfare. The relationship between democracy, immigration, and diversity.

*4-5 units, Win (Olzak, S)*

**SOC 346. Workshop: Ethnography**

Restricted to doctoral students. Student research employing ethnographic methods. May be repeated for credit. Prerequisite: consent of instructor.

*1-2 units, not given this year*

**SOC 347. Race and Ethnicity in Society and Institutions**

(Same as EDUC 315X) Primarily for doctoral students. Major theories and empirical research. Emphasis is on schooling and race, racial identity, urban issues, and the impact of immigration on race relations.

*1-5 units, not given this year*

**SOC 348. Advanced Topics in the Sociology of Gender**

Seminar for graduate students who have research projects in progress that focus on questions about gender and society. Research projects can be at any stage from the initial development to the final writing up of results. Focus is on questions posed by the research projects of the seminar participants. Readings include relevant background to each other's questions and present their own work in progress. A final paper reports the progress on the seminar member's research project.

*3-5 units, Spr (Staff)*

**SOC 350. Sociology of Race**

Emphasis on cultural approaches that focus on meaning and

meaning-making in the realm of race and race relations. Issues and complications in conceptualizing and theorizing race. Differentiation, organization, and stratification by race across a range of domains. Identity, political and economic participation, group solidarity.

*3-5 units, Spr (Fields, C)*

**SOC 350W. Workshop: Migration, Race, Ethnicity and Nation**

Current theories and research, recent publications, and presentations of ongoing research by faculty and students. May be repeated for credit. Prerequisite: consent of instructor.

*1-3 units, Aut (McDermott, M; Jimenez, T), Win (McDermott, M; Jimenez, T), Spr (Jimenez, T)*

**SOC 357. Immigration and Assimilation**

Major theoretical debates and empirical applications in the study of immigrant assimilation. Topics include racial and ethnic identity, socioeconomic integration, political participation, and national identity. Companion to SOC 358.

*3-5 units, not given this year*

**SOC 358. Sociology of Immigration**

Topics include: the process of migration; historical perspectives; immigrant integration; transnationalism; immigration policy; labor; nations and nationalism.

*1-5 units, not given this year*

**SOC 359. Organizations and Uncertainty**

Organizations and environments characterized by institutional uncertainty. Beliefs at the roots of shared routines and institutional myths are absent. Institutionalists and neo-institutionalists, organizations facing uncertain institutional environments.

*3-5 units, Aut (Parigi, P)*

**SOC 361. Social Psychology of Organizations**

Seminar. Social psychological theories and research relevant to organizational behavior. Current research topics; theories in micro-organizational behavior. Topics include models of attribution, choice and decision making, intergroup behavior, stereotyping, and social influence. Prerequisites: Ph.D student; graduate-level social psychology course.

*4 units, not given this year*

**SOC 361W. Workshop: Networks and Organizations**

(Same as EDUC 361) For students doing advanced research. Group comments and criticism on dissertation projects at any phase of completion, including data problems, empirical and theoretical challenges, presentation refinement, and job market presentations. Collaboration, debate, and shaping research ideas. Prerequisite: courses in organizational theory or social network analysis.

*1-3 units, Aut (Powell, W), Win (Powell, W), Spr (Powell, W)*

**SOC 362. Organization and Environment**

This seminar considers the leading sociological approaches to analyzing relations of organizations and environments, with a special emphasis on dynamics. Attention is given to theoretical formulations, research designs, and results of empirical studies. Prerequisite: Enrollment in a PhD program.

*4 units, Aut (Carroll, G)*

**SOC 363A. Seminar on Organizational Theory**

(Same as EDUC 375A, MS&E 389) The social science literature on organizations assessed through consideration of the major theoretical traditions and lines of research predominant in the field.

*5 units, Aut (Powell, W)*

**SOC 363B. Seminar on Organizations: Institutional Analysis**

(Same as EDUC 375B) Seminar. Key lines of inquiry on organizational change, emphasizing network, institutional, and evolutionary arguments.

*3-5 units, not given this year*

**SOC 366. Organization Studies: Theories and Analyses**

(Same as EDUC 288) Principles of organizational behavior and analysis; theories of group and individual behavior; organizational culture; and applications to school organization and design. Case studies.

*4-5 units, Aut (McFarland, D)*

**SOC 366A. Organizational Ecology**

(Same as OB 601) This seminar examines theoretical and methodological issues in the study of the ecology of organizations. Particular attention is given to the dynamics that characterize the

interface between organizational populations and their audiences.

4 units, Spr (Staff)

### **SOC 367. Institutional Analysis of Organizations**

Reading and research on the nature, origins, and effects of the modern institutional system. Emphasis is on the effects of institutional systems on organizational structure.

3-5 units, not given this year

### **SOC 368W. Workshop: China Social Science**

(Same as POLISCI 448R) For Ph.D. students in the social sciences and history. Research on contemporary society and politics in the People's Republic of China. May be repeated for credit. Prerequisite: consent of instructor.

1 unit, Aut (Walder, A; Oi, J), Win (Walder, A; Oi, J), Spr (Walder, A; Zhou, X; Oi, J)

### **SOC 369. Social Network Analysis**

(Same as EDUC 316) Introduction to social network theory, methods, and research applications in sociology. Network concepts of interactionist (balance, cohesion, centrality) and structuralist (structural equivalence, roles, duality) traditions are defined and applied to topics in small groups, social movements, organizations, communities. Students apply these techniques to data on schools and classrooms. (SSPEP)

4-5 units, Win (McFarland, D)

### **SOC 370A. Sociological Theory: Social Structure, Inequality, and Conflict**

Restricted to doctoral students. The traditions of structural analysis derived from the work of Marx, Weber, and related thinkers. Antecedent ideas in foundational works are traced through contemporary theory and research on political conflict, social stratification, formal organization, and the economy.

5 units, Aut (Olzak, S)

### **SOC 370B. Social Interaction and Group Process**

Theoretical strategies for the study of interaction, group, and network processes, including rational choice and exchange theory, the theory of action, symbolic interactionism, formal sociology, and social phenomenology. Antecedent ideas in foundational works and contemporary programs of theoretical research.

3-5 units, Win (Staff)

### **SOC 372. Theoretical Analysis and Design**

Theoretical analysis and the logical elements of design, including the systematic analysis of the logical structure of arguments, the relationship of arguments to more encompassing theoretical or metatheoretical assumptions, the derivation of logical implications from arguments, assessments of theoretically significant problems or gaps in knowledge.

3-5 units, not given this year

### **SOC 374. Philanthropy and Civil Society**

(Same as EDUC 374, POLISCI 334) Associated with the Center for Philanthropy and Civil Society (PACS). Year-long workshop for doctoral students and advanced undergraduates writing senior theses on the nature of civil society or philanthropy. Focus is on pursuit of progressive research and writing contributing to the current scholarly knowledge of the nonprofit sector and philanthropy. Accomplished in a large part through peer review. Readings include recent scholarship in aforementioned fields. May be repeated for credit for a maximum of 9 units.

1-3 units, Aut (Powell, W), Win (Powell, W), Spr (Powell, W)

### **SOC 376. Perspectives on Organization and Environment**

Sociologists and organizational scholars have increasingly come to recognize that networks are not simply relevant as conduits for the flow of information and resources, but are critical determinants of identity, shaping preferences and influencing perceptions of the qualities that inhere in actors. Research that informs the link between networks and identity based on intellectual traditions such as social exchange theory, role theory, and economic and historical sociology.

4 units, not given this year

### **SOC 377. Comparing Institutional Forms: Public, Private, and Nonprofit**

(Same as EDUC 377, GSBGEN 346, PUBLPOL 317) For students interested in the nonprofit sector, those in the joint Business and Education program, and for Public Policy MA students. The focus is on the missions, functions, and capabilities of nonprofit, public,

and private organizations, and the managerial challenges inherent in the different sectors. Focus is on sectors with significant competition among institutional forms, including health care, social services, the arts, and education. Sources include scholarly articles, cases, and historical materials.

4 units

### **SOC 378. Seminar on Institutional Theory and World Society**

Sociological analyses of the rise and impact of the expanded modern world order, with its internationalized organizations and globalized discourse. Consequences for national and local society: education, political organization, economic structure, the environment, and science. The centrality of the individual and the rationalized organization as legitimated actors.

1-5 units, Win (Meyer, J)

### **SOC 380. Qualitative Methods**

Priority to Sociology doctoral students. Emphasis is on observational and interview-based research. Limited enrollment.

3-5 units, Spr (Jimenez, T)

### **SOC 381. Sociological Methodology I: Introduction**

Enrollment limited to first-year Sociology doctoral students. Basic math and statistics. Types of variables, how to recode and transform variables, and how to manage different types of data sets. How to use and think about weights. Introduction to statistical packages and programming. Introduction to multiple regression, and introduction to the interpretation of regression results.

5 units, Aut (Rosenfeld, M)

### **SOC 382. Sociological Methodology II: Multivariate Regression**

Preference to Sociology doctoral students. Required for Ph.D. in Sociology. Enrollment limited to first-year Sociology doctoral students. Rigorous treatment of linear regression models, model assumptions, and various remedies for when these assumptions are violated. Introduction to panel data analysis. Enrollment limited to 15. Prerequisites: 381.

4-5 units, Win (Young, C)

### **SOC 383. Sociological Methodology III: Models for Discrete Outcomes**

Required for Ph.D. in Sociology; enrollment limited to first-year Sociology doctoral students. The rationale for and interpretation of static and dynamic models for the analysis of discrete variables. Prerequisites: 381 and 382, or equivalents.

5 units, Spr (Zhou, X)

### **SOC 384. New Models and Methods in the Social Sciences**

Two-week intensive introduction to new statistical approaches. Emphasis is on applications. Topics may include network models, multilevel models, latent class models, mixed methods, new qualitative methods, growth models, geostatistical tools, survey-based experiments, new methods for estimating causal effects, web-based surveys, advanced discrete choice models, and diffusion models.

2-5 units, Sum (Staff)

### **SOC 385B. Research Practicum II**

Continuation of 385A. Workshop on research methods for second year Sociology doctoral students. Ongoing student research, methodological problems, and possible solutions. Required for second year paper.

1 unit, not given this year

### **SOC 388. Log-Linear Models**

Analysis of categorical data with log-linear and negative binomial models. Measures of fit and hypothesis testing.

3-5 units, not given this year

### **SOC 389. Mixed Method Research Design and Analysis**

Research designs that incorporate qualitative and quantitative analyses in a single project. The tension between thinking case-wise and variable-wise; how the focus on relationships between variables that is the hallmark of the quantitative approach can be brought into qualitative work.

3-5 units, not given this year

### **SOC 390. Graduate Individual Study**

May be repeated for credit.

1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### **SOC 391. Graduate Directed Research**

May be repeated for credit.

1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### **SOC 392. Research Apprenticeship**

May be repeated for credit.

1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### **SOC 393. Teaching Apprenticeship**

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### **SOC 635. Social Movements and Organizations**

This research seminar is intended for students seeking to learn more about how collective action underpins institutional change in organizations and industries, and how the success of collective action, in turn, hinges on organizational structures and processes to recruit and mobilize individuals. The purpose of this course is to provide you a roadmap for you to roam the terrain of movements and organizations, and be prepared to generate original research ideas that extend inquiry in your chosen area of research.

4 units, Win (Rao, H)

### **SOC 670. Designing Social Research**

This is a course in the design of social research, with a particular emphasis on research field (i.e., non-laboratory) settings. As such, the course is a forum for discussing and developing an understanding of the different strategies social theorists employ to explain social processes, develop theories, and make these theories as believable as possible. In general, these issues will be discussed in the context of sociological research on organizations, but this will not be the exclusive focus of the course. A range of topics will be covered, for example: formulating and motivating research questions; varieties of explanation; experimental and quasi-experimental methods, including natural experiments; counterfactual models; conceptualization and measurement; sampling and case selection; qualitative and quantitative approaches. This course is particularly oriented toward developing an appreciation of the tradeoffs of different approaches. It is well suited to Ph.D. students working on q

4 units, Win (Sorensen, J)

### **SOC 802. TGR Dissertation**

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

## **SOPHOMORE COLLEGE (SCS) COURSES**

### **ANTHROPOLOGY SOPHOMORE COLLEGE COURSES**

#### **ANTHRO 10SC. Darwin, Evolution, and Galapagos**

(Same as HUMBIO 17SC) Lessons from the study of flora and fauna in Galapagos from Darwin's time to today. Adaptation, sexual selection, speciation, and adaptive radiation. The challenges the Galapagos Islands pose for conservation.

2 units, Aut (Durham, W)

#### **ANTHRO 12SC. Parks and Peoples: Dilemmas of Protected Area Conservation in East Africa**

(Same as HUMBIO 19SC) A September Studies course, offered in a special session before Autumn Quarter. Students participating in this course will have it added to their Autumn study list in late November. Pros and cons of parks and protected areas; the dilemma of achieving conservation in a way that creates local community benefits and is socially just. Case study approach to study protected area (PA) approaches, proponents, objectives, successes, benefits, costs, ways to increase compatibility of the interests of parks and people. Final paper on some aspect of conservation dilemmas in East Africa and presentation of paper.

2 units, Aut (Staff)

### **BIOLOGY SOPHOMORE COLLEGE COURSES**

#### **BIO 10SC. Natural History, Marine Biology, and Research**

Monterey Bay is home to the nation's largest marine sanctuary and also home to Stanford's Hopkins Marine Station. This course, which is based at Hopkins, explores the spectacular biology of Monterey Bay and the artistic and political history of the region.

The course focuses on issues of conservation, sanctuary, and stewardship of the oceans and coastal lands. We will meet with conservationists, filmmakers, artists, authors, environmentalists, politicians, land-use planners, and lawyers, as well as scientists and educators, to learn what is being done to appreciate, protect, and study the coastline and near-shore waters at local and national levels. We will take a look at the discipline of marine biology to discover the range of topics and methods of research it embraces and to help define some of the larger issues in biology that loom in our future. The course emphasizes interactions and discussions between individuals, groups, and our guests; it is a total immersion experience. We wi

2 units, Aut (Thompson, S)

### **COMPARATIVE LITERATURE SOPHOMORE COLLEGE COURSES**

#### **COMPLIT 11SC. Worlds (No Longer) Apart**

What (if anything) do supermall shoppers in the Philippines, a Filipino taxi driver in Paris, and television viewers in Nepal have to do with a legal case in Canada, two young Japanese on a pilgrimage to Graceland, and a South Asian lawyer/liquor store owner trying to reclaim his property in Uganda from where he lives, in Mississippi? This course uses literary narratives, films, and historical research to examine new textures of contemporary life, where borders seem hard-pressed to contain culture. Texts include Pico Iyer, *Video Night in Kathmandu*, Mira Nair's film *Mississippi Masala*, and M.G. Vassanji, *No New Land*. New forms of identity have emerged that reflect the cultural changes that have accompanied such movements. Nevertheless, we will not idealize such phenomena either; we will want also to carefully observe the binding power of nations. The result will be a finer-tuned sense of globalization and the local and the global. The course emphasizes creative

2 units, Aut (Palumbo-Liu, D)

#### **COMPLIT 12SC. Ghost Stories: Why the Dead Return and What They Want From Us**

Study of the ghost story genre, from classical literature to popular film. Exploration of anxiety about our own mortality and wisdom about the cultural place of the past. Reading of selected stories and novels that explore ghosts and hauntings. Regular participation in CourseWork discussion forum and work in small groups with other course members to discuss and present readings.

2 units, Aut (Berman, R)

### **COMPARATIVE MEDICINE SOPHOMORE COLLEGE COURSES**

#### **COMPMD 10SC. Comparative Anatomy and Physiology of Mammals**

Introduction to common laboratory, domestic, and exotic mammals. Investigation of the unique adaptations of species in terms of their morphological, anatomical, and behavioral characteristics. How these species interact with their own and other species, including humans; basic evolution and the impact of habitat destruction on wild animals; diversity of the mammalian orders, along with the fundamentals of comparative anatomy, physiology and basic dissection techniques. Lectures, dissection labs, student presentations, field trip to local zoo.

2 units, Aut (Bouley, D)

### **COMPUTER SCIENCE SOPHOMORE COLLEGE COURSES**

#### **CS 10SC. Great Ideas in Computer Science**

Exploration of great ideas in computer science, from understanding how search engines on the Web work to looking at mathematical theories underlying social networks, from questioning whether a computer can be intelligent to analyzing the notion of what is even possible to computers. Small group work to research topics in computer science. Field trips to local companies and the Computer History Museum.

2 units, Aut (Sahami, M; Roberts, E)

## DRAMA SOPHOMORE COLLEGE COURSES

### DRAMA 11SC. Learning Theater: From Audience to Critic at the Oregon Shakespeare Festival

Study of the details of the plays, their interpretation, their production, and acting itself, aimed at full appreciation of the theatrical experience. Extended stay in Ashland, Oregon, at the Oregon Shakespeare Festival (OSF). Time backstage, meeting with actors, designers, and artistic and administrative directors of OSF. Reading of plays before the seminar begins. In Ashland, production of staged readings and design of a final paper based on one of the productions.

2 units, Aut (Rehm, R; Paulson, L)

## EARTH SYSTEMS SOPHOMORE COLLEGE COURSES

### EARTHSYS 12SC. Environmental and Geological Field Studies in the Rocky Mountains

(Same as EESS 12SC, GES 12SC) Three-week field program emphasizing coupled environmental and geological problems in the Rocky Mountains, covering a broad range of topics including the geologic origin of the American West from three billion years ago to the present; paleoclimatology and the glacial history of this mountainous region; the long- and short-term carbon cycle and global climate change; and environmental issues in the American West related to changing land-use patterns and increased demand for its abundant natural resources. Examination of earth/environmental science-related questions in three different settings: 1) the three-billion-year-old rocks and the modern glaciers of the Wind River Mountains of Wyoming; 2) the sediments in the adjacent Wind River basin; and 3) the volcanic center of Yellowstone National Park and the mountainous region of Teton National Park. Small group work to analyze data and prepare reports and maps. Lectures in the field prior to and after fieldwork. Note: One week of backpack

2 units, Aut (Chamberlain, P)

### EARTHSYS 13SC. The Colorado River: Water in the West as Seen from a Raft in the Grand Canyon

(Same as HISTORY 23SC, HUMBIO 20SC) Expeditionary-style seminar spending 14 days rafting 225 miles through the Grand Canyon while studying the law, economics, politics, ecology, hydrology, history, literature, and art of the Colorado River. Students learn about the river through a variety of disciplines. Immersion in the grand subject of water in the West and sustainability, the focus of a major interdisciplinary research initiative of the Bill Lane Center for the American West and the Woods Institute for the Environment at Stanford.

2 units, Aut (Kennedy, D; Thompson, B; Ardoin, N; Freyberg, D)

## ECONOMICS SOPHOMORE COLLEGE COURSES

### ECON 13SC. A Random Walk Down Wall Street

Coverage of modern finance theory and a wide range of financial instruments: stocks, bonds, options, mutual funds, exchange traded funds, etc. Discussion of historical returns on different asset classes, the efficient market hypothesis, and the case for and against index funds as well as the collapse of the investment banks, the unprecedented actions of the Federal Reserve and the Treasury to strengthen the banking system, and the ongoing course of the economic recession.

2 units, Aut (Shoven, J)

## ELECTRICAL ENGINEERING SOPHOMORE COLLEGE COURSES

### EE 10SC. Mathematics of the Information Age

Empedocles taught that the world is made of four elements; earth, air, fire, and water. And what of the quintessence? Physics banished the ether as that elusive fifth element, but our current age has settled on information as the element that permeates and connects the world. What is information? Can it be measured and manipulated like the other elements? The primary steps -- before

circuits and chips and computers take charge -- are mathematical, and information became mathematical through the work of Claude Shannon on problems in communication. Shannon laid the foundations for the digital revolution that has become part of our everyday lives. The mathematics of the information age is likewise a part of your everyday life, from images to iTunes to the Internet, and the mathematics is quite accessible. We will discuss the elements of information theory and how information is represented in different ways for different purposes. We will work with the mathematical representation of s

2 units, Aut (Osgood, B)

## ENGLISH SOPHOMORE COLLEGE COURSES

### ENGLISH 15SC. Mixed Race in the New Millennium: Crossings of Kin, Culture, & Faith in the 21st Century

Examination of political and aesthetic implications of Generation Ethnically Ambiguous (E.A.), including contemporary images of mixed race as represented in literature, art, performance, film, Internet, and popular culture. How a range of cultural and legal events are changing the way we talk and think not only about race but also crossings and mixings across gender, nation, religion, and socioeconomic experience. Assignments explore the current controversies over mixed race identification and also the expressive and political possibilities for representing complex identities: requirements include three two to three-page analytical writing assignments and an individualized project. (Students can choose two options for this project: artistic project or written narrative.)

2 units, Aut (Elam, M)

## ENVIRONMENTAL EARTH SYSTEM SCIENCE SOPHOMORE COLLEGE COURSES

### EESS 12SC. Environmental and Geological Field Studies in the Rocky Mountains

(Same as EARTHSYS 12SC, GES 12SC) Three-week field program emphasizing coupled environmental and geological problems in the Rocky Mountains, covering a broad range of topics including the geologic origin of the American West from three billion years ago to the present; paleoclimatology and the glacial history of this mountainous region; the long- and short-term carbon cycle and global climate change; and environmental issues in the American West related to changing land-use patterns and increased demand for its abundant natural resources. Examination of earth/environmental science-related questions in three different settings: 1) the three-billion-year-old rocks and the modern glaciers of the Wind River Mountains of Wyoming; 2) the sediments in the adjacent Wind River basin; and 3) the volcanic center of Yellowstone National Park and the mountainous region of Teton National Park. Small group work to analyze data and prepare reports and maps. Lectures in the field prior to and after fieldwork. Note: One week of backpack

2 units, Aut (Chamberlain, P)

## GEOLOGICAL AND ENVIRONMENTAL SCIENCES SOPHOMORE COLLEGE COURSES

### GES 12SC. Environmental and Geological Field Studies in the Rocky Mountains

(Same as EESS 12SC, EARTHSYS 12SC) Three-week field program emphasizing coupled environmental and geological problems in the Rocky Mountains, covering a broad range of topics including the geologic origin of the American West from three billion years ago to the present; paleoclimatology and the glacial history of this mountainous region; the long- and short-term carbon cycle and global climate change; and environmental issues in the American West related to changing land-use patterns and increased demand for its abundant natural resources. Examination of earth/environmental science-related questions in three different settings: 1) the three-billion-year-old rocks and the modern glaciers of the Wind River Mountains of Wyoming; 2) the sediments in the adjacent Wind River basin; and 3) the volcanic

center of Yellowstone National Park and the mountainous region of Teton National Park. Small group work to analyze data and prepare reports and maps. Lectures in the field prior to and after fieldwork. Note: One week of backpack

2 units, Aut (*Chamberlain, P*)

## HISTORY SOPHOMORE COLLEGE COURSES

### HISTORY 21SC. Celluloid America: Explorations in Film and History

Exploration of the history and culture of the United States through film, examining both the history of the medium and the ways in which American history has been represented in movies. Topics include the invention of moving picture technology, the creation of cinema language, the rise and fall of the Hollywood studio system, the emergence and evolution of film genres (westerns, romantic comedies, film noir, science fiction, Blaxploitation, etc.), the quest for overseas markets for American movies, race and film, and the future of movies in the digital age. Daily readings and discussions as well as a number of required screenings. Short research projects on topics of students' choosing.

2 units, Aut (*Campbell, J*)

### HISTORY 23SC. The Colorado River: Water in the West as Seen from a Raft in the Grand Canyon

(Same as EARTHSYS 13SC, HUMBIO 20SC) Expeditionary-style seminar spending 14 days rafting 225 miles through the Grand Canyon while studying the law, economics, politics, ecology, hydrology, history, literature, and art of the Colorado River. Students learn about the river through a variety of disciplines. Immersion in the grand subject of water in the West and sustainability, the focus of a major interdisciplinary research initiative of the Bill Lane Center for the American West and the Woods Institute for the Environment at Stanford.

2 units, Aut (*Kennedy, D; Thompson, B; Ardoin, N; Freyberg, D*)

## HUMAN BIOLOGY SOPHOMORE COLLEGE COURSES

### HUMBIO 17SC. Darwin, Evolution, and Galapagos

(Same as ANTHRO 10SC) Lessons from the study of flora and fauna in Galapagos from Darwin's time to today. Adaptation, sexual selection, speciation, and adaptive radiation. The challenges the Galapagos Islands pose for conservation.

2 units, Aut (*Durham, W*)

### HUMBIO 19SC. Parks and Peoples: Dilemmas of Protected Area Conservation in East Africa

(Same as ANTHRO 12SC) A September Studies course, offered in a special session before Autumn Quarter. Students participating in this course will have it added to their Autumn study list in late November. Pros and cons of parks and protected areas; the dilemma of achieving conservation in a way that creates local community benefits and is socially just. Case study approach to study protected area (PA) approaches, proponents, objectives, successes, benefits, costs, ways to increase compatibility of the interests of parks and people. Final paper on some aspect of conservation dilemmas in East Africa and presentation of paper.

2 units, Aut (*Staff*)

### HUMBIO 20SC. The Colorado River: Water in the West as Seen from a Raft in the Grand Canyon

(Same as EARTHSYS 13SC, HISTORY 23SC) Expeditionary-style seminar spending 14 days rafting 225 miles through the Grand Canyon while studying the law, economics, politics, ecology, hydrology, history, literature, and art of the Colorado River. Students learn about the river through a variety of disciplines. Immersion in the grand subject of water in the West and sustainability, the focus of a major interdisciplinary research initiative of the Bill Lane Center for the American West and the Woods Institute for the Environment at Stanford.

2 units, Aut (*Kennedy, D; Thompson, B; Ardoin, N; Freyberg, D*)

## MICROBIOLOGY AND IMMUNOLOGY SOPHOMORE COLLEGE COURSES

### MI 18SC. The Coming Influenza Pandemic

Examines the H1N1 influenza virus from molecular, clinical, societal, historical, demographic, economic, and political perspectives. Examines the unique genetic, epidemiological, virologic, and pathogenic features of the influenza virus that allow it to continue to reinvent itself and re-emerge on an annual basis. Discusses past successes and failures, the current status of influenza, and the critical factors to consider to avert the coming influenza pandemic. Explores whether or not the lessons learned from influenza can be applied to other diseases. Includes guest lectures, field trips, student presentations.

2 units, Aut (*Siegel, R*)

## POLITICAL SCIENCE SOPHOMORE COLLEGE COURSES

### POLISCI 10SC. American Foreign Policy in the 21st Century

Investigation of foreign policy challenges and choices facing the United States. Topics include political considerations that influence the making and conduct of diplomacy, challenges to policy associated with the proliferation of weapons of mass destruction, international terrorism, failing and failed states, and regional, interstate, and intrastate conflict. Examination of how the changing distribution of power in the international system impacts the United States and its allies. Course includes a 48-hour simulation.

2 units, Aut (*Blacker, C*)

### POLISCI 22SC. The Face of Battle

Focus on the complexity of the process by which strategy is translated into tactical decisions by the officers and foot soldiers on the field of battle. Focus on three battles in American history: Gettysburg (July 1863), the Battle of Little Bighorn (June 1876), and the Battle of Lozano Ridge in Afghanistan (November 2003). Reading of major works on the battles and the conflicts in which they occurred; travel to Gettysburg, Pennsylvania, and the Little Bighorn battlefield in Montana. Extensive research on individual participants at Gettysburg and Little Bighorn.

2 units, Aut (*Sagan, S*)

### POLISCI 24SC. American Conservatism and its Critics in the 21st Century

Study of conservative political and economic thought from the 20th century onward and the influence of these ideas about freedom and capitalism on contemporary U.S. politics and public policy. Reading of works of leading conservative thinkers and their critics, including liberals and fellow conservatives, and evaluation of the strength of conservative responses to those criticisms. Study of public policy issues (tax policy, entitlement policy, health care policy) facing the U.S. and evaluation of conservative and liberal policy solutions to these problems.

2 units, Aut (*Staff*)

## PSYCHOLOGY SOPHOMORE COLLEGE COURSES

### PSYCH 12SC. The Cultural Shaping of Emotion

A September Studies course, offered in a special session before Autumn Quarter. Students participating in this course will have it added to their Autumn study list in late November. Examination of how culture influences the socialization of emotion, perceptions of emotion, and the meaning of happiness. Implications of cultural differences in emotion for health and education. Discussion of popular books and memoirs as well as empirical research from psychology, anthropology, sociology, and psychiatry. Hands-on experience with different methods of conducting research on culture and emotion.

2 units, Aut (*Staff*)

# SPANISH LANGUAGE (SPANLANG) COURSES

## UNDERGRADUATE COURSES IN SPANISH LANGUAGE

Primarily for undergraduates; graduate students may enroll with consent of adviser.

### **SPANLANG 1. First-Year Spanish, First Quarter**

Emphasis is on developing socially and culturally appropriate proficiency in interpersonal, interpretive, and presentational spheres. Influences shaping the production of oral and written texts in the Spanish- and English-speaking world.

5 units, Aut (Casas Roige, R), Win (Del Carpio, C), Spr (Reinhold, V)

### **SPANLANG 1A. Accelerated First-Year Spanish, Part 1**

Completes first-year sequence in two rather than three quarters. For students with previous knowledge of Spanish, or those with a strong background in another Romance language. 2A fulfills the University language requirement. Prerequisite: written and oral placement tests.

5 units, Aut (Ortiz Cuevas, C), Win (Ortiz Cuevas, C)

### **SPANLANG 2. First-Year Spanish, Second Quarter**

Continuation of 1. Emphasis is on developing socially and culturally appropriate proficiency in interpersonal, interpretive, and presentational spheres. Influences shaping the production of oral and written texts in the Spanish- and English-speaking world. Prerequisite 1.

5 units, Aut (Nissler, P), Win (Spragins, E), Spr (Del Carpio, C)

### **SPANLANG 2A. Accelerated First-Year Spanish, Part 2**

Completes first-year sequence in two rather than three quarters. For students with previous knowledge of Spanish, or those with a strong background in another Romance language. 2A fulfills the University language requirement. Prerequisite: written and oral placement tests. Continuation of 1A. Fulfills the University language requirement. Prerequisite: 1A or written and oral placement tests.

5 units, Win (Won, H), Spr (Ortiz Cuevas, C)

### **SPANLANG 3. First-Year Spanish, Third Quarter**

Continuation of 2. Emphasis is on developing socially and culturally appropriate proficiency in interpersonal, interpretive, and presentational spheres. Influences shaping the production of oral and written texts in the Spanish- and English-speaking world. Prerequisite 2. Fulfills the University language requirement.

5 units, Aut (Catoira, L), Win (Nissler, P), Spr (Spragins, E)

### **SPANLANG 5A. Intensive First-Year Spanish, Part A**

Same as SPANLANG 1. Goal is to engage in interactions with Spanish speakers in socially and culturally appropriate forms. Social and cultural influences shaping the production of oral and written texts in the Spanish- and English-speaking world. Only Stanford graduate students restricted to 9 units may register for 205A,B,C.

5 units, Sum (Staff)

### **SPANLANG 5B. Intensive First-Year Spanish, Part B**

Same as SPANLANG 2. Continuation of 5A. Goal is to engage in interactions with Spanish speakers in socially and culturally appropriate forms. Social and cultural influences shaping the production of oral and written texts in the Spanish- and English-speaking world. Only Stanford graduate students restricted to 9 units may register for 205A,B,C. Prerequisite 1 or 5A.

5 units, Sum (Staff)

### **SPANLANG 5C. Intensive First-Year Spanish, Part C**

Same as SPANLANG 3. Continuation of 5B. Continuation of 5A. Goal is to engage in interactions with Spanish speakers in socially and culturally appropriate forms. Social and cultural influences shaping the production of oral and written texts in the Spanish- and English-speaking world. Only Stanford graduate students restricted to 9 units may register for 205A,B,C. Prerequisite 2 or 5B. Fulfills the University Foreign Language Requirement.

5 units, Sum (Staff)

### **SPANLANG 10. Beginning Oral Communication**

Additional pronunciation, vocabulary, and speaking skills. May be repeated once for credit. Prerequisite: one quarter of Spanish, demonstrated oral proficiency above the novice level; may be taken concurrently with 2, 2A, or 3.

2 units, Aut (Brates, V), Win (Brates, V), Spr (Corso, I)

### **SPANLANG 11C. Second-Year Spanish: Cultural Emphasis, First Quarter**

Sequence integrating culture and language. Emphasis is on advanced proficiency in oral and written discourse including presentational language and socioculturally appropriate discourse in formal and informal, academic, and professional contexts. Prerequisite: one year of college Spanish or equivalent.

4-5 units, Aut (Garcia-Garcia, C), Win (Molitoris, J), Spr (Sanchez, K)

### **SPANLANG 11R. Second-Year Spanish: Emphasis on International Relations, First Quarter**

Sequence integrating geopolitics and language. Emphasis is on advanced proficiency in oral and written discourse including presentational language, international relations, and socioeconomics of the Spanish-speaking world. Prerequisite: one year of college Spanish or equivalent.

4-5 units, Aut (Brates, V)

### **SPANLANG 12C. Second-Year Spanish: Cultural Emphasis, Second Quarter**

Continuation of 11C. Sequence integrating culture and language. Emphasis is on advanced proficiency in oral and written discourse including presentational language and socioculturally appropriate discourse in formal and informal, academic, and professional contexts. Prerequisite: 11 or equivalent.

4-5 units, Aut (Urruela, M), Win (Miano, A), Spr (Malik, C)

### **SPANLANG 12R. Second-Year Spanish: Emphasis on International Relations, Second Quarter**

Continuation of 11R. Sequence integrating geopolitics and language. Emphasis is on advanced proficiency in oral and written discourse including presentational language, international relations, and socioeconomics of the Spanish-speaking world. Prerequisite: Prerequisite 11R or equivalent.

4-5 units, Win (Brates, V)

### **SPANLANG 13C. Second-Year Spanish: Cultural Emphasis, Third Quarter**

Continuation of 12C. Sequence integrating culture and language. Emphasis is on advanced proficiency in oral and written discourse including presentational language and socioculturally appropriate discourse in formal and informal, academic, and professional contexts. Prerequisite: 12 or equivalent.

4-5 units, Aut (Catoira, L), Win (Urruela, M), Spr (Urruela, M)

### **SPANLANG 13R. Second-Year Spanish: Emphasis on International Relations, Third Quarter**

Continuation of 12R. Sequence integrating geopolitics and language. Emphasis is on advanced proficiency in oral and written discourse including presentational language, international relations, and socioeconomics of the Spanish-speaking world. Prerequisite: 12R or equivalent. Fulfills the IR major language requirement.

4-5 units, Spr (Brates, V)

### **SPANLANG 15. Intermediate Oral Communication**

Emphasis is on interaction in Spanish locally and globally. Regional vocabularies and cultures at home and abroad. Interaction with local native Spanish speakers and communities globally via the Internet. May be repeated once for credit. Prerequisite: first-year Spanish and demonstrated oral proficiency above the low intermediate level.

3 units, Aut (Gonzalez Flores, F), Win (Gonzalez Flores, F), Spr (Gonzalez Flores, F)

### **SPANLANG 15S. Intermediate Oral Communication**

Emphasis is on interaction in Spanish locally and globally. Regional vocabularies and cultures at home and abroad. Interaction with local native Spanish speakers and communities globally via the Internet. May be repeated once for credit. Prerequisite: first-year Spanish and demonstrated oral proficiency above the low intermediate level.

3 units, Sum (Staff)



**SPANLANG 21B. Second-Year Spanish for Heritage Language Students, First Quarter**

Emphasis is on ability to communicate orally and in writing. Spelling and the written accent. Goal is to understand, interpret, and analyze texts, movies, radio, and television. Written language skills include rules for editing written language. Third quarter focus is on the development of written and oral styles and registers used in more formal settings.

3-5 units, Aut (Sierra, A)

**SPANLANG 22B. Second-Year Spanish for Heritage Language Students, Second Quarter**

Second-Year Spanish for Heritage Language Students, Second Quarter - Continuation of 21B. Emphasis is on ability to communicate orally and in writing. Continuation of 21B. Spelling and the written accent. Goal is to understand, interpret, and analyze texts, movies, radio, and television. Written language skills include rules for editing written language. Prerequisite: 21B or equivalent.

3-5 units, Win (Sierra, A)

**SPANLANG 23B. Second-Year Spanish for Heritage Language Students, Third Quarter**

Emphasis is on ability to communicate orally and in writing. Spelling and the written accent. Goal is to understand, interpret, and analyze texts, movies, radio, and television. Written language skills include rules for editing written language. Third quarter Focus is on the development of written and oral styles and registers used in more formal settings. Prerequisite: 22B or equivalent.

3-5 units, Spr (Sierra, A)

**SPANLANG 25A. Intensive Second-Year Spanish, Part A**

Same as SPANLANG 11. Sequence integrating culture and language. Emphasis is on advanced proficiency in oral and written discourse including presentational language and socioculturally appropriate discourse in formal and informal, academic, and professional contexts. Prerequisite: one year of college Spanish or equivalent.

4 units, Sum (Staff)

**SPANLANG 25B. Intensive Second-Year Spanish, Part B**

Same as SPANLANG 12. Continuation of 25A. Prerequisite: 25A or equivalent.

4 units, Sum (Staff)

**SPANLANG 25C. Intensive Second-Year Spanish, Part C**

Same as SPANLANG 13. Continuation of 25B. Prerequisite: 25B or equivalent.

4 units, Sum (Staff)

**SPANLANG 60A. Beginning Spanish Conversation**

(AU)

1 unit, Aut (Urruela, M)

**SPANLANG 60B. Intermediate Spanish Conversation**

(AU)

1 unit, Win (Urruela, M)

**SPANLANG 60C. Advanced Spanish Conversation**

(AU)

1 unit, Spr (Urruela, M)

**SPANLANG 60T. Teaching Spanish Conversation**

1 unit, Aut (Urruela, M), Win (Urruela, M), Spr (Urruela, M)

**SPANLANG 99. Language Specials**

May be repeated for credit. Prerequisite: consent of instructor.

1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**SPANLANG 100. Advanced Oral Communication**

For students who have completed second-year Spanish or who have oral skills above the intermediate level. Interactive activities require students to persuade, analyze, support opinions, and gather and interpret others' points of view. Focus is on vocabulary enrichment and idiomatic expressions. Cultural, literary, political, and journalistic readings. May be repeated once for credit. Prerequisite: 13 or equivalent.

3 units, Aut (Junguito Camacho, M), Win (Junguito Camacho, M), Spr (Catoira, L)

**SPANLANG 101. The Structure of Spanish**

Criteria and skills to analyze Spanish grammatical structure. Identification of word functions in sentences and texts, types of sentences, and terminology. Structure of nouns, adjectives, and verbs, and their relationship with meaning. The differences

between Spanish grammar as a formal system and in everyday life. Prerequisite: 13C, 13R, 23B, or equivalent.

3-5 units, Aut (Miano, A)

**SPANLANG 102. Composition and Writing Workshop**

Individual development of the ability to write in Spanish. Emphasis is on style and diction, and on preparing and writing essays on literary topics. Non-Spanish majors or minors may choose topics more closely related to their studies for projects.

Prerequisite: two years of college Spanish or equivalent. WIM

3-5 units, Aut (Brates, V), Win (Miano, A), Spr (Brates, V)

**SPANLANG 102B. Composition and Writing Workshop for Heritage Language Students**

For students with a good understanding of written accents, spelling, and syntax. Focus is on the craft of writing with emphasis on brainstorming, planning, outlining, drafting, revising, style, diction, and editing. Writing essays on literary topics. Non-Spanish majors or minors may choose topics related to their studies.

Prerequisite: 23B or equivalent.

3-5 units, not given this year

**SPANLANG 121M. Spanish for Medical Students**

(Same as HRP 280) First quarter of three-quarter series. Goal is a practical and culturally appropriate command of spoken Spanish. Emphasis is on taking the medical history. Topics include the human body, hospital procedures, diagnostics, food, and essential doctor-patient phrases when dealing with Spanish-speaking patients. Series can be taken independently, depending on the level of prior knowledge.

2 units, Aut (Corso, I)

**SPANLANG 122M. Spanish for Medical Students**

(Same as HRP 281) Second quarter of three-quarter series. Goal is a practical and culturally appropriate command of spoken Spanish. Emphasis is on performing a physical examination. Topics include the human body, hospital procedures, diagnostics, food, and essential doctor-patient phrases when dealing with Spanish-speaking patients. Series can be taken independently, depending on the level of prior knowledge.

2 units, Win (Corso, I)

**SPANLANG 123M. Spanish for Medical Students**

(Same as HRP 282) Third quarter of three-quarter series. Goal is a practical and culturally appropriate command of spoken Spanish. Emphasis is on different specialties and medical conditions. Topics include the human body, hospital procedures, diagnostics, food, and essential doctor-patient phrases when dealing with Spanish-speaking patients. Series can be taken independently, depending on the level of prior knowledge.

2 units, Spr (Staff)

**SPANLANG 131M. Spanish for Heritage and Foreign Language Pre-Med and Public Health Students**

For pre-med or public health students who grew up in homes where Spanish is spoken or for students who possess a considerable command of Spanish. Focus is on developing the ability to provide information on health-related topics to Spanish speakers in the U.S. Students participate in the organization and delivery of information on preventive health care in a workshop setting to a Spanish-speaking community.

3-4 units, not given this year

**SPANLANG 199. Individual Reading**

May be repeated for credit. Prerequisite: consent of instructor.

1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**GRADUATE COURSES IN SPANISH LANGUAGE**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**SPANLANG 1G. Accelerated First-Year Business Spanish, Part 1**

For GSB students only. Limited enrollment.

4 units, Win (Reinhold, V)

**SPANLANG 2G. Accelerated First-Year Business Spanish, Part 2**

Continuation of 1G. For GSB students only. Limited enrollment.

4 units, Spr (Reinhold, V)



### SPANLANG 3G. Spanish for Business Professionals

For GSB students only. Limited enrollment.

4 units, Aut (*Reinhold, V*)

### SPANLANG 205A. Intensive First-Year Spanish for Stanford Grads, Part A

Same as SPANLANG 1. For Stanford graduate students only. Goal is to engage in interactions with Spanish speakers using socially and culturally appropriate forms. Social and cultural influences shaping the production of oral and written texts in the Spanish- and English-speaking world. Stanford graduate students restricted to 9 units may take 205A,B,C for a total of 9 units or 2 of the courses for a total of 9 units.

3-5 units, Sum (*Staff*)

### SPANLANG 205B. Intensive First-Year Spanish for Stanford Grads, Part B

Same as SPANLANG 2. Continuation of 205A. For Stanford graduate students only. Goal is to engage in interactions with Spanish speakers using socially and culturally appropriate forms. Social and cultural influences shaping the production of oral and written texts in the Spanish- and English-speaking world. Stanford graduate students restricted to 9 units may take 205A,B,C for a total of 9 units or 2 of the courses for a total of 9 units. Prerequisite 205A or equivalent.

3-5 units, Sum (*Staff*)

### SPANLANG 205C. Intensive First-Year Spanish for Stanford Grads, Part C

Same as SPANLANG 3. Continuation of 205B. For Stanford graduate students only. Goal is to engage in interactions with Spanish speakers using socially and culturally appropriate forms. Social and cultural influences shaping the production of oral and written texts in the Spanish- and English-speaking world. Stanford graduate students restricted to 9 units may take 205A,B,C for a total of 9 units or 2 of the courses for a total of 9 units. Prerequisite 205B or equivalent.

3-5 units, Sum (*Staff*)

### SPANLANG 225A. Intensive Second-Year Spanish for Stanford Grads, Part A

Same as SPANLANG 11. For Stanford Graduate students restricted to 9 units. Sequence integrating culture and language. Emphasis is on advanced proficiency in oral and written discourse including presentational language and socioculturally appropriate discourse in formal and informal, academic, and professional contexts. Prerequisite: one year of college Spanish or equivalent.

3-4 units, Sum (*Staff*)

### SPANLANG 225B. Intensive Second-Year Spanish for Stanford Grads, Part B

Same as SPANLANG 12. Continuation of 225A. For Stanford Graduate students restricted to 9 units. Prerequisite 225A or equivalent.

3-4 units, Sum (*Staff*)

### SPANLANG 225C. Intensive Second-Year Spanish for Stanford Grads, Part C

Same as SPANLANG 13. Continuation of 225B. For Stanford Graduate students restricted to 9 units. Prerequisite 225B or equivalent.

3-4 units, Sum (*Staff*)

### SPANLANG 250. Reading Spanish

Reading Spanish - For students who have already taken Spanish for at least one year or have superior reading proficiency in another Romance language. Emphasis is on academic texts. Fulfills University reading requirements for advanced degrees if students earn a grade of 'B.'

3 units, Aut (*Brates, V*)

### SPANLANG 394. Graduate Studies in Spanish Conversation

Prerequisite: consent of instructor.

1-3 units, Aut (*Staff*), Win (*Staff*), Spr (*Staff*)

### SPANLANG 395. Graduate Studies in Spanish

Prerequisite: consent of instructor.

2-5 units, Aut (*Staff*), Win (*Staff*), Spr (*Staff*)

## SPECIAL LANGUAGE PROGRAM (SPECLANG) COURSES

### UNDERGRADUATE COURSES IN SPECIAL LANGUAGE PROGRAM

Primarily for undergraduates; graduate students may enroll with consent of adviser.

#### SPECLANG 75. Greek Culture, Ideals, and Themes

Introduction to Greek culture and its global influence in a social historical context, through images from its past and institutions in contemporary Greek society. Limited enrollment. GER:DB-Hum, EC-GlobalCom

3 units, Spr (*Prionas, E*)

#### SPECLANG 104B. Beginning Albanian, Second Quarter

3 units, not given this year

#### SPECLANG 104C. Beginning Albanian, Third Quarter

3 units, not given this year

#### SPECLANG 105A. Intermediate Albanian, First Quarter

3 units, Aut (*Bacaj, T*)

#### SPECLANG 105B. Intermediate Albanian, Second Quarter

3 units, Win (*Bacaj, T*)

#### SPECLANG 105C. Intermediate Albanian, Third Quarter

Continuation of 105B. Prerequisite 105B or consent of instructor.

3 units, Spr (*Bacaj, T*)

#### SPECLANG 106A. Advanced Albanian, First Quarter

3 units, Win (*Bacaj, T*)

#### SPECLANG 106B. Advanced Albanian, Second Quarter

3 units, Spr (*Bacaj, T*)

#### SPECLANG 106C. Advanced Albanian, Third Quarter

3 units, not given this year

#### SPECLANG 107A. Beginning Bulgarian, First Quarter

3 units, not given this year

#### SPECLANG 107B. Beginning Bulgarian, Second Quarter

3 units, not given this year

#### SPECLANG 107C. Beginning Bulgarian, Third Quarter

3 units, not given this year

#### SPECLANG 112A. Intermediate Hungarian Conversation, First Quarter

3 units, Aut (*Szoke, E*)

#### SPECLANG 112B. Intermediate Hungarian Conversation, Second Quarter

3 units, Win (*Szoke, E*)

#### SPECLANG 112C. Intermediate Hungarian Conversation, Third Quarter

3 units, not given this year

#### SPECLANG 123C. Beginning Armenian, Third Quarter

Continuation of 123B.

3 units, not given this year

#### SPECLANG 129A. Beginning Ukrainian, First Quarter

Grammatical structures, vocabulary, and sentence patterns through speaking, reading, writing, and listening. Ukrainian culture.

3 units, Aut (*Jarboe, L*)

#### SPECLANG 129B. Beginning Ukrainian, Second Quarter

Continuation of 129A.

3 units, Win (*Jarboe, L*)

#### SPECLANG 129C. Beginning Ukrainian, Third Quarter

Grammatical structures, vocabulary, and sentence patterns through speaking, reading, writing, and listening. Ukrainian culture.

3 units, Spr (*Jarboe, L*)

#### SPECLANG 130A. Intermediate Ukrainian, First Quarter

Continuation of 129C.

3 units, Aut (*Jarboe, L*)

#### SPECLANG 130B. Intermediate Ukrainian, Second Quarter

Continuation of 130A.

3 units, Win (*Jarboe, L*)

**SPECLANG 130C. Intermediate Ukrainian, Third Quarter**

Continuation of 130B.  
3 units, Spr (Jarboe, L)

**SPECLANG 131A. Advanced Ukrainian, First Quarter**

3 units, Aut (Jarboe, L)

**SPECLANG 131B. Advanced Ukrainian, Second Quarter**

3 units, Win (Jarboe, L)

**SPECLANG 131C. Advanced Ukrainian, Third Quarter**

3 units, Spr (Staff)

**SPECLANG 138A. Beginning Navajo, First Quarter**

Grammatical structures, vocabulary, and sentence patterns through speaking, reading, writing, and listening. Navajo culture.

4 units, Win (Staff)

**SPECLANG 144A. Beginning Tagalog, First Quarter**

Grammatical structures, vocabulary, and sentence patterns through speaking, reading, writing, and listening. Tagalog culture.

3 units, Aut (De Ramos, M)

**SPECLANG 144B. Beginning Tagalog, Second Quarter**

Continuation of 144A.

3 units, Win (Staff)

**SPECLANG 144C. Beginning Tagalog, Third Quarter**

Continuation of 144B.

3 units, Spr (Gotico, S)

**SPECLANG 145A. Intermediate Tagalog, First Quarter**

Grammar structures and vocabulary through authentic materials. Cultural proficiency. Fulfills the University language requirement.

3 units, Aut (De Ramos, M)

**SPECLANG 145B. Intermediate Tagalog, Second Quarter**

Continuation of 145A.

3 units, Win (Staff)

**SPECLANG 145C. Intermediate Tagalog, Third Quarter**

Continuation of 145B.

3 units, Spr (Gotico, S)

**SPECLANG 146A. Advanced Tagalog, First Quarter**

3 units, Aut (De Ramos, M)

**SPECLANG 146B. Advanced Tagalog, Second Quarter**

3 units, Win (Staff)

**SPECLANG 146C. Advanced Tagalog, Third Quarter**

3 units, Spr (Gotico, S)

**SPECLANG 150A. Beginning Vietnamese, First Quarter**

Grammatical structures, vocabulary, and sentence patterns through speaking, reading, writing, and listening. Vietnamese culture.

3 units, Aut (Nguyen, D)

**SPECLANG 150B. Beginning Vietnamese, Second Quarter**

Continuation of 150A.

3 units, Win (Nguyen, D)

**SPECLANG 150C. Beginning Vietnamese, Third Quarter**

Continuation of 150B.

3 units, Spr (Nguyen, D)

**SPECLANG 151A. Intermediate Vietnamese, First Quarter**

Continuation of 150C. Fulfills the University language requirement.

3 units, Aut (Nguyen, D)

**SPECLANG 151B. Intermediate Vietnamese, Second quarter**

Continuation of 151A.

3 units, Win (Nguyen, D)

**SPECLANG 151C. Intermediate Vietnamese, Third Quarter**

Continuation of 151B.

3 units, Spr (Nguyen, D)

**SPECLANG 152A. Beginning Hindi, First Quarter**

Grammatical structures, vocabulary, and sentence patterns through speaking, reading, writing, and listening. Hindi culture.

5 units, Aut (Staff)

**SPECLANG 152B. Beginning Hindi, Second Quarter**

Continuation of 152A.

5 units, Win (Staff)

**SPECLANG 152C. Beginning Hindi, Third Quarter**

Continuation of 152B. Fulfills the University language requirement.

5 units, Spr (Desai, S)

**SPECLANG 153A. Intermediate Hindi, First Quarter**

Second year sequence requires completion of first year or consent of the instructor. Focus on expanding all language skills, mastering grammar patterns and new vocabulary through authentic readings, writing essays, oral presentations and the use of multimedia-based materials. Focus on cultural proficiency.

4 units, Aut (Staff)

**SPECLANG 153B. Intermediate Hindi, Second Quarter**

Continuation of 153A.

4 units, Win (Staff)

**SPECLANG 153C. Intermediate Hindi, Third Quarter**

Continuation of 153B.

4 units, Spr (Desai, S)

**SPECLANG 154A. Advanced Hindi, First Quarter**

Continuation of 153C.

4 units, Aut (Staff)

**SPECLANG 154B. Advanced Hindi, Second Quarter**

Continuation of 154A.

4 units, Win (Staff)

**SPECLANG 154C. Advanced Hindi, Third Quarter**

Continuation of 154B.

4 units, Spr (Sancheti, P)

**SPECLANG 156A. Beginning Indonesian, First Quarter**

Grammatical structures, vocabulary, and sentence patterns through speaking, reading, writing, and listening. Indonesian culture.

3 units, not given this year

**SPECLANG 156B. Beginning Indonesian, Second Quarter**

Continuation of 156A.

3 units, not given this year

**SPECLANG 156C. Beginning Indonesian, Third Quarter**

Continuation of 156B.

3 units, not given this year

**SPECLANG 157A. Intermediate Indonesian, First Quarter**

Continuation of 156C. Fulfills the University language requirement.

3 units, not given this year

**SPECLANG 157B. Intermediate Indonesian, Second Quarter**

Continuation of 157A.

3 units, not given this year

**SPECLANG 164A. Beginning Czech, First Quarter**

Grammatical structures, vocabulary, and sentence patterns through speaking, reading, writing, and listening. Czech culture.

3 units, Aut (Dusatko, J)

**SPECLANG 164B. Beginning Czech, Second Quarter**

Continuation of 164A.

3 units, Win (Dusatko, J)

**SPECLANG 164C. Beginning Czech, Third Quarter**

Continuation of 164B.

3 units, Spr (Dusatko, J)

**SPECLANG 165A. Intermediate Czech, First Quarter**

Continuation of 164C. Fulfills the University language requirement.

3 units, Aut (Dusatko, J)

**SPECLANG 165B. Intermediate Czech, Second Quarter**

Continuation of 165A.

3 units, Win (Dusatko, J)

**SPECLANG 165C. Intermediate Czech, Third Quarter**

Continuation of 165B.

3 units, Spr (Dusatko, J)

**SPECLANG 166A. Advanced Czech, First Quarter**

(Staff)

1-4 units, Aut (Dusatko, J)

**SPECLANG 166C. Advanced Czech, Third Quarter**

1-4 units, Spr (Dusatko, J)

**SPECLANG 167A. Beginning Polish, First Quarter**

Grammatical structures, vocabulary, and sentence patterns through speaking, reading, writing, and listening. Polish culture.

3 units, Aut (Szudelski, G)

**SPECLANG 167B. Beginning Polish, Second Quarter**

Continuation of 167A.  
3 units, Win (Szudelski, G)

**SPECLANG 167C. Beginning Polish, Third Quarter**

Continuation of 167B.  
3 units, Spr (Szudelski, G)

**SPECLANG 168A. Intermediate Polish, First Quarter**

Continuation of 167C. Fulfills the University language requirement.  
3 units, Aut (Szudelski, G)

**SPECLANG 168B. Intermediate Polish, Second Quarter**

Continuation of 168A.  
3 units, Win (Szudelski, G)

**SPECLANG 168C. Intermediate Polish, Third Quarter**

Continuation of 168B.  
3 units, Spr (Szudelski, G)

**SPECLANG 169A. Advanced Polish, First Quarter**

(Staff)  
3 units, Aut (Szudelski, G)

**SPECLANG 169B. Advanced Polish, Second Quarter**

3 units, Win (Szudelski, G)

**SPECLANG 169C. Advanced Polish, Third Quarter**

3 units, Spr (Szudelski, G)

**SPECLANG 170A. Beginning Modern Greek, First Quarter**

Grammatical structures, vocabulary, and sentence patterns through speaking, reading, writing, and listening. Greek culture.  
4 units, Aut (Prionas, E)

**SPECLANG 170B. Beginning Modern Greek, Second Quarter**

Continuation of 170A.  
4 units, Win (Prionas, E)

**SPECLANG 170C. Beginning Modern Greek, Third Quarter**

Continuation of 170B. Emphasis on speaking, reading, writing and listening. Student-centered, interactive approach focuses on mastering the basic grammar structures and basic vocabulary through a multimodal approach. Introduction to the Greek culture. Fulfills the University language requirement.  
4 units, Spr (Prionas, E)

**SPECLANG 171B. Intermediate Modern Greek, Second Quarter**

Grammar structures and vocabulary through authentic materials. Cultural proficiency.  
4 units, Win (Prionas, E)

**SPECLANG 171C. Intermediate Modern Greek, Third Quarter**

Grammar structures and vocabulary through authentic materials. Cultural proficiency.  
4 units, Spr (Prionas, E)

**SPECLANG 172A. Modern Greek Language and Culture through Literature and Film, First Quarter**

Accelerated. Vocabulary enrichment through multimedia, online materials.  
4 units, not given this year

**SPECLANG 172B. Modern Greek Language and Culture through Literature and Film, Second Quarter**

Continuation of 172A.  
4 units, not given this year

**SPECLANG 172C. Modern Greek Language and Culture through Literature and Film, Third Quarter**

Accelerated. Vocabulary enrichment through multimedia, online materials.  
4 units, not given this year

**SPECLANG 173A. Beginning Hungarian, First Quarter**

Grammatical structures, vocabulary, and sentence patterns through speaking, reading, writing, and listening. Hungarian culture.  
3 units, Aut (Szoke, E), Win (Szoke, E)

**SPECLANG 173B. Beginning Hungarian, Second Quarter**

Continuation of 173A.  
3 units, Win (Szoke, E)

**SPECLANG 173C. Beginning Hungarian, Third Quarter**

Emphasis on speaking, reading, writing and listening. Student-

centered, interactive approach focuses on mastering the basic grammar structures and basic vocabulary. Introduction to the Hungarian culture.

3 units, not given this year

**SPECLANG 174A. Beginning Quechua, First Quarter**

Grammatical structures, vocabulary, and sentence patterns through speaking, reading, writing, and listening. Quechua culture.  
3 units, Aut (Fajardo, J)

**SPECLANG 174B. Beginning Quechua, Second Quarter**

Continuation of 174A.  
3 units, Win (Fajardo, J)

**SPECLANG 174C. Beginning Quechua, Third Quarter**

Continuation of 174B.  
3 units, not given this year

**SPECLANG 174C. Beginning Quechua - 3rd quarter**

3 units, Spr (Fajardo, J)

**SPECLANG 175A. Intermediate Quechua, Firsts Quarter**

Continuation of 174C. Fulfills the University Foreign Language Requirement.  
3 units, Aut (Staff)

**SPECLANG 175B. Intermediate Quechua, Second Quarter**

Continuation of 175A.  
3 units, Win (Staff)

**SPECLANG 175C. Intermediate Quechua, Third Quarter**

Continuation of 175B.  
3 units, Spr (Staff)

**SPECLANG 176B. Beginning Thai, Second Quarter**

Grammatical structures, vocabulary, and sentence patterns through speaking, reading, writing, and listening. Thai culture.  
3 units, not given this year

**SPECLANG 177A. Intermediate Thai, First Quarter**

Grammar structures and vocabulary through authentic materials. Cultural proficiency.  
3 units, not given this year

**SPECLANG 177B. Intermediate Thai, Second Quarter**

Grammar structures and vocabulary through authentic materials. Cultural proficiency.  
3 units, not given this year

**SPECLANG 177C. Intermediate Thai, Third Quarter**

Grammar structures and vocabulary through authentic materials. Cultural proficiency.  
3 units, not given this year

**SPECLANG 178A. Beginning Sign Language, First Quarter**

Comprehension and production skills; cultural awareness necessary for communication. Limited enrollment.  
4 units, Aut (Haas, C)

**SPECLANG 178B. Beginning Sign Language, Second Quarter**

continuation of 178A.  
4 units, Win (Haas, C)

**SPECLANG 178C. Beginning Sign Language, Third Quarter**

Continuation of 178B. Fulfills the University language requirement.  
4 units, Spr (Haas, C)

**SPECLANG 179A. Intermediate Sign Language, First Quarter**

Additional functional structures, lexical items, and history. Limited enrollment.  
4 units, Aut (Haas, C)

**SPECLANG 179B. Intermediate Sign Language, Second Quarter**

Continuation of 179A. Limited enrollment.  
4 units, Win (Haas, C)

**SPECLANG 179C. Intermediate Sign Language, Third Quarter**

Continuation of 179B. Limited enrollment.  
4 units, Spr (Haas, C)

**SPECLANG 182A. Intermediate Hungarian, First Quarter**

3 units, Aut (Szoke, E)

**SPECLANG 182B. Intermediate Hungarian, Second Quarter**

(Staff)  
3 units, Win (Szoke, E)

- SPECLANG 182C. Intermediate Hungarian, Third Quarter**  
(Staff)  
*3 units, Spr (Szoke, E)*
- SPECLANG 183A. Beginning Sanskrit, First Quarter**  
Sanskrit script and literary readings.  
*3 units, Aut (Porta, F)*
- SPECLANG 183B. Beginning Sanskrit, Second Quarter**  
Sanskrit script and literary readings.  
*3 units, Win (Porta, F)*
- SPECLANG 183C. Beginning Sanskrit, Third Quarter**  
Sanskrit script and literary readings.  
*3 units, Spr (Porta, F)*
- SPECLANG 186A. Beginning Serbo-Croatian, First Quarter**  
Grammatical structures, vocabulary, and sentence patterns through speaking, reading, writing, and listening. Serb and Croat culture.  
*3 units, Aut (Rakicevic, B)*
- SPECLANG 186B. Beginning Serbo-Croatian, Second Quarter**  
Continuation of 186A.  
*3 units, Win (Rakicevic, B)*
- SPECLANG 186C. Beginning Serbo-Croatian, Third Quarter**  
Continuation of 186B.  
*3 units, Spr (Rakicevic, B)*
- SPECLANG 188A. Advanced Serbo-Croatian, First Quarter**  
*3 units, Aut (Rakicevic, B)*
- SPECLANG 188B. Advanced Serbo-Croatian, Second Quarter**  
*3 units, Win (Rakicevic, B)*
- SPECLANG 188C. Advanced Serbo-Croatian, Third Quarter**  
*3 units, Spr (Rakicevic, B)*
- SPECLANG 189A. Beginning Hawaiian, First Quarter**  
*4 units, Aut (Peralto, S)*
- SPECLANG 189B. Beginning Hawaiian, Second Quarter**  
*4 units, Win (Peralto, S)*
- SPECLANG 189C. Beginning Hawaiian, Third Quarter**  
*4 units, Spr (Peralto, S)*
- SPECLANG 192A. Beginning Kazakh, First Quarter**  
Grammatical structures, vocabulary, and sentence patterns through speaking, reading, writing, and listening. Kazakh culture.  
*3 units, Aut (Kunanbaeva, A)*
- SPECLANG 192B. Beginning Kazakh, Second Quarter**  
Continuation of 192A.  
*3 units, Win (Kunanbaeva, A)*
- SPECLANG 192C. Beginning Kazakh, Third Quarter**  
Continuation of 192B.  
*3 units, Spr (Kunanbaeva, A)*
- SPECLANG 193A. Intermediate Kazakh, First Quarter**  
Continuation of 192C. Fulfills the University language requirement.  
*3 units, Aut (Kunanbaeva, A)*
- SPECLANG 193B. Intermediate Kazakh, Second Quarter**  
Continuation of 193A.  
*3 units, Win (Kunanbaeva, A)*
- SPECLANG 193C. Intermediate Kazakh, Third Quarter**  
Continuation of 193B.  
*3 units, Spr (Kunanbaeva, A)*
- SPECLANG 198Q. Modern Greece in Film and Literature**  
(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Cultural and literary highlights. Filmmakers include Kakoyannis, Dassen, Boulmetis, Angelopoulos, and Scorsese; readings from Eugenides, Gage, Kavafis, Kazantzakis, Samarakis, Seferis, and Elytis. GER:DB-Hum, DB-Hum, EC-GlobalCom  
*3-5 units, Aut (Prionas, E)*
- SPECLANG 215A. Modern Greek for Heritage Language Learners, First Quarter**  
For students of Greek background. Sources include authentic texts, multimedia materials, and Greek media.  
*2-4 units, Aut (Prionas, E)*
- SPECLANG 215B. Modern Greek for Heritage Language Learners, Second Quarter**  
Continuation of 215A.  
*2-4 units, Win (Prionas, E)*
- SPECLANG 215C. Modern Greek for Heritage Language Learners, Third Quarter**  
Continuation of 215B.  
*2-4 units, not given this year*
- SPECLANG 224A. Advanced Vietnamese, First Quarter**  
Grammar structures and vocabulary through authentic materials. Cultural proficiency.  
*3 units, not given this year*
- SPECLANG 224B. Advanced Vietnamese, Second Quarter**  
Continuation of 224A.  
*3 units, not given this year*
- SPECLANG 224C. Advanced Vietnamese, Third Quarter**  
Continuation of 224B.  
*3 units, not given this year*
- SPECLANG 238A. Beginning Uzbek, First Quarter**  
*3 units, not given this year*
- SPECLANG 238B. Beginning Uzbek, Second Quarter**  
Continuation of 238A.  
*3 units, not given this year*
- SPECLANG 238C. Beginning Uzbek, Third Quarter**  
Continuation of 238B.  
*3 units, not given this year*
- SPECLANG 239A. Intermediate Uzbek, First Quarter**  
Continuation of 238C. fulfills the University Foreign Language Requirement.  
*3 units, Aut (Staff)*
- SPECLANG 239B. Intermediate Uzbek, Second Quarter**  
Continuation of 239A.  
*3 units, Win (Staff)*
- SPECLANG 239C. Intermediate Uzbek, Third Quarter**  
*3 units, Spr (Kunanbaeva, A)*
- SPECLANG 240A. Advanced Uzbek, First quarter**  
Continuation of 239C.  
*3 units, Aut (Staff)*
- SPECLANG 240B. Advanced Uzbek, Second Quarter**  
Continuation of 240A.  
*3 units, Win (Staff)*
- SPECLANG 240C. Advanced Uzbek, Third Quarter**  
Continuation of 240B.  
*3 units, Spr (Staff)*
- SPECLANG 241A. Ukrainian for Speakers of a Slavic Language, First Quarter**  
*3 units, Aut (Jarboe, L)*
- SPECLANG 241B. Ukrainian for Speakers of a Slavic Language, Second Quarter**  
Continuation of 241A.  
*3 units, Win (Jarboe, L)*
- SPECLANG 241C. Ukrainian for Speakers of a Slavic Language, Third Quarter**  
Continuation of 241B.  
*3 units, not given this year*
- SPECLANG 247. Introduction to Siouan Language & Culture I**  
introduction to the three dialects of the Siouan Language: Dakota, Nakota and Lakota. The focus will be on the Lakota dialect with accompanying notation on when it is appropriate to use the other two dialects. The method for teaching the Lakota dialect will be through the use of immersion techniques relying on cultural context, i.e. use of songs as poetry including current usage on Utube of Round Dance songs by today's youth to illustrate the adaptation of cultural ways to fit today's world. Use of a Dakota/Lakota grammar, Dakota/Lakota texts, and a basic introduction to a writing system that works for literacy. Definition of what oral culture means and the role of memory in the preservation of a way of life.  
*5 units, not given this year*
- SPECLANG 247A. Beginning Lakota, First Quarter**  
*4 units, Aut (Shaw, D)*

**SPECLANG 247B. Beginning Lakota, Second Quarter***4 units, Win (Staff)***SPECLANG 247C. Beginning Lakota, Third Quarter***4 units, Spr (Staff)***SPECLANG 248. Introduction to Siouan Language & Culture II**

Continuation of the Introduction to Siouan Language & Culture I. This course will take a more focused approach on one cultural aspect of Dakota/Nakota/Lakota culture through the analysis of Dakota/Nakota/Lakota words in the lyrics of songs sung in the Sundance as a focus of study in the continuing use of language in the Dakota/Nakota/Lakota culture.

*5 units, not given this year***SPECLANG 250A. Beginning Romanian, First Quarter***3 units, Aut (Negip-Schatt, S)***SPECLANG 250B. Beginning Romanian, Second Quarter***3 units, Win (Negip-Schatt, S)***SPECLANG 250C. Beginning Romanian, Third Quarter***3 units, Spr (Negip-Schatt, S)***SPECLANG 251A. Intermediate Romanian, First Quarter***3 units, Aut (Negip-Schatt, S)***SPECLANG 251B. Intermediate Romanian, Second Quarter***3 units, Win (Negip-Schatt, S)***SPECLANG 251C. Intermediate Romanian, Third Quarter***3 units, Spr (Negip-Schatt, S)***SPECLANG 252A. Advanced Romanian, First Quarter***3 units, Aut (Negip-Schatt, S)***SPECLANG 252B. Advanced Romanian, Second Quarter***3 units, Win (Negip-Schatt, S)***SPECLANG 252C. Advanced Romanian, Third Quarter***3 units, Spr (Negip-Schatt, S)***SPECLANG 254A. Advanced Hungarian, First Quarter***3 units, Aut (Szoke, E)***SPECLANG 254B. Advanced Hungarian, second Quarter***3 units, Win (Szoke, E)***SPECLANG 254C. Advanced Hungarian, Third Quarter***3 units, Win (Szoke, E), Spr (Szoke, E)***SPECLANG 260A. Advanced Modern Greek, First Quarter***1-4 units, Win (Prionas, E)***SPECLANG 260B. Advanced Modern Greek, Second Quarter***1-4 units, Spr (Prionas, E)***SPECLANG 260C. Advanced Modern Greek, Third Quarter***1-4 units, not given this year***SPECLANG 262A. Intermediate Kyrgyz, First Quarter**

Fulfills the University Foreign Language Requirement.

*3 units, Aut (Staff)***SPECLANG 262B. Intermediate Kyrgyz, Second Quarter**

Continuation of 262A.

*3 units, Win (Staff)***SPECLANG 262C. Intermediate Kyrgyz, Third Quarter**

Continuation of 262B.

*3 units, Spr (Staff)***GRADUATE COURSES IN SPECIAL LANGUAGE PROGRAM**

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**SPECLANG 297. Directed Reading**

Prerequisite: consent of instructor.

*1-4 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)***SPECLANG 395. Graduate Studies in Special Language**

Prerequisite: consent of instructor.

*1-4 units, Aut (Staff), Win (Staff), Spr (Staff)***STATISTICS (STATS) COURSES****UNDERGRADUATE COURSES IN STATISTICS**

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**STATS 42Q. Undergraduate Admissions to Selective Universities - a Statistical Perspective**

The goal is the building of a statistical model, based on applicant data, for predicting admission to selective universities. The model will consider factors such as gender, ethnicity, legacy status, public-private schooling, test scores, effects of early action, and athletics. Common misconceptions and statistical pitfalls are investigated. The applicant data are not those associated with any specific university.

*2 units, not given this year***STATS 47N. Breaking the Code?**

(F,Sem) Stanford Introductory Seminar. Preference to freshmen. Cryptography and its counterpart, cryptanalysis or code breaking. How the earliest cryptanalysts used statistical tools to decrypt messages by uncovering recurring patterns. How such frequency-analysis tools have been used to analyze biblical texts to produce a Bible code, and to detect genes in the human genome. Overview of codes and ciphers. Statistical tools useful for code breaking. Students use simple computer programs to apply these tools to break codes and explore applications to various kinds of data. GER:DB-Math

*3 units, Aut (Holmes, S)***STATS 50. Mathematics of Sports**

(Same as MCS 100) The use of mathematics, statistics, and probability in the analysis of sports performance, sports records, and strategy. Topics include mathematical analysis of the physics of sports and the determinations of optimal strategies. New diagnostic statistics and strategies for each sport. Corequisite: STATS 116. GER:DB-Math

*3 units, Aut (Cover, T)***STATS 60. Introduction to Statistical Methods: Precalculus**

(Same as PSYCH 10, STATS 160) Techniques for organizing data, computing, and interpreting measures of central tendency, variability, and association. Estimation, confidence intervals, tests of hypotheses, t-tests, correlation, and regression. Possible topics: analysis of variance and chi-square tests, computer statistical packages. GER:DB-Math

*5 units, Aut (Walther, G), Win (Thomas, E), Spr (Staff), Sum (Staff)***STATS 110. Statistical Methods in Engineering and the Physical Sciences**

Introduction to statistics for engineers and physical scientists. Topics: descriptive statistics, probability, interval estimation, tests of hypotheses, nonparametric methods, linear regression, analysis of variance, elementary experimental design. Prerequisite: one year of calculus. GER:DB-Math

*4-5 units, Aut (Staff), Sum (Staff)***STATS 116. Theory of Probability**

Probability spaces as models for phenomena with statistical regularity. Discrete spaces (binomial, hypergeometric, Poisson). Continuous spaces (normal, exponential) and densities. Random variables, expectation, independence, conditional probability. Introduction to the laws of large numbers and central limit theorem. Prerequisites: MATH 52 and familiarity with infinite series, or equivalent. GER:DB-Math

*3-5 units, Aut (Donoho, D), Spr (Romano, J), Sum (Staff)***STATS 141. Biostatistics**

(Same as BIO 141) Introductory statistical methods for biological data: describing data (numerical and graphical summaries); introduction to probability; and statistical inference (hypothesis tests and confidence intervals). Intermediate statistical methods: comparing groups (analysis of variance); analyzing associations (linear and logistic regression); and methods for categorical data (contingency tables and odds ratio). Course content integrated with statistical computing in R. GER:DB-Math

4-5 units, Aut (Staff)

### STATS 166. Computational Biology

(Same as BIOMEDIN 366, STATS 366) Course is designed to introduce students from the mathematical, physical and engineering sciences to selected current issues in computational biology and bioinformatics. Topics: Principles of gene expression and taxa abundance measurements by microarrays and sequencing. Kernel methods for graph gene interaction graph construction. Phylogenetic trees and their uses in microbiome studies. Computational nonparametric statistics for the analyses of real genomic studies. Assignments: weekly reading of papers and a final project.

3 units, Spr (Holmes, S)

### STATS 167. Probability: Ten Great Ideas About Chance

(Same as PHIL 166, PHIL 266, STATS 267) Foundational approaches to thinking about chance in matters such as gambling, the law, and everyday affairs. Topics include: chance and decisions; the mathematics of chance; frequencies, symmetry, and chance; Bayes great idea; chance and psychology; misuses of chance; and harnessing chance. Emphasis is on the philosophical underpinnings and problems. Prerequisite: exposure to probability or a first course in statistics at the level of STATS 60 or 116. GER:DB-Math

4 units, Spr (Diaconis, P; Skyrms, B)

### STATS 191. Introduction to Applied Statistics

Statistical tools for modern data analysis. Topics include regression and prediction, elements of the analysis of variance, bootstrap, and cross-validation. Emphasis is on conceptual rather than theoretical understanding. Applications to social/biological sciences. Student assignments/projects require use of the software package R. Recommended: 60, 110, or 141. GER:DB-Math

3-4 units, Win (Taylor, J)

### STATS 198. Practical Training

For students majoring in Mathematical and Computational Science only. Students obtain employment in a relevant industrial or research activity to enhance their professional experience.

1-3 units, Sum (Staff)

### STATS 199. Independent Study

For undergraduates.

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

## GRADUATE COURSES IN STATISTICS

Primarily for graduate students; undergraduates may enroll with consent of instructor.

### STATS 160. Introduction to Statistical Methods: Precalculus

(Same as PSYCH 10, STATS 60) Techniques for organizing data, computing, and interpreting measures of central tendency, variability, and association. Estimation, confidence intervals, tests of hypotheses, t-tests, correlation, and regression. Possible topics: analysis of variance and chi-square tests, computer statistical packages.

5 units, Aut (Walther, G), Win (Thomas, E), Spr (Staff), Sum (Staff)

### STATS 200. Introduction to Statistical Inference

Modern statistical concepts and procedures derived from a mathematical framework. Statistical inference, decision theory; point and interval estimation, tests of hypotheses; Neyman-Pearson theory. Bayesian analysis; maximum likelihood, large sample theory. Prerequisite: 116.

3 units, Win (Walther, G), Sum (Staff)

### STATS 202. Data Mining and Analysis

Data mining is used to discover patterns and relationships in data. Emphasis is on large complex data sets such as those in very large databases or through web mining. Topics: decision trees, association rules, clustering, case based methods, and data visualization.

3 units, Aut (Taylor, J), Sum (Staff)

### STATS 203. Introduction to Regression Models and Analysis of Variance

Modeling and interpretation of observational and experimental data using linear and nonlinear regression methods. Model building and selection methods. Multivariable analysis. Fixed and random effects models. Experimental design. Pre- or corequisite:

200.

3 units, Win (Johnstone, I)

### STATS 205. Introduction to Nonparametric Statistics

Nonparametric analogs of the one- and two-sample t-tests and analysis of variance; the sign test, median test, Wilcoxon's tests, and the Kruskal-Wallis and Friedman tests, tests of independence. Nonparametric regression and nonparametric density estimation, modern nonparametric techniques, nonparametric confidence interval estimates.

3 units, not given this year

### STATS 206. Applied Multivariate Analysis

Introduction to the statistical analysis of several quantitative measurements on each observational unit. Emphasis is on concepts, computer-intensive methods. Examples from economics, education, geology, psychology. Topics: multiple regression, multivariate analysis of variance, principal components, factor analysis, canonical correlations, multidimensional scaling, clustering. Pre- or corequisite: 200.

3 units, not given this year

### STATS 207. Introduction to Time Series Analysis

Time series models used in economics and engineering. Trend fitting, autoregressive and moving average models and spectral analysis, Kalman filtering, and state-space models. Seasonality, transformations, and introduction to financial time series. Prerequisite: basic course in Statistics at the level of 200.

3 units, Spr (Donoho, D)

### STATS 208. Introduction to the Bootstrap

The bootstrap is a computer-based method for assigning measures of accuracy to statistical estimates. By substituting computation in place of mathematical formulas, it permits the statistical analysis of complicated estimators. Topics: nonparametric assessment of standard errors, biases, and confidence intervals; related resampling methods including the jackknife, cross-validation, and permutation tests. Theory and applications. Prerequisite: course in statistics or probability.

3 units, not given this year

### STATS 209. Understanding Statistical Models and their Social Science Applications

(Same as EDUC 260X, HRP 239) Critical examination of statistical methods in social science applications, especially for cause and effect determinations. Topics: path analysis, multilevel models, matching and propensity score methods, analysis of covariance, instrumental variables, compliance, longitudinal data, mediating and moderating variables. See <http://www-stat.stanford.edu/~rag/stat209>. Prerequisite: intermediate-level statistical methods

3 units, Win (Rogosa, D)

### STATS 211. Meta-research: Appraising Research Findings, Bias, and Meta-analysis

(Same as HRP 206, MED 206) Open to graduate, medical, and undergraduate students. Appraisal of the quality and credibility of research findings; evaluation of sources of bias. Meta-analysis as a quantitative (statistical) method for combining results of independent studies. Examples from medicine, epidemiology, genomics, ecology, social/behavioral sciences, education. Collaborative analyses. Project involving generation of a meta-research project or reworking and evaluation of an existing published meta-analysis. Prerequisite: knowledge of basic statistics.

3 units, Win (Olkin, I; Ioannidis, J)

### STATS 212. Applied Statistics with SAS

Data analysis and implementation of statistical tools in SAS. Topics: reading in and describing data, categorical data, dates and longitudinal data, correlation and regression, nonparametric comparisons, ANOVA, multiple regression, multivariate data analysis, using arrays and macros in SAS. Prerequisite: statistical techniques at the level of STATS 191 or 203; knowledge of SAS not required.

3 units, Sum (Staff)

### STATS 213. Introduction to Graphical Models

Multivariate Normal Distribution and Inference, Wishart distributions, graph theory, probabilistic Markov models, pairwise and global Markov property, decomposable graph, Markov equivalence, MLE for DAG models and undirected graphical

models, Bayesian inference for DAG models and undirected graphical models. Prerequisites: STATS 116, MATH 104 or equivalent class in linear algebra.

3 units, Aut (Rajaratnam, B; Ben-David, E)

### STATS 215. Statistical Models in Biology

Poisson and renewal processes, Markov chains in discrete and continuous time, branching processes, diffusion. Applications to models of nucleotide evolution, recombination, the Wright-Fisher process, coalescence, genetic mapping, sequence analysis. Theoretical material approximately the same as in STATS 217, but emphasis is on examples drawn from applications in biology, especially genetics. Prerequisite: 116 or equivalent.

3 units, Win (Siegmond, D)

### STATS 217. Introduction to Stochastic Processes

Discrete and continuous time Markov chains, poisson processes, random walks, branching processes, first passage times, recurrence and transience, stationary distributions. Non-Statistics masters students may want to consider taking STATS 215 instead. Prerequisite: STATS 116 or consent of instructor.

3 units, Win (Rajaratnam, B), Sum (Staff)

### STATS 218. Introduction to Stochastic Processes

Renewal theory, Brownian motion, Gaussian processes, second order processes, martingales.

3 units, Spr (Olshen, R), Sum (Staff)

### STATS 219. Stochastic Processes

(Same as MATH 136) Introduction to measure theory, Lp spaces and Hilbert spaces. Random variables, expectation, conditional expectation, conditional distribution. Uniform integrability, almost sure and Lp convergence. Stochastic processes: definition, stationarity, sample path continuity. Examples: random walk, Markov chains, Gaussian processes, Poisson processes, Martingales. Construction and basic properties of Brownian motion. Prerequisite: STATS 116 or MATH 151 or equivalent. Recommended: MATH 115 or equivalent.

3 units, Aut (Ding, J)

### STATS 221. Introduction to Mathematical Finance

Interest rate and discounted value. Financial derivatives, hedging, and risk management. Stochastic models of financial markets, introduction to Ito calculus and stochastic differential equations. Black-Scholes pricing of European options. Optimal stopping and American options. Prerequisites: MATH 53, STATS 116, or equivalents.

3-4 units, Sum (Staff)

### STATS 222. Statistical Methods for Longitudinal Data

(Same as EDUC 351A) Research designs and statistical procedures for time-ordered (repeated-measures) data. The analysis of longitudinal panel data is central to empirical research on learning and development. Topics: measurement of change, growth curve models, analysis of durations including survival analysis, experimental and non-experimental group comparisons, reciprocal effects, stability. See <http://www-stat.stanford.edu/~rag/stat222/>. Prerequisite: intermediate statistical methods.

2-3 units, Spr (Rogosa, D)

### STATS 237. Time Series Modeling and Forecasting

Box-Jenkins and Bayesian approaches. State-space and change-point models. Application to revenue prediction, forecasting product demand, and other real world problems. Development and assessment of models and forecasts in practical applications. Hands-on experience with real data.

3 units, Sum (Staff)

### STATS 239A. Workshop in Quantitative Finance

Topics of current interest.

1 unit, not given this year

### STATS 239B. Workshop in Quantitative Finance

Topics of current interest. May be repeated for credit.

1 unit, not given this year

### STATS 240. Statistical Methods in Finance

(SCPD students register for 240P.) Regression analysis and applications to investment models. Principal components and multivariate analysis. Likelihood inference and Bayesian methods. Financial time series. Estimation and modeling of volatilities. Statistical methods for portfolio management. Prerequisite: STATS 200 or equivalent.

3-4 units, Aut (Rajaratnam, B)

### STATS 240P. Statistical Methods in Finance

For SCPD students; see 240.

3 units, Aut (Rajaratnam, B)

### STATS 241. Financial Modeling Methodology and Applications

(SCPD students register for 241P.) Substantive and empirical modeling approaches in options and interest rate markets. Nonlinear least squares and nonparametric regression. Multivariate time series modeling and forecasting. Applications of canonical correlation analysis and cointegration. Statistical trading strategies and their evaluation. Prerequisite: 240 or equivalent.

3-4 units, Win (Lai, T)

### STATS 241P. Financial Modeling Methodology and Applications

For SCPD students; see 241.

3 units, Win (Lai, T)

### STATS 242. Algorithmic Trading and Quantitative Strategies

An introduction to financial trading strategies based on methods of statistical arbitrage that can be automated. Methodologies related to high frequency data and stylized facts on asset returns; models of order book dynamics and order placement, dynamic trade planning with feedback; momentum strategies, pairs trading. Emphasis on developing and implementing models that reflect the market and behavioral patterns. Prerequisite: STATS 240 or equivalent.

3 units, Sum (Staff)

### STATS 243. Statistical Models and Methods for Risk Management and Surveillance

(SCPD students register for 243P.) Market risk and credit risk, credit markets. Back testing, stress testing and Monte Carlo methods. Logistic regression, generalized linear models and generalized mixed models. Loan prepayment and default as competing risks. Survival and hazard functions, correlated default intensities, frailty and contagion. Risk surveillance, early warning and adaptive control methodologies. Banking and bank regulation, asset and liability management. Prerequisite: STATS 240 or equivalent.

3-4 units, Spr (Lai, T)

### STATS 243P. Statistical Models and Methods for Risk Management and Surveillance

For SCPD students; see 243.

3 units, Spr (Lai, T)

### STATS 250. Mathematical Finance

(Same as MATH 238) Stochastic models of financial markets. Forward and futures contracts. European options and equivalent martingale measures. Hedging strategies and management of risk. Term structure models and interest rate derivatives. Optimal stopping and American options. Corequisites: MATH 236 and 227 or equivalent.

3 units, Win (Papanicolaou, G)

### STATS 253. Spatial Statistics

(Same as STATS 352) Statistical descriptions of spatial variability, spatial random functions, grid models, spatial partitions, spatial sampling, linear and nonlinear interpolation and smoothing with error estimation, Bayes methods and pattern simulation from posterior distributions, multivariate spatial statistics, spatial classification, nonstationary spatial statistics, space-time statistics and estimation of time trends from monitoring data, spatial point patterns, models of attraction and repulsion. Applications to earth and environmental sciences, meteorology, astronomy, remote-sensing, ecology, materials.

3 units, not given this year

### STATS 260A. Workshop in Biostatistics

(Same as HRP 260A) Applications of statistical techniques to current problems in medical science.

1-2 units, Aut (Olshen, R; Sabatti, C)

### STATS 260B. Workshop in Biostatistics

(Same as HRP 260B) Applications of statistical techniques to current problems in medical science.

1-2 units, Win (Olshen, R; Sabatti, C)

**STATS 260C. Workshop in Biostatistics**

(Same as HRP 260C) Applications of statistical techniques to current problems in medical science.

1-2 units, Spr (Staff)

**STATS 261. Intermediate Biostatistics: Analysis of Discrete Data**

(Same as BIOMEDIN 233, HRP 261) Methods for analyzing data from case-control and cross-sectional studies: the 2x2 table, chi-square test, Fisher's exact test, odds ratios, Mantel-Haenzel methods, stratification, tests for matched data, logistic regression, conditional logistic regression. Emphasis is on data analysis in SAS. Special topics: cross-fold validation and bootstrap inference.

3 units, Win (Sainani, K)

**STATS 262. Intermediate Biostatistics: Regression, Prediction, Survival Analysis**

(Same as HRP 262) Methods for analyzing longitudinal data. Topics include Kaplan-Meier methods, Cox regression, hazard ratios, time-dependent variables, longitudinal data structures, profile plots, missing data, modeling change, MANOVA, repeated-measures ANOVA, GEE, and mixed models. Emphasis is on practical applications. Prerequisites: basic ANOVA and linear regression.

3 units, Spr (Staff)

**STATS 267. Probability: Ten Great Ideas About Chance**

(Same as PHIL 166, PHIL 266, STATS 167) Foundational approaches to thinking about chance in matters such as gambling, the law, and everyday affairs. Topics include: chance and decisions; the mathematics of chance; frequencies, symmetry, and chance; Bayes great idea; chance and psychology; misuses of chance; and harnessing chance. Emphasis is on the philosophical underpinnings and problems. Prerequisite: exposure to probability or a first course in statistics at the level of STATS 60 or 116.

4 units, Spr (Diaconis, P; Skyrms, B)

**STATS 270. A Course in Bayesian Statistics**

(Same as STATS 370) Advanced-level Bayesian statistics. Topics: Discussion of the mathematical and theoretical foundation for Bayesian inferential procedures. Examination of the construction of priors and the asymptotic properties of likelihoods and posterior densities. Discussion including but not limited to the case of finite dimensional parameter space. Prerequisite: familiarity with standard probability and multivariate distribution theory.

3 units, Win (Wong, W)

**STATS 290. Paradigms for Computing with Data**

Advanced programming and computing techniques to support projects in data analysis and related research. For Statistics graduate students and others whose research involves data analysis and development of associated computational software. Prerequisites: Programming experience including familiarity with R; computing at least at the level of CS 106; statistics at the level of STATS 110 or 141.

3 units, Win (Narasimhan, B; Chambers, J)

**STATS 297. Practical Training**

For students in the M.S. program in Financial Mathematics only. Students obtain employment in a relevant industrial or research activity to enhance their professional experience. May be repeated for credit once. Prerequisite: consent of adviser.

1-3 units, Aut (Lai, T), Win (Lai, T), Spr (Lai, T), Sum (Staff)

**STATS 298. Industrial Research for Statisticians**

Masters-level research as in 299, but must be conducted for an off-campus employer. Final report required. Prerequisite: enrollment in Statistics M.S. or Ph.D. program, prior to candidacy.

1-9 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**STATS 299. Independent Study**

For Statistics M.S. students only. Reading or research program under the supervision of a Statistics faculty member. May be repeated for credit.

1-10 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**STATS 300. Advanced Topics in Statistics**

May be repeated for credit.

3 units, Sum (Staff)

**STATS 300A. Theory of Statistics**

Elementary decision theory; loss and risk functions, Bayes estimation; UMVU estimator, minimax estimators, shrinkage

estimators. Hypothesis testing and confidence intervals: Neyman-Pearson theory; UMP tests and uniformly most accurate confidence intervals; use of unbiasedness and invariance to eliminate nuisance parameters. Large sample theory: basic convergence concepts; robustness; efficiency; contiguity, locally asymptotically normal experiments; convolution theorem; asymptotically UMP and maximin tests. Asymptotic theory of likelihood ratio and score tests. Rank permutation and randomization tests; jackknife, bootstrap, subsampling and other resampling methods. Further topics: sequential analysis, optimal experimental design, empirical processes with applications to statistics, Edgeworth expansions, density estimation, time series.

2-3 units, Aut (Siegmund, D)

**STATS 300B. Theory of Statistics**

Elementary decision theory; loss and risk functions, Bayes estimation; UMVU estimator, minimax estimators, shrinkage estimators. Hypothesis testing and confidence intervals: Neyman-Pearson theory; UMP tests and uniformly most accurate confidence intervals; use of unbiasedness and invariance to eliminate nuisance parameters. Large sample theory: basic convergence concepts; robustness; efficiency; contiguity, locally asymptotically normal experiments; convolution theorem; asymptotically UMP and maximin tests. Asymptotic theory of likelihood ratio and score tests. Rank permutation and randomization tests; jackknife, bootstrap, subsampling and other resampling methods. Further topics: sequential analysis, optimal experimental design, empirical processes with applications to statistics, Edgeworth expansions, density estimation, time series.

2-4 units, Win (Johnstone, I)

**STATS 300C. Theory of Statistics**

Decision theory formulation of statistical problems. Minimax, admissible procedures. Complete class theorems (all minimax or admissible procedures are Bayes), Bayes procedures, conjugate priors, hierarchical models. Bayesian non parametrics: diaichlet, tail free, polya trees, bayesian sieves. Inconsistency of bayes rules.

2-4 units, Spr (Candes, E)

**STATS 302. Qualifying Exams Workshop**

Prepares Statistics Ph.D. students for the qualifying exams by reviewing relevant course topics and problem solving strategies.

3 units, Sum (Staff)

**STATS 303. PhD First Year Student Workshop**

For Statistics First Year PhD students only. Discussion of relevant topics in first year student courses, consultation with PhD advisor.

1 unit, Aut (Walther, G), Win (Walther, G), Spr (Walther, G), Sum (Staff)

**STATS 305. Introduction to Statistical Modeling**

Review of univariate regression. Multiple regression. Geometry, subspaces, orthogonality, projections, normal equations, rank deficiency, estimable functions and Gauss-Markov theorem. Computation via QR decomposition, Gramm-Schmidt orthogonalization and the SVD. Interpreting coefficients, collinearity, graphical displays. Fits and the Hat matrix, leverage & influence, diagnostics, weighted least squares and resistance. Model selection, Cp/Aic and crossvalidation, stepwise, lasso. Basis expansions, splines. Multivariate normal distribution theory. ANOVA: Sources of measurements, fixed and random effects, randomization. Emphasis on problem sets involving substantive computations with data sets. Prerequisites: consent of instructor, 116, 200, applied statistics course, CS 106A, MATH 114.

2-4 units, Aut (Owen, A)

**STATS 306A. Methods for Applied Statistics**

Regression modeling extended to categorical data. Logistic regression. Loglinear models. Generalized linear models. Discriminant analysis. Categorical data models from information retrieval and Internet modeling. Prerequisite: 305 or equivalent.

2-4 units, Win (Efron, B)

**STATS 306B. Methods for Applied Statistics: Unsupervised Learning**

Unsupervised learning techniques in statistics, machine learning, and data mining.

2-3 units, Spr (Tibshirani, R)

**STATS 310A. Theory of Probability**

(Same as MATH 230A) Mathematical tools: sigma algebras, measure theory, connections between coin tossing and Lebesgue



measure, basic convergence theorems. Probability: independence, Borel-Cantelli lemmas, almost sure and  $L_p$  convergence, weak and strong laws of large numbers. Large deviations. Weak convergence; central limit theorems; Poisson convergence; Stein's method. Prerequisites: 116, MATH 171.

2-4 units, Aut (Diaconis, P)

#### STATS 310B. Theory of Probability

(Same as MATH 230B) Conditional expectations, discrete time martingales, stopping times, uniform integrability, applications to 0-1 laws, Radon-Nikodym Theorem, ruin problems, etc. Other topics as time allows selected from (i) local limit theorems, (ii) renewal theory, (iii) discrete time Markov chains, (iv) random walk theory, (v) ergodic theory. Prerequisite: 310A or MATH 230A.

2-3 units, Win (Siegmund, D)

#### STATS 310C. Theory of Probability

(Same as MATH 230C) Continuous time stochastic processes: martingales, Brownian motion, stationary independent increments, Markov jump processes and Gaussian processes. Invariance principle, random walks, LIL and functional CLT. Markov and strong Markov property. Infinitely divisible laws. Some ergodic theory. Prerequisite: 310B or MATH 230B.

2-4 units, Spr (Dembo, A)

#### STATS 314. Advanced Statistical Methods

Topic this year is multiple hypothesis testing. The demand for new methodology for the simultaneous testing of many hypotheses as driven by modern applications in genomics, imaging, astronomy, and finance. High dimensionality: how tests of many hypotheses may be considered simultaneously. Classical techniques, and recent developments. Stepwise methods, generalized error rates such as the false discovery rate, and the role of resampling. May be repeated for credit.

2-3 units, not given this year

#### STATS 315A. Modern Applied Statistics: Learning

Overview of supervised learning. Linear regression and related methods. Model selection, least angle regression and the lasso, stepwise methods. Classification. Linear discriminant analysis, logistic regression, and support vector machines (SVMs). Basis expansions, splines and regularization. Kernel methods. Generalized additive models. Kernel smoothing. Gaussian mixtures and the EM algorithm. Model assessment and selection: crossvalidation and the bootstrap. Pathwise coordinate descent. Sparse graphical models. Prerequisites: STATS 305, 306A,B or consent of instructor.

2-3 units, Win (Hastie, T)

#### STATS 315B. Modern Applied Statistics: Data Mining

Two-part sequence. New techniques for predictive and descriptive learning using ideas that bridge gaps among statistics, computer science, and artificial intelligence. Emphasis is on statistical aspects of their application and integration with more standard statistical methodology. Predictive learning refers to estimating models from data with the goal of predicting future outcomes, in particular, regression and classification models. Descriptive learning is used to discover general patterns and relationships in data without a predictive goal, viewed from a statistical perspective as computer automated exploratory analysis of large complex data sets.

2-3 units, Spr (Friedman, J)

#### STATS 316. Stochastic Processes on Graphs

Local weak convergence, Gibbs measures on trees, cavity method, and replica symmetry breaking. Examples include random  $k$ -satisfiability, the assignment problem, spin glasses, and neural networks. Prerequisite: 310A or equivalent.

1-3 units, not given this year

#### STATS 317. Stochastic Processes

Semimartingales, stochastic integration, Ito's formula, Girsanov's theorem. Gaussian and related processes. Stationary/isotropic processes. Integral geometry and geometric probability. Maxima of random fields and applications to spatial statistics and imaging.

3 units, Spr (Taylor, J)

#### STATS 318. Modern Markov Chains

Tools for understanding Markov chains as they arise in applications. Random walk on graphs, reversible Markov chains, Metropolis algorithm, Gibbs sampler, hybrid Monte Carlo,

auxiliary variables, hit and run, Swedson-Wong algorithms, geometric theory, Poincare-Nash-Cheger-Log-Sobolov inequalities. Comparison techniques, coupling, stationary times, Harris recurrence, central limit theorems, and large deviations.

3 units, Spr (Candes, E)

#### STATS 319. Literature of Statistics

Literature study of topics in statistics and probability culminating in oral and written reports. May be repeated for credit.

1-3 units, Aut (Romano, J), Win (Rajaratnam, B)

#### STATS 320. Heterogeneous Data with Kernels

Mathematical and computational methods necessary to understanding analysis of heterogeneous data using generalized inner products and Kernels. For areas that need to integrate data from various sources, biology, environmental and chemical engineering, molecular biology, bioinformatics. Topics: Distances, inner products and duality. Multivariate projections. Complex heterogeneous data structures (networks, trees, categorical as well as multivariate continuous data). Canonical correlation analysis, canonical correspondence analysis. Kernel methods in Statistics. Representer theorem. Kernels on graphs. Kernel versions of standard statistical procedures. Data cubes and tensor methods.

3 units, not given this year

#### STATS 321. Modern Applied Statistics: Transposable Data

Topics: clustering, biclustering, and spectral clustering. Data analysis using the singular value decomposition, nonnegative decomposition, and generalizations. Plaid model, aspect model, and additive clustering. Correspondence analysis, Rasch model, and independent component analysis. Page rank, hubs, and authorities. Probabilistic latent semantic indexing. Recommender systems. Applications to genomics and information retrieval. Prerequisites: 315A,B, 305/306A,B, or consent of instructor.

3 units, Spr (Owen, A)

#### STATS 322. Function Estimation in White Noise

Gaussian white noise model sequence space form. Hyperrectangles, quadratic convexity, and Pinsker's theorem. Minimax estimation on  $L_p$  balls and Besov spaces. Role of wavelets and unconditional bases. Linear and threshold estimators. Oracle inequalities. Optimal recovery and universal thresholding. Stein's unbiased risk estimator and threshold choice. Complexity penalized model selection. Connecting fast wavelet algorithms and theory. Beyond orthogonal bases.

3 units, not given this year

#### STATS 324. Multivariate Analysis

Classic multivariate statistics: properties of the multivariate normal distribution, determinants, volumes, projections, matrix square roots, the singular value decomposition; Wishart distributions, Hotelling's T-square; principal components, canonical correlations, Fisher's discriminant, the Cauchy projection formula.

2-3 units, not given this year

#### STATS 329. Large-Scale Simultaneous Inference

Estimation, testing, and prediction for microarray-like data. Modern scientific technologies, typified by microarrays and imaging devices, produce inference problems with thousands of parallel cases to consider simultaneously. Topics: empirical Bayes techniques, James-Stein estimation, large-scale simultaneous testing, false discovery rates, local fdr, proper choice of null hypothesis (theoretical, permutation, empirical nulls), power, effects of correlation on tests and estimation accuracy, prediction methods, related sets of cases (enrichment), effect size estimation. Theory and methods illustrated on a variety of large-scale data sets.

1-3 units, not given this year

#### STATS 330. An Introduction to Compressed Sensing

(Same as CME 362) Compressed sensing is a new data acquisition theory asserting that one can design nonadaptive sampling techniques that condense the information in a compressible signal into a small amount of data. This revelation may change the way engineers think about signal acquisition. Course covers fundamental theoretical ideas, numerical methods in large-scale convex optimization, hardware implementations, connections with statistical estimation in high dimensions, and extensions such as recovery of data matrices from few entries (famous Netflix Prize).

3 units, Aut (Donoho, D)

**STATS 335. Simultaneous and Selective Inference**

We follow the change from concern about simultaneous inference on multiple parameters to concern about the selection effect, in areas where the multiplicity is high: Genomics, Brain Imaging and Medical Statistics. We review: (i) Basic principles for constructing simultaneous inference (ii) The introduction of the false discovery rate (iii) Variations on the false discovery rate. We emphasize (iv) selective inference, as a goal that merits its own terms and treatment, and present open challenges regarding concepts and methods.

3 units, Win (Staff)

**STATS 338. Topics in Biostatistics**

Data monitoring and interim analysis of clinical trials. Design of Phase I, II, III trials. Survival analysis. Longitudinal data analysis.

3 units, not given this year

**STATS 341. Applied Multivariate Statistics**

Theory, computational aspects, and practice of a variety of important multivariate statistical tools for data analysis. Topics include classical multivariate Gaussian and undirected graphical models, graphical displays. PCA, SVD and generalizations including canonical correlation analysis, linear discriminant analysis, correspondence analysis, with focus on recent variants. Factor analysis and independent component analysis. Multidimensional scaling and its variants (e.g. Isomap, spectral clustering). Students are expected to program in R. Prerequisite: STATS 305 or equivalent.

3 units, Spr (Hastie, T)

**STATS 345. Computational Algorithms for Statistical Genetics**

(Same as GENE 245) Computational algorithms for human genetics research. Topics include: permutation, bootstrap, expectation maximization, hidden Markov model, and Markov chain Monte Carlo. Rationales and techniques illustrated with existing implementations commonly used in population genetics research, disease association studies, and genomics analysis. Prerequisite: GENE 244 or consent of instructor.

2-3 units, alternate years, not given this year

**STATS 351A. An Introduction to Random Matrix Theory**

(Same as MATH 231A) Patterns in the eigenvalue distribution of typical large matrices, which also show up in physics (energy distribution in scattering experiments), combinatorics (length of longest increasing subsequence), first passage percolation and number theory (zeros of the zeta function). Classical compact ensembles (random orthogonal matrices). The tools of determinantal point processes.

3 units, not given this year

**STATS 352. Spatial Statistics**

(Same as STATS 253) Statistical descriptions of spatial variability, spatial random functions, grid models, spatial partitions, spatial sampling, linear and nonlinear interpolation and smoothing with error estimation, Bayes methods and pattern simulation from posterior distributions, multivariate spatial statistics, spatial classification, nonstationary spatial statistics, space-time statistics and estimation of time trends from monitoring data, spatial point patterns, models of attraction and repulsion. Applications to earth and environmental sciences, meteorology, astronomy, remote-sensing, ecology, materials.

3 units, not given this year

**STATS 362. Monte Carlo**

Random numbers and vectors: inversion, acceptance-rejection, copulas. Variance reduction: antithetics, stratification, control variates, importance sampling. MCMC: Markov chains, detailed balance, Metropolis-Hastings, random walk Metropolis, independence sampler, Gibbs sampling, slice sampler, hybrids of Gibbs and Metropolis, tempering. Sequential Monte Carlo. Quasi-Monte Carlo. Randomized quasi-Monte Carlo. Examples, problems and motivation from Bayesian statistics, machine learning, computational finance and graphics.

2-3 units, Aut (Owen, A)

**STATS 366. Computational Biology**

(Same as BIOMEDIN 366, STATS 166) Course is designed to introduce students from the mathematical, physical and engineering sciences to selected current issues in computational biology and bioinformatics. Topics: Principles of gene expression and taxa abundance measurements by microarrays and sequencing.

Kernel methods for graph gene interaction graph construction. Phylogenetic trees and their uses in microbiome studies. Computational nonparametric statistics for the analyses of real genomic studies. Assignments: weekly reading of papers and a final project.

3 units, Spr (Holmes, S)

**STATS 367. Statistical Models in Genetics**

Statistical problems in association and linkage analysis of qualitative and quantitative traits in human and experimental populations; sequence alignment and analysis; population genetics/evolution (Wright-Fisher model, Kingman coalescent, models of nucleotide substitution); related computational algorithms. Prerequisites: knowledge of probability through elementary stochastic processes and statistics through likelihood theory.

3 units, Aut (Sabatti, C)

**STATS 370. A Course in Bayesian Statistics**

(Same as STATS 270) Advanced-level Bayesian statistics. Topics: Discussion of the mathematical and theoretical foundation for Bayesian inferential procedures. Examination of the construction of priors and the asymptotic properties of likelihoods and posterior densities. Discussion including but not limited to the case of finite dimensional parameter space. Prerequisite: familiarity with standard probability and multivariate distribution theory.

3 units, Win (Wong, W)

**STATS 374. Large Deviations**

(Same as MATH 234) Combinatorial estimates and the method of types. Large deviation probabilities for partial sums and for empirical distributions, Cramer's and Sanov's theorems and their Markov extensions. Applications in statistics, information theory, and statistical mechanics. Prerequisite: MATH 230A or STATS 310.

3 units, not given this year

**STATS 375. Inference in Graphical Models**

Graphical models as a unifying framework for describing the statistical relationships between large sets of variables; computing the marginal distribution of one or a few such variables. Focus is on sparse graphical structures, low-complexity algorithms, and their analysis. Topics include: variational inference; message passing algorithms; belief propagation; generalized belief propagation; survey propagation. Analysis techniques: correlation decay; distributional recursions. Applications from engineering, computer science, and statistics. Prerequisite: EE 278, STATS 116, or CS 228. Recommended: EE 376A or STATS 217.

3 units, not given this year

**STATS 376A. Information Theory**

(Same as EE 376A) The fundamental ideas of information theory. Entropy and intrinsic randomness. Data compression to the entropy limit. Huffman coding. Arithmetic coding. Channel capacity, the communication limit. Gaussian channels. Kolmogorov complexity. Asymptotic equipartition property. Information theory and Kelly gambling. Applications to communication and data compression. Prerequisite: EE178/278A or STATS 116, or equivalent.

3 units, Win (Weissman, I)

**STATS 376B. Information Theory**

(Same as EE 376B) Rate distortion theory and Kolmogorov complexity. Information theory and statistics. Method of types. Stein's lemma. AEP. Information capacity of networks. Slepian-Wolf theorem. Optimal investment and information theory. Universal portfolios and universal data compression. Maximum entropy and Burg's theorem. Prerequisite: EE376A.

3 units, Spr (Cover, T)

**STATS 390. Consulting Workshop**

Skills required of practicing statistical consultants, including exposure to statistical applications. Students participate as consultants in the department's drop-in consulting service, analyze client data, and prepare formal written reports. Seminar provides supervised experience in short term consulting. May be repeated for credit. Prerequisites: course work in applied statistics or data analysis, and consent of instructor.

1-3 units, Aut (Sabatti, C), Win (Simon, N), Spr (Donoho, D), Sum (Staff)

**STATS 396. Research Workshop in Computational Biology**

Applications of Computational Statistics and Data Mining to

Biological Data. Attendance mandatory. Instructor approval required.

*1-2 units, Aut (Staff), Win (Staff), Spr (Staff)*

### **STATS 397. PhD Oral Exam Workshop**

For Statistics PhD students defending their dissertation.

*1 unit, Spr (Efron, B; Holmes, S)*

### **STATS 398. Industrial Research for Statisticians**

Doctoral research as in 298, but must be conducted for an off-campus employer. Final report required. May be repeated for credit. Prerequisite: Statistics Ph.D. candidate.

*1-9 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

### **STATS 399. Research**

Research work as distinguished from independent study of nonresearch character listed in 199. May be repeated for credit.

*1-10 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

### **STATS 801. TGR Project**

*0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

### **STATS 802. TGR Dissertation**

*0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

## STEM CELL BIOLOGY AND REGENERATIVE MEDICINE (STEMREM) COURSES

### UNDERGRADUATE COURSES IN STEM CELL BIOLOGY AND REGENERATIVE MEDICINE

Primarily for undergraduates; graduate students may enroll with consent of adviser.

#### **STEMREM 83Q. The Stem Cell: Biological, Social, and Practical Aspects of Stem Cell Research**

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Ethical, legal, social, and economic dimensions of stem cell research such as the discovery of human embryonic stem cells and the international landscape of public policy. How stem cells work, their role in the upkeep of the human body, and current and future uses in medicine. Issues at the intersection of science and society such as human-animal hybrids, notions of justice in intellectual property law, distribution of health care, and the major ethical frameworks defining the debate. Prerequisite: AP Biology

*3 units, Spr (Scott, C)*

### GRADUATE COURSES IN STEM CELL BIOLOGY AND REGENERATIVE MEDICINE

Primarily for graduate students; undergraduates may enroll with consent of instructor.

#### **STEMREM 296. Stem Cell Biology and Regenerative Medicine**

For graduate and medical students. Embryonic and adult stem cells, including origin, regulation, self-renewal, differentiation, fate, and relationship to cancer; biological mechanisms and methods to translate findings to therapeutic applications.

*5 units, Win (Weissman, I; Fuller, M; Nusse, R; Longaker, M; Tang, C; Lee, A)*

#### **STEMREM 399. Graduate Research**

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

*1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

#### **STEMREM 802. TGR Dissertation**

*0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

## STRUCTURAL BIOLOGY (SBIO) COURSES

### UNDERGRADUATE COURSES IN STRUCTURAL BIOLOGY

Primarily for undergraduates; graduate students may enroll with consent of adviser.

#### **SBIO 199. Undergraduate Research**

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

*1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

### GRADUATE COURSES IN STRUCTURAL BIOLOGY

Primarily for graduate students; undergraduates may enroll with consent of instructor.

#### **SBIO 228. Computational Structural Biology**

(Same as BIOPHYS 228) Interatomic forces and interactions such as electrostatics and hydrophobicity, and protein structure in terms of amino acid properties, local chain conformation, secondary structure, domains, and families of folds. How protein motion can be simulated. Bioinformatics introduced in terms of methods that compare proteins via their amino acid sequences and their three-dimensional structures. Structure prediction via simple comparative modeling. How to detect and model remote homologues. Predicting the structure of a protein from knowledge of its amino acid sequence. Via Internet.

*3 units, not given this year*

#### **SBIO 241. Biological Macromolecules**

(Same as BIOC 241, BIOPHYS 241) The physical and chemical basis of macromolecular function. Forces that stabilize biopolymers with three-dimensional structures and their functional implications. Thermodynamics, molecular forces, structure and kinetics of enzymatic and diffusional processes, and relationship to their practical application in experimental design and interpretation. Biological function and the level of individual molecular interactions and at the level of complex processes. Case studies in lecture and discussion of classic and current literature. Enrollment limited to 30. Prerequisites: None; background in biochemistry and physical chemistry preferred but material available for those with deficiency; undergraduates with consent of instructor only.

*3-5 units, Aut (Herschlag, D; Ferrell, J; Puglisi, J; Block, S; Weis, W; Garcia, K)*

#### **SBIO 242. Methods in Molecular Biophysics**

(Same as BIOPHYS 242) Experimental methods in molecular biophysics from theoretical and practical standpoints. Emphasis is on X-ray diffraction, nuclear magnetic resonance, and fluorescence spectroscopy. Prerequisite: physical chemistry or consent of instructor.

*3 units, alternate years, not given this year*

#### **SBIO 274. Topics in Nucleic Acid Structure and Function**

Principles of nucleic acid structure and function. Methods for investigating nucleic acid structure. Limited to graduate students and postdoctoral fellows in structural biology. Prerequisite: consent of instructor.

*2 units, not given this year*

#### **SBIO 299. Directed Reading in Structural Biology**

Prerequisite: consent of instructor.

*1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

#### **SBIO 370. Medical Scholars Research**

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

*4-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

#### **SBIO 399. Graduate Research**

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**SBIO 801. TGR Project**

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**SBIO 802. TGR Dissertation**

0 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

## STRUCTURED LIBERAL EDUCATION (SLE) COURSES

### UNDERGRADUATE COURSES IN STRUCTURED LIBERAL EDUCATION

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**SLE 91. Structured Liberal Education**

Three quarter sequence; restricted to and required of SLE students. Comprehensive study of the intellectual foundations of the western tradition in dialogue with eastern, indigenous, and postcolonial perspectives. The cultural foundations of western civilization in ancient Greece, Rome, and the Middle East, with attention to Buddhist and Hindu counterparts and the questions these traditions address in common. Texts and authors include Homer, Plato, Aristotle, Greek tragedy, Sappho, the Hebrew Bible, the New Testament, Saint Augustine, and texts from Hindu and Buddhist traditions. GER:DB-Hum, IHUM-1

9 units, Aut (Lougee Chappell, C; Watkins, G)

**SLE 92. Structured Liberal Education**

Three quarter sequence; restricted to and required of SLE students. Comprehensive study of the intellectual foundations of the western tradition in dialogue with eastern, indigenous, and postcolonial perspectives. The foundations of the modern world, from late antiquity through the Middle Ages, the Renaissance, the Enlightenment, and the Scientific Revolution. Authors include Dante, Descartes, Shakespeare, and texts from Chinese and Islamic traditions. GER:DB-Hum, IHUM-2

9 units, Win (Lougee Chappell, C; Watkins, G)

**SLE 93. Structured Liberal Education**

Three quarter sequence; restricted to and required of SLE students. Comprehensive study of the intellectual foundations of the western tradition in dialogue with eastern, indigenous, and postcolonial perspectives. Modernity as a period in intellectual history and a problem in the human sciences. Authors include Marx, Nietzsche, Freud, Kafka, Woolf, Eliot, and Sartre. GER:DB-Hum, IHUM-3

10 units, Spr (Lougee Chappell, C; Watkins, G)

**SLE 199. Teaching SLE**

1 unit, Aut (Watkins, G), Win (Watkins, G; Lougee Chappell, C), Spr (Watkins, G; Lougee Chappell, C)

**SLE 299. Structured Liberal Education Capstone Seminar**

Senior capstone project for students who were enrolled in SLE their freshman year.

1 unit, Spr (Watkins, G)

## SURGERY (SURG) COURSES

### UNDERGRADUATE COURSES IN SURGERY

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**SURG 68Q. Current Concepts in Transplantation**

(S,Sem) Stanford Introductory Seminar. Preference to sophomores. Biological aspects of cell and organ transplantation, including issues that arise in the media. Diseases for which transplantation is a treatment, the state of the art in human transplantation, transplantation of animal tissue into humans (xenotransplantation), development of new tissue and organs in the laboratory (tissue engineering and cloning), and development of drugs and biological strategies to promote long-term survival of the tissue or organ (tolerance). How to write a scientific abstract, critique scientific

literature, and research and present topics in contemporary transplantation.

3 units, Spr (Martinez, O; Krams, S)

**SURG 69Q. It's All in the Head: Understanding Diversity, Development, and Deformities of the Face**

Preference to sophomores. How the face conveys moods and emotions, and elicits reactions when disease or genetic disorders leave behind disfigurement. New work by evolutionary and molecular biologists concerning how variations in facial form are elicited; how tissues and molecules interact to form the face. How differences in facial anatomy affect an individual's self-perception and their acceptance in our beauty-conscious society.

3-4 units, not given this year

**SURG 70Q. Surgical Anatomy of the Hand: From Rodin to Reconstruction**

(F,Dial) Stanford Introductory Dialogue. The surgical anatomy of the hand is extremely complex in terms of structure and function. Exploration of the anatomy of the hand in different contexts: its representation in art forms, the historical development of the study of hand anatomy, current operative techniques for reconstruction, advances in tissue engineering, and the future of hand transplantation.

2 units, Win (Chang, J)

**SURG 101. Regional Study of Human Structure**

Enrollment limited to seniors and graduate students. Lectures in regional anatomy and dissection of the human cadaver; the anatomy of the trunk and limbs through the dissection process, excluding the head and neck.

5 units, Win (Gosling, J; Whitmore, I)

**SURG 111A. Emergency Medical Technician Training**

(Same as SURG 211A) Basics of life support outside the hospital setting. Topics include emergency patient assessments for cardiac, respiratory, and neurological emergencies, as well as readiness training for emergencies on- and off-campus. Lectures, practicals, and applications. Students taking the class for 4 units complete additional FEMA training and additional clinical rotations. Upon completion of SURG 111A,B,C or 211A,B,C, students are eligible to sit for the National Registry EMT licensure exam. Prerequisites: CPR-PR certification, application (see <http://surg211.stanford.edu>), and consent of instructor.

3-4 units, Aut (Gilbert, G; D'Souza, P; Wheeler, J; Moore, L)

**SURG 111B. Emergency Medical Technician Training**

(Same as SURG 211B) Continuation of 111A/211A. Approach to traumatic injuries. Topics include head, neck, and trunk injuries, bleeding and shock, burn emergencies, and environmental emergencies. Lectures, practicals, and applications. Students taking the class for 4 units complete additional online FEMA training and additional clinical rotations. Upon completion of SURG 111A,B,C or 211A,B,C, students are eligible to sit for the National Registry EMT licensure exam. Prerequisites: 111A/211A, CPR-PR certification, and consent of instructor.

3-4 units, Win (D'Souza, P; Gilbert, G; Moore, L; Wheeler, J)

**SURG 111C. Emergency Medical Technician Training**

(Same as SURG 211C) Continuation of 111B/211B. Special topics in EMS. Topics include pediatric, obstetric, and gynecologic emergencies, EMS operations, mass casualty incidents, and assault. Lectures, practicals, and applications. Students taking the class for 4 units complete additional online FEMA training and additional clinical rotations. Upon completion of SURG 111A,B,C or 211A,B,C, students are eligible to sit for the National Registry EMT certification exam. Prerequisites: 111B/211B, CPR-PR certification, and consent of instructor.

3-4 units, Spr (Staff)

**SURG 112A. Advanced Training and Teaching for the EMT**

(Same as SURG 212A) Ongoing training for current EMS providers. Students practice BLS assessments and medical care through simulated patient encounters. Topics include airway and stroke management, abdominal emergencies, prehospital pharmacology, and teaching skills. Students taking the course for 3 units also serve as teaching assistants for Surgery 111, the Stanford EMT training course. Prerequisites: SURG 111/211 A-C (or equivalent), CPR-PR certification, and consent of instructor.

2-3 units, Aut (Gilbert, G; D'Souza, P; Moore, L; Wheeler, J)

**SURG 112B. Advanced Training and Teaching for the EMT**  
(Same as SURG 212B) Ongoing training for current EMS providers. Students practice BLS assessments and medical care through simulated patient encounters. Topics include assessment and treatment of the undifferentiated trauma patient (including airway management, monitoring, and evaluation) and prehospital care in nontraditional locations. Students taking the course for 3 units also serve as teaching assistants for Surgery 111, the Stanford EMT training course. Prerequisites: SURG 111/211 A-C (or equivalent), CPR-PR certification, and consent of instructor.

*2-3 units, Win (Gilbert, G; D'Souza, P)*

**SURG 112C. Advanced Training and Teaching for the EMT**  
(Same as SURG 212C) Ongoing training for current EMS providers. Students practice BLS assessments and medical care through simulated patient encounters. Topics include mass casualty incidents, assaults, and pediatric emergencies. Expanded scope topics may be included - ACLS, ultrasound, and suturing. Students taking the course for 3 units also serve as teaching assistants for Surgery 111, the Stanford EMT training course. Prerequisites: SURG 111/211 A-C (or equivalent), CPR-PR certification, and consent of instructor.

*2-3 units, Spr (Staff)*

**SURG 150. Principles and Practice of International Medical Humanitarianism in Surgery**

(Same as SURG 250) Open to undergraduate, graduate, and medical students. Focus is on understanding ethical theory behind humanitarianism (utilitarianism, global health equity, and basic human rights), the growing role of surgery in international health, and social innovation and business in the health care sector. Summer internship opportunities for international health service with subsidized travel for top students. Guest speakers include world-renowned physicians, CEOs, and social-medical entrepreneurs.

*4 units, not given this year*

**SURG 199. Undergraduate Research**

Investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

*1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

## GRADUATE COURSES IN SURGERY

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**SURG 201. Basic Cardiac Life Support**

All medical students must be certified in Basic Cardiac Life Support before the end of the first (autumn) quarter. Students who provide documentation of certification received within six months prior to the date of matriculation will be exempted from the requirement. The course teaches one- and two-rescuer CPR, management of an obstructed airway, and CPR for infants and children. Upon completion of the course, students receive an American Heart Association certificate in BLS.

*1 unit, Aut (Smith-Coggins, R; Lee, C)*

**SURG 203A. Human Anatomy**

Introduction to human structure and function presented from a medical perspective. Introduction to the physical examination and frequently-used medical imaging techniques. Students are required to attend lectures, actively participate in seminar groups, and engage in dissection of the human body in the anatomy laboratory. Surgery 203A presents structure of the thorax, abdomen, pelvis and limbs.

*11 units, Aut (Gosling, J; Srivastava, S; Whitmore, I)*

**SURG 203B. Human Anatomy**

Continues the introduction to human structure and function from a medical perspective, the physical examination, and frequently-used medical imaging techniques. Students are required to attend lectures, actively participate in seminar groups, and engage in dissection of the human body in the anatomy laboratory. Surgery 203B presents structure of the head, neck and back.

*4 units, Win (Gosling, J; Whitmore, I; Srivastava, S)*

**SURG 204. Introduction to Surgery**

Designed to give pre-clinical MD students a broad overview of all the surgical specialties. Lectures by leading surgeons from General Surgery, Plastic Surgery, Neurosurgery. Orthopedic

Surgery, Head and Neck Surgery, Transplantation Surgery and Cardiac Surgery highlight the array of diseases and operations performed in their disciplines. In addition, each lecture gives students a roadmap as to how to enter that discipline.

*1 unit, Aut (Greco, R; Lopez, A)*

**SURG 205. Advanced Suturing Techniques**

Builds upon skills taught in the Surgical Interest Group's introductory suturing workshops. Techniques such as suturing in a hole, suturing different tissues, and hand, instrument and laparoscopic knot tying.

*1 unit, Aut (Visser, B; Tran, P)*

**SURG 208. Plastic Surgery Tutorial**

Diagnosis, theory, and practice of plastic and reconstructive surgery. Limited to two students per faculty member.

*2 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**SURG 209. Plastic Surgery**

Students participate in plastic and reconstructive surgery as functioning members of the clinical team. Students are exposed to operative surgery, emergency and trauma care, evaluation of operative candidates in the outpatient setting, and also attend teaching conferences. Limited to four students. Prerequisite: completion of first year or clinical experience.

*1-18 units, Aut (Chang, J; Schendel, S; Lorenz, H; Longaker, M; Gurtner, G; Girod, S; Hentz, V; Lee, G), Win (Chang, J; Schendel, S; Lorenz, H; Longaker, M; Gurtner, G; Girod, S; Hentz, V; Lee, G), Spr (Chang, J; Girod, S; Gurtner, G; Hentz, V; Lee, G;*

**SURG 211A. Emergency Medical Technician Training**

(Same as SURG 111A) Basics of life support outside the hospital setting. Topics include emergency patient assessments for cardiac, respiratory, and neurological emergencies, as well as readiness training for emergencies on- and off-campus. Lectures, practicals, and applications. Students taking the class for 4 units complete additional FEMA training and additional clinical rotations. Upon completion of SURG 111A,B,C or 211A,B,C, students are eligible to sit for the National Registry EMT licensure exam. Prerequisites: CPR-PR certification, application (see <http://surg211.stanford.edu>), and consent of instructor.

*3-4 units, Aut (Gilbert, G; D'Souza, P; Wheeler, J; Moore, L)*

**SURG 211B. Emergency Medical Technician Training**

(Same as SURG 111B) Continuation of 111A/211A. Approach to traumatic injuries. Topics include head, neck, and trunk injuries, bleeding and shock, burn emergencies, and environmental emergencies. Lectures, practicals, and applications. Students taking the class for 4 units complete additional online FEMA training and additional clinical rotations. Upon completion of SURG 111A,B,C or 211A,B,C, students are eligible to sit for the National Registry EMT licensure exam. Prerequisites: 111A/211A, CPR-PR certification, and consent of instructor.

*3-4 units, Win (D'Souza, P; Gilbert, G; Moore, L; Wheeler, J)*

**SURG 211C. Emergency Medical Technician Training**

(Same as SURG 111C) Continuation of 111B/211B. Special topics in EMS. Topics include pediatric, obstetric, and gynecologic emergencies, EMS operations, mass casualty incidents, and assault. Lectures, practicals, and applications. Students taking the class for 4 units complete additional online FEMA training and additional clinical rotations. Upon completion of SURG 111A,B,C or 211A,B,C, students are eligible to sit for the National Registry EMT certification exam. Prerequisites: 111B/211B, CPR-PR certification, and consent of instructor.

*3-4 units, Spr (Staff)*

**SURG 212A. Advanced Training and Teaching for the EMT**

(Same as SURG 112A) Ongoing training for current EMS providers. Students practice BLS assessments and medical care through simulated patient encounters. Topics include airway and stroke management, abdominal emergencies, prehospital pharmacology, and teaching skills. Students taking the course for 3 units also serve as teaching assistants for Surgery 111, the Stanford EMT training course. Prerequisites: SURG 111/211 A-C (or equivalent), CPR-PR certification, and consent of instructor.

*2-3 units, Aut (Gilbert, G; D'Souza, P; Moore, L; Wheeler, J)*

**SURG 212B. Advanced Training and Teaching for the EMT**

(Same as SURG 112B) Ongoing training for current EMS providers. Students practice BLS assessments and medical care

through simulated patient encounters. Topics include assessment and treatment of the undifferentiated trauma patient (including airway management, monitoring, and evaluation) and prehospital care in nontraditional locations. Students taking the course for 3 units also serve as teaching assistants for Surgery 111, the Stanford EMT training course. Prerequisites: SURG 111/211 A-C (or equivalent), CPR-PR certification, and consent of instructor.

*2-3 units, Win (Gilbert, G; D'Souza, P)*

#### **SURG 212C. Advanced Training and Teaching for the EMT**

(Same as SURG 112C) Ongoing training for current EMS providers. Students practice BLS assessments and medical care through simulated patient encounters. Topics include mass casualty incidents, assaults, and pediatric emergencies. Expanded scope topics may be included - ACLS, ultrasound, and suturing. Students taking the course for 3 units also serve as teaching assistants for Surgery 111, the Stanford EMT training course. Prerequisites: SURG 111/211 A-C (or equivalent), CPR-PR certification, and consent of instructor.

*2-3 units, Spr (Staff)*

#### **SURG 220. Emergency Medicine: Introduction**

The specialty of emergency medicine and initial care of emergency patients, both in the pre-hospital phase and in the emergency department. Lectures and/or practical sessions cover: patient assessment; the initial management of the multiple trauma patient; and common medical emergencies, such as poisoning, asthma, and chest pain. Students taking the course for 1 unit must have 50% class attendance and pass the final exam; 2 units constitutes 70% class attendance and passing the final exam; 3 units includes participation in emergency department observation shifts.

*1-3 units, Aut (Chiao, A; White, W)*

#### **SURG 222. Biosecurity and Bioterrorism Response**

(Same as PUBLPOL 122, PUBLPOL 222) Open to medical, graduate, and undergraduate students. Explores the questions of how well the US and global healthcare systems are prepared to withstand a bioterrorism attack, what the parallels are to withstanding a pandemic, what can be done to prevent an attack. How the medical/healthcare field, government, and the technology sectors are involved in biosecurity and bioterrorism response, how these sectors interface, and the multidisciplinary challenges involved. Focus is on current biosecurity challenges, including global bio-surveillance, making the medical diagnosis, isolation, containment, hospital surge capacity, stockpiling and distribution of countermeasures, food and agriculture biosecurity, new promising technologies for detection of bio-threats and countermeasures. 2 unit option for class participation and short paper. 4 unit option includes a research paper.

*2-4 units, Win (Buchman, M)*

#### **SURG 223. Wilderness Medicine**

Open to all students. Wilderness-related illnesses and injuries; a framework for evaluation and treatment of emergencies in the backcountry. Hands-on clinical skills. Topics include high altitude medicine, hypothermia, envenomations, search and rescue, improvisation, and survival medicine. Includes opportunity for certification in Wilderness First Aid (WFA). 3 units includes participation in an Emergency Department observation shift and a day-long field-trip for hands-on field work.

*2-3 units, Spr (Staff)*

#### **SURG 228. Introduction to Vascular Disease and Treatment**

Develops basic interventional skills using hands-on endovascular simulation in multiple vascular beds. Designed for students interested in careers in vascular surgery, interventional cardiology, interventional radiology, and vascular medicine. Topics: peripheral vascular disease, angiography, SFA interventions, aortoiliac disease; visceral vascular disease and renal interventions, cerebrovascular disease and carotid intervention lab; frontiers in vascular disease.

*1 unit, Aut (Lee, J), Win (Lee, J)*

#### **SURG 229. Advanced Vascular Disease and Treatment**

Designed for students interested in careers in vascular surgery and vascular medicine. Expands upon the basic physiology, pathology, and skills learned in SURG 228. Topics: renal disease, cerebrovascular disease and carotid interventions, AAA disease and intervention, DVT disease, the future of vascular surgery. Centered on simulation based learning, student presentations, and

discussion. Prerequisite: SURG 228

*1 unit, Spr (Staff)*

#### **SURG 230. Obesity in America**

Prevalence and effects of the obesity epidemic in America and the growing prevalence of associated comorbidities such as diabetes, hypertension, hyperlipidemia, sleep apnea, and joint problems. Risk factors, multi-disciplinary treatment options, the role of food in society, patients' perspectives, and current research in the field.

*1 unit, Win (Morton, J; Lodhia, N)*

#### **SURG 231. Haiti and Healthcare**

Originally developed to highlight healthcare in extreme poverty in Haiti, related lectures have been added covering healthcare in resource poor environments with the objective to introduce students to the complexity and unique problems of working in the Third World's healthcare morass.

*1 unit, Spr (Staff)*

#### **SURG 250. Principles and Practice of International Medical Humanitarianism in Surgery**

(Same as SURG 150) Open to undergraduate, graduate, and medical students. Focus is on understanding ethical theory behind humanitarianism (utilitarianism, global health equity, and basic human rights), the growing role of surgery in international health, and social innovation and business in the health care sector. Summer internship opportunities for international health service with subsidized travel for top students. Guest speakers include world-renowned physicians, CEOs, and social-medical entrepreneurs.

*4 units, not given this year*

#### **SURG 254. Operative Anatomy and Techniques**

For preclinical students; provides a background in and integrates knowledge of surgical anatomy and therapy. Surgical or operative anatomy differs from gross anatomy in that the area exposed during surgery may be limited, the dissection may require exposing other seemingly unrelated anatomic structures with unique landmarks, and the procedure may require unusual technical facility. The course provides an opportunity for students to understand the goals of representative surgical procedures (translating pathophysiology to surgical decision making to actual incision). Students learn surgical skills and perform the dissection of a number of commonly performed operations in the cadaver laboratory. The course emphasizes hands-on participation in surgical procedures in the laboratory and is taught by attending physicians in general, cardiothoracic, vascular, plastic, head and neck, urologic, and orthopedic surgery.

*1 unit, Win (Srivastava, S; Fann, J; Johannet, P)*

#### **SURG 280. Early Clinical Experience in Surgery**

Provides an observational experience in a surgery specialty. Prerequisite: consent of instructor.

*1-2 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

#### **SURG 290. Fundamentals of Digital Anatomy: Techniques, Methods, and Applications**

Explores the power of digital anatomy. How 3D anatomical data sets are created from human specimens; how they are processed, analyzed, and rendered. Focus on how digital content is best used for learning anatomy, patient education, and clinical practice. May be taken for 1 unit (lecture only) or 3 units (lecture and practicum).

*1-3 units, Spr (Staff)*

#### **SURG 296. Individual Work: Human Anatomy**

Carried out under the supervision of one or more members of the staff. Prerequisite: consent of instructor.

*1-18 units, Aut (Whitmore, I; Gosling, J; Srivastava, S), Win (Whitmore, I; Gosling, J; Srivastava, S), Spr (Whitmore, I; Gosling, J; Srivastava, S), Sum (Whitmore, I; Gosling, J; Srivastava, S)*

#### **SURG 298. Procedure-based-specialty Preparation Boot Camp**

Designed for graduating medical students pursuing a procedure-based residency or internship (e.g. gynecology, dermatology, surgery, interventional radiology). Incorporates in both skills and simulation workshops the basic skills required of residents and interns in procedure-based specialties with a review of relevant anatomy as it relates to these procedures. An opportunity for students to become facile with basic procedural skills and anatomic principles prior to entering their residencies or internships. Prerequisite: graduating medical student.

1 unit, Win (Staff)

### **SURG 299. Directed Reading in Surgery**

Consists of studies in progress, including cardiovascular and circulatory problems; gastric physiology; hemostatic disorders; homotransplantation; liver disorders; orthopedic pathology; bone growth; radiation injury; immunology, bacteriology, pathology, and physiology of the eye; physiological optics; comparative ophthalmology; neurophysiology of hearing; spatial orientation and disorientation; nasal function; and psychophysics of sensation. Prerequisite: consent of instructor.

1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### **SURG 370. Medical Scholars Research**

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

4-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

### **SURG 399. Graduate Research**

Students undertake investigations sponsored by individual faculty members.

1-18 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

## SYMBOLIC SYSTEMS (SYMSYS) COURSES

### **UNDERGRADUATE COURSES IN SYMBOLIC SYSTEMS**

Primarily for undergraduates; graduate students may enroll with consent of adviser.

#### **SYMSYS 100. Introduction to Cognitive and Information Sciences**

(Same as LINGUIST 144, PHIL 190, PSYCH 132) The history, foundations, and accomplishments of the cognitive sciences, including presentations by leading Stanford researchers in artificial intelligence, linguistics, philosophy, and psychology. Overview of the issues addressed in the Symbolic Systems major. GER:DB-SocSci

4 units, Spr (Goodman, N)

#### **SYMSYS 145. Cognition in Interaction Design**

(Same as SYMSYS 245) Interactive systems from the standpoint of human cognition. Topics include skill acquisition, complex learning, reasoning, language, perception, methods in usability testing, special computational techniques such as intelligent and adaptive interfaces, and design for people with cognitive disabilities. Students conduct analyses of real world problems of their own choosing and redesign/analyze a project of an interactive system. GER:DB-SocSci

3 units, Win (Shrager, J)

#### **SYMSYS 170. Decision Behavior: Theory and Evidence**

(Same as SYMSYS 270) Introduction to the study of judgment and decision making, relating theory and evidence from disciplines such as psychology, economics, statistics, neuroscience, and philosophy. The development and critique of Homo economicus as a model of human behavior, and more recent theories based on empirical findings. Recommended: background in formal reasoning.

3-4 units, not given this year

#### **SYMSYS 190. Senior Honors Tutorial**

Under the supervision of their faculty honors adviser, students work on their senior honors project. May be repeated for credit.

1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

#### **SYMSYS 191. Senior Honors Seminar**

Recommended for seniors doing an honors project. Under the leadership of the Symbolic Systems program coordinator, students discuss, and present their honors project.

1 unit, Aut (Davies, T)

#### **SYMSYS 196. Independent Study**

Independent work under the supervision of a faculty member. Can be repeated for credit.

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

## GRADUATE COURSES IN SYMBOLIC SYSTEMS

Primarily for graduate students; undergraduates may enroll with consent of instructor.

#### **SYMSYS 200. Symbolic Systems in Practice**

Applying a Symbolic Systems education at Stanford and outside. The basics of research and practice. Students develop and present a project, and investigate different career paths, including academic, industrial, professional, and public service, through interviews with alumni.

2-3 units, Win (Davies, T)

#### **SYMSYS 201. ICT, Society, and Democracy**

The impact of information and communication technologies on social and political life. Interdisciplinary. Classic and contemporary readings focusing on topics such as social networks, virtual versus face-to-face communication, the public sphere, voting technology, and collaborative production.

3 units, Spr (Davies, T)

#### **SYMSYS 206. Topics in the Philosophy of Neuroscience**

Preference to Undergraduates. Focus is literature in philosophy and neuroscience whose topics include perception, memory, neurophenomenology, sensorimotor accounts of consciousness, computational models, and eliminativism, among others. Prerequisites: Familiarity with philosophy (Phil 80) or neuroscience.

3 units, not given this year

#### **SYMSYS 209. Battles Over Bits**

The changing nature of information in the Internet age and its relationship to human behavior. Philosophical assumptions underlying practices such as open source software development, file sharing, common carriage, and community wireless networks, contrasted with arguments for protecting private and commercial interests such as software patents, copy protection, copyright infringement lawsuits, and regulatory barriers. Theory and evidence from disciplines including psychology, economics, computer science, law, and political science. Prerequisite: PSYCH 40, 55, 70, or SYMBSYS 202.

3 units, not given this year

#### **SYMSYS 210. Learning Facial Emotions: Art and Psychology**

Artistic and psychological learning approaches for emotion recognition from facial expressions. The advantages of learning by image-based microexpressions, subtle expressions, macro expressions, art drawing and actor mimicry when there are cognitive deficits due to conditions such as autism. Comparative analysis uses brain studies, learning theory, and human-computer interaction. Studio component conveys the artistic and psychological approaches. Prerequisites: PSYCH 1, SYMSYS 100 or consent of instructor. Go to [www.stanford.edu/~dwilkins/Symsys210Enroll.doc](http://www.stanford.edu/~dwilkins/Symsys210Enroll.doc) to sign up for a Permission Number.

3 units, not given this year

#### **SYMSYS 211. Learning Facial Emotions: Art, Psychology, Human-Computer Interaction**

Learning to recognize facial emotions by drawing a live model versus the psychology method of using classified images of subtle and micro expressions. Dimensions of analysis include cognitive modeling and neuroscience. The design of human-computer interaction systems for people with cognitive deficits such as autism and Aspergers, which integrate the art and psychology approaches using methods such as robot heads, avatars, and facial recognition software. Prerequisites: PSYCH 1 or consent of instructor.

3 units, not given this year

#### **SYMSYS 245. Cognition in Interaction Design**

(Same as SYMSYS 145) Interactive systems from the standpoint of human cognition. Topics include skill acquisition, complex learning, reasoning, language, perception, methods in usability testing, special computational techniques such as intelligent and adaptive interfaces, and design for people with cognitive disabilities. Students conduct analyses of real world problems of their own choosing and redesign/analyze a project of an interactive



system.

3 units, Win (Shrager, J)

**SYMSYS 270. Decision Behavior: Theory and Evidence**

(Same as SYMSYS 170) Introduction to the study of judgment and decision making, relating theory and evidence from disciplines such as psychology, economics, statistics, neuroscience, and philosophy. The development and critique of Homo economicus as a model of human behavior, and more recent theories based on empirical findings. Recommended: background in formal reasoning.

3-4 units, not given this year

**SYMSYS 280. Symbolic Systems Research Seminar**

A mixture of public lectures of interest to Symbolic Systems students (the Symbolic Systems Forum) and student-led meetings to discuss research in Symbolic Systems. Can be repeated for credit. Open to both undergraduates and Master's students.

1 unit, Aut (Staff), Win (Staff), Spr (Staff)

**SYMSYS 290. Master's Degree Project**

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**SYMSYS 291. Master's Program Seminar**

Enrollment limited to students in the Symbolic Systems M.S. degree program. May be repeated for credit.

1 unit, Aut (Davies, T), Win (Davies, T), Spr (Davies, T)

**SYMSYS 296. Independent Study**

Independent work under the supervision of a faculty member. Can be repeated for credit.

1-15 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

**SYMSYS 299. Curricular Practical Training**

Students obtain employment in a relevant research or industrial activity to enhance their professional experience consistent with their degree programs. Meets the requirements for curricular practical training for students on F-1 visas. Students submit a concise report detailing work activities, problems worked on, and key results. May be repeated for credit. Prerequisite: qualified offer of employment and consent of advisor.

1 unit, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)

## TIBETAN LANGUAGE (TIBETLNG) COURSES

### UNDERGRADUATE COURSES IN TIBETAN LANGUAGE

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**TIBETLNG 1. First-Year Tibetan, First Quarter**

Grammar, reading, and composition. Tibetan culture and the Tibetan view of reality.

4 units, Aut (Clark, R)

**TIBETLNG 2. First Year Tibetan, Second Quarter**

Continuation of 1.

4 units, Win (Clark, R)

**TIBETLNG 3. First Year Tibetan, Third Quarter**

Continuation of 2.

4 units, Spr (Clark, R)

**TIBETLNG 13. Intermediate Tibetan, Third-Quarter**

Continuation of 12.

4 units, not given this year

**TIBETLNG 21. Intermediate/Advanced Tibetan, First Quarter**

4 units, Aut (Clark, R)

**TIBETLNG 22. Intermediate/Advanced Tibetan, Second Quarter**

4 units, Win (Clark, R)

**TIBETLNG 23. Intermediate/Advance Tibetan, Thrid Quarter**

4 units, Spr (Clark, R)

**TIBETLNG 199. Individual Work**

May be repeated for credit. Prerequisite: consent of instructor.

1-5 units, Aut (Staff), Win (Staff), Spr (Staff)

## GRADUATE COURSES IN TIBETAN LANGUAGE

Primarily for graduate students; undergraduates may enroll with consent of instructor.

**TIBETLNG 395. Graduate Studies in Tibetan**

May be repeated for credit. Prerequisite: consent of instructor.

2-5 units, Aut (Staff), Win (Staff), Spr (Staff)

## URBAN STUDIES (URBANST) COURSES

### UNDERGRADUATE COURSES IN URBAN STUDIES

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**URBANST 100ASB. Pre-field Course for Urban Studies Alternative Spring Break**

Limited to students participating in the Alternative Spring Break program. See <http://asb.stanford.edu> for more information.

1 unit, Win (McLennan, W)

**URBANST 110. Utopia and Reality: Introduction to Urban Studies**

The study of cities and urban civilization. History of urbanization and current issues such as suburbanization, racial discrimination, globalization, and urban sustainability. Public policies designed to address these issues and Utopian versions of what cities could be in the future. GER:DB-SocSci, EC-AmerCul

4 units, Aut (Stout, F), Spr (Stout, F)

**URBANST 112. The Urban Underclass**

(Same as SOC 149, SOC 249) (Graduate students register for 249.) Recent research and theory on the urban underclass, including evidence on the concentration of African Americans in urban ghettos, and the debate surrounding the causes of poverty in urban settings. Ethnic/racial conflict, residential segregation, and changes in the family structure of the urban poor. GER:DB-SocSci, EC-AmerCul

5 units, Spr (Rosenfeld, M)

**URBANST 113. Introduction to Urban Design: Contemporary Urban Design in Theory and Practice**

Comparative studies in neighborhood conservation, inner city regeneration, and growth policies for metropolitan regions. Lect-disc and research focusing on case studies from North America and abroad, team urban design projects. Two class workshops in San Francisco Sat Jan 15 and Jan 29. Terms: Win | Units: 5 | UG Reqs: GER:DBSocSci | Grading: Letter (ABCD/NP) Instructors: Gast, G. GER:DB-SocSci

5 units, Win (Gast, G)

**URBANST 114. Cities in Comparative Perspective**

(Same as ANTHRO 126) Core course for Urban Studies majors. We will study urban space both historically and cross-culturally. Urban Studies, by definition, is an interdisciplinary field, where the methodological approaches draw upon a diverse set of analytic tools. Disciplines that occupy a prominent place in this class are geography, cultural anthropology, sociology, history, media studies, and literature. In this context, we will discuss the importance of cities around the world to the economic, cultural, and political well-being of modern societies and examine how forces such as industrialization, decentralization, and globalization affect the structure and function of cities. GER:DB-SocSci

5 units, Spr (Kapur, C)

**URBANST 115. Urban Sustainability: Long-Term Archaeological Perspectives**

(Same as CLASSGEN 123, CLASSGEN 223) Comparative and archaeological view of urban design and sustainability. How fast changing cities challenge human relationships with nature. Innovation and change, growth, industrial development, the consumption of goods and materials. Five millennia of city life including Near Eastern city states, Graeco-Roman antiquity, the Indus Valley, and the Americas.



3-5 units, Aut (Shanks, M)

**URBANST 122. Ethics and Politics of Public Service**

(Same as CSRE 178, ETHICSOC 133, HUMBIO 178, PHIL 175A, PHIL 275A, POLISCI 133) Ethical and political questions in public service work, including volunteering, service learning, humanitarian assistance, and public service professions such as medicine and teaching. Motives and outcomes in service work. Connections between service work and justice. Is mandatory service an oxymoron? History of public service in the U.S. Issues in crosscultural service work. Integration with the Haas Center for Public Service to connect service activities and public service aspirations with academic experiences at Stanford. GER:DB-SocSci

5 units, Win (Mitchell, T)

**URBANST 123. Approaching Research and the Community**

Comparative perspective on research with communities and basic overview of research methodologies, with an emphasis on the principles and practices of doing community-based research as a collaborative enterprise between academic researchers and community members. How academic scholarship can be made useful to communities. How service experiences and interests can be used to develop research questions in collaboration with communities and serve as a starting point for developing senior theses or other independent research projects.

2 units, Spr (Staff)

**URBANST 126. Spirituality and Nonviolent Urban and Social Transformation**

(Same as RELIGST 162) A life of engagement in social transformation is often built on a foundation of spiritual and religious commitments. Case studies of nonviolent social change agents including Rosa Parks in the civil rights movement, César Chávez in the labor movement, and William Sloane Coffin in the peace movement; the religious and spiritual underpinnings of their commitments. Theory and principles of nonviolence. Films and readings. Service learning component includes placements in organizations engaged in social transformation. Service Learning Course (certified by Haas Center). GER:DB-Hum

5 units, Win (Sanders, J; Karlin-Neumann, P)

**URBANST 127. COMMUNITY PLANNING WORKSHOP**

4-5 units, not given this year

**URBANST 127. Community Planning Workshop**

Students work in teams to conduct research, analyze and evaluate alternatives, and make recommendations for possible solutions to local community development issues. Students work with community partners to blend theory and practice to accomplish a community based project.

4-5 units, not given next year

**URBANST 128. Community Mapping Practicum**

Students will use mapping techniques to explore community planning and policy issues in Redwood City. Focusing on building other skills including teamwork, writing, and oral communication. GIS is not a prerequisite.

4 units, not given this year

**URBANST 131. Social Innovation and the Social Entrepreneur**

Invited lecture series. Perspectives and endeavors of thought leaders and entrepreneurs who address social needs in the U.S. and internationally through private for-profit and nonprofit organizations, nongovernmental organizations, or public institutions.

1 unit, Aut (Edwards, M)

**URBANST 132. Concepts and Analytic Skills for the Social Sector**

How to create and grow innovative, non-profit and for-profit ventures which have the primary goal of solving social and environmental problems. Topics include organizational mission, strategy, marketing, financing and evaluation. Opportunities and limits of methods from the for-profit sector to meet social goals. Perspectives from the field of social entrepreneurship. Focus is on integrating theory with practical applications. Enrollment limited to 20. Prerequisite: consent of instructor. GER:DB-SocSci

4 units, Win (Litvak, L)

**URBANST 133. Social Entrepreneurship Collaboratory**

Interdisciplinary student teams create and develop U.S. and

international social entrepreneurship initiatives. Proposed initiatives may be new entities, or innovative projects, partnerships, and/or strategies impacting existing organizations and social issues in the U.S. and internationally. Focus is on each team's research and on planning documents to further project development. Project development varies with the quarter and the skill set of each team, but should include: issue and needs identification; market research; design and development of an innovative and feasible solution; and drafting of planning documents. In advanced cases, solicitation of funding and implementation of a pilot project. Enrollment limited to 30. May be repeated for credit. Prerequisites: 131 and 132, or consent of instructor.

4 units, Aut (Edwards, M), Spr (Scher, L)

**URBANST 137. Innovations in Microcredit and Development Finance**

The role of innovative financial institutions in supporting economic development, the alleviation of rural and urban poverty, and gender equity. Analysis of the strengths and limits of commercial banks, public development banks, credit unions, and microcredit organizations both in the U.S. and internationally. Readings include academic journal articles, formal case studies, evaluations, and annual reports. Priority to students who have taken any portion of the social innovation series: URBANST 131, 132, or 133. Recommended: ECON 1A or 1B.

4 units, Spr (Kieschnick, M)

**URBANST 160. Environmental Policy and the City in U.S.**

**History**

Looks at the historical backgrounds of current issues in urban environmental policy, including waste, transportation, air pollution, and other major issues. Covers the period 1800 to the present. Explores the relevance of historical scholarship

5 units, Win (Staff)

**URBANST 161. U.S. Urban History since 1920**

The end of European immigration and its impact on cities; the Depression and cities; WW II and the martial metropolis; de-industrialization; suburbanization; African American migration; urban renewal; riots, race, and the narrative of urban crisis; the impact of immigration from Asia, Latin America, and Africa; homelessness; the rise of the Sunbelt cities; gentrification; globalization and cities. Final project is history of a San Francisco neighborhood, based on primary sources and site visit. GER:DB-SocSci, EC-AmerCul

5 units, Spr (Kahan, M)

**URBANST 162. Managing Local Governments**

In-the-trenches approach. Issues in leading and managing local governments in an era of accelerating and discontinuous change. Focus is on practical strategies related to financing, public services impacted by increasing demand and revenue constraints, the politics of urban planning, private-public partnerships, public sector marketing, entrepreneurial problem solving, promoting a learning and risk-taking organizational culture, and developing careers in local government. Enrollment limited to 25; preference to Urban Studies majors. GER:DB-SocSci

4 units, not given this year

**URBANST 163. Land Use Control**

Methods of land use control related to the pattern and scale of development and the protection of land and water resources. Emphasis is on the relationship between the desired land use goal and geographical landscape, physical externalities, land use law, and regulatory agencies. Topics include the historical roots of modern land use controls; urban reforms of the 19th century; private ownership of land; zoning; local, state, and federal land use regulation; and land trusts preservation. Smart growth, environmental impact consideration, private property rights, and special purpose agencies are related to current issues. GER:DB-SocSci

4 units, not given this year

**URBANST 164. Sustainable Cities**

Focus is on the prospects for urban sustainability, including social, economic and environmental dimensions. Course examines the main problems facing urban areas, how they are assessed, and the policies and programs that try to address them through a team-based service learning project. Topics depend on projects but

potentially include sustainability indicators, ecological footprint, air and water quality, climate change, and sustainable energy and transportation policies.

4-5 units, Spr (Boudet, H)

**URBANST 165. Sustainable Urban and Regional Transportation Planning**

Environmental, economic, and equity aspects of urban transportation in 21st-century U.S. Expanded choices in urban and regional mobility that do not diminish resources for future generations. Implications for the global environment and the livability of communities. GER:DB-SocSci

4-5 units, Aut (Kott, J)

**URBANST 166. East Palo Alto: Reading Urban Change**

Examines the changes in East Palo Alto's build environment, economy, and civil society since the 1990s. Focus on the redevelopment of the Whiskey Gulch / Over the Ramp section into University Circle. Students use archived film footage to analyze the history.

5 units, Win (Kahan, M)

**URBANST 171. Urban Design Studio**

The practical application of urban design theory. Projects focus on designing neighborhood and downtown regions to balance livability, revitalization, population growth, and historic preservation.

5 units, Spr (Glanz, D)

**URBANST 190. Urban Professions Seminar**

Workshop. Contemporary practice of urban design and planning, community development, urban education, public service law, and related fields. Topics depend partly on student interests. Bay Area professionals lecture and respond to questions concerning their day-to-day work, impressions of their field, and the academic background recommended for their work.

1 unit, not given this year

**URBANST 194. Internship in Urban Studies**

For Urban Studies majors only. Students organize an internship in an office of a government agency, a community organization, or a private firm directly relevant to the major. Reading supplements internship. Paper summarizes internship experience and related readings.

2-4 units, Aut (Staff), Win (Staff), Spr (Staff)

**URBANST 195. Special Projects in Urban Studies**

1-5 units, Aut (Staff), Win (Staff), Spr (Staff)

**URBANST 197. Directed Reading**

1-5 units, Aut (Kahan, M), Win (Staff), Spr (Kahan, M)

**URBANST 198. Senior Research in Public Service**

Limited to seniors approved by their departments for honors thesis and admitted to the year-round Public Service Scholars Program sponsored by the Haas Center for Public Service. What standards in addition to those expected by the academy apply to research conducted as a form of public service? How can communities benefit from research? Theory and practice of research as a form of public service readings, thesis workshops, and public presentation of completed research. May be repeated for credit. Corequisite: 199.

1-3 units, Aut (Visconti, V), Win (Visconti, V), Spr (Staff)

**URBANST 199. Senior Honors Thesis**

1-10 units, Aut (Staff), Win (Staff), Spr (Staff)

**URBANST 201. Preparation for Senior Project**

(Same as SOC 201) First part of capstone experience for Urban Studies majors pursuing an internship-based research project or honors thesis. Assignments culminate in a research proposal, which may be submitted for funding. Students also identify and prepare for a related internship, normally to begin in Spring Quarter in URBANST 201B or in Summer. Research proposed in the final assignment may be carried out in Spring or Summer Quarter; consent required for Autumn Quarter research. Service Learning Course (certified by Haas Center).

5 units, not given this year

**URBANST 201A. Capstone Internship in Urban Studies**

Restricted to Urban Studies majors. Students work at least 80 hours with a supervisor, establish learning goals, and create products demonstrating progress. Reflection on service and integration of internship with senior research plans. Must be

completed by start of Winter Quarter senior year. May continue for additional quarter as 194. Service Learning Course (certified by Haas Center). Corequisite: URBANST 201 or consent of instructor.

3 units, Aut (Kahan, M), Win (Kahan, M), Spr (Kahan, M)

**URBANST 201B. Capstone Internship Seminar**

Students carry out an internship of at least 80 hours with a community organization or government agency. Class meets weekly to discuss related issues, including ethics of service, combining service and research, navigating organizational dynamics, and setting and accomplishing internship goals. Students submit internship agreement and internship-related deliverables, and give in-class presentations.

3-4 units, Spr (Kahan, M)

**URBANST 202. Preparation for Senior Research**

(Same as SOC 202) Primarily for juniors in Sociology; sophomores who plan to be off-campus Winter Quarter of their junior year may register with consent of instructor. Students write a research prospectus and grant proposal, which may be submitted for funding. Research proposal in final assignment may be carried out in Spring or Summer Quarter; consent required for Autumn Quarter research.

5 units, Win (McAdam, D)

**URBANST 203. Senior Seminar**

Conclusion of capstone sequence. Students write a substantial paper based on the research project developed in 201 or 202. Students in the honors program may incorporate paper into their thesis. Guest scholar chosen by students. WIM

5 units, Aut (Kahan, M)

## WRITING AND RHETORIC, PROGRAM IN (PWR) COURSES

### UNDERGRADUATE COURSES IN WRITING AND RHETORIC, PROGRAM IN

Primarily for undergraduates; graduate students may enroll with consent of adviser.

**PWR 1AH. Writing & Rhetoric 1: The Rhetoric of American Multicultural Experience**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Exploration of multicultural experience and cultural assimilation, focusing on the theme of social acceptance. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)

4 units, Win (Heredia, A)

**PWR 1AO. Writing & Rhetoric 1: Visual Rhetoric Across the Globe: Capturing Culture in Images**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Analysis of styles of leadership across the globe and communication strategies used to bring about change. Exploration of how global leaders learn cross-cultural rhetoric skills to adapt to dynamic and unfamiliar situations. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)

4 units, Aut (O'Brien, A)

**PWR 1AT. Writing & Rhetoric 1: A Mountain for Itself: The Rhetoric of Wilderness**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)

4 units, Win (Todhunter, A)

**PWR 1CA. Writing & Rhetoric 1: The Rhetoric of Gaming**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based

argument using multiple sources. Individual conferences with instructor. Topics include how gameplay in a variety of genres operates as argument about cultural values and how games function as sites of community building, social networking, and learning. Students produce research-based arguments on these issues and merge practice and production in storyboarding rhetorically persuasive games. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)

*4 units, Aut (Alfano, C), Spr (Alfano, C)*

**PWR 1CK. Writing & Rhetoric 1: Reading the Newspaper**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)

*4 units, Aut (Kamrath, C), Spr (Kamrath, C)*

**PWR 1CR. Writing & Rhetoric 1: Writing Nature: Discourses in Ecology, Culture, and Technology**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Inquiry into human relationships with nature and how these influence ethical choices and social justice. See [http://ual.stanford.edu/AP/univ\\_req/PWR/Courses.html](http://ual.stanford.edu/AP/univ_req/PWR/Courses.html)

*4 units, Aut (Ross, C), Win (Ross, C), Spr (Ross, C)*

**PWR 1D. Writing Well: An Introduction to College Writing**

Offered only to participants in the Summer College for High School Students. Develops critical reading, writing, and research skills applicable to any area of study. Emphases include close reading, analysis of varied texts, development of strong theses, revision strategies, and introduction to research-based argument. Classes are small, encouraging extensive interaction between students and instructors. Discussions of readings, peer work, and individual conferences with instructors. Each section has a thematic emphasis developed by the instructor; students choose sections based on their individual interests. Does not meet the Stanford first-year writing requirement.

*3 units, Sum (Staff)*

**PWR 1DC. Writing & Rhetoric 1: Is This What a Feminist Looks Like? Race/Gender in the Obama Age**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Study of the coverage of and activism in a post-racial U.S., including evaluation of the debate over the intersections of racial activism and feminist activism in U.S. politics. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)

*4 units, not given this year*

**PWR 1DH. Writing & Rhetoric 1: The Virtue of Vice and the Vice of Virtue: The Rhetoric of Criminality**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Students investigate language and images that construct criminals, analyzing how these representations shape personal and cultural beliefs. Analysis of the costs and benefits of retributive, restorative, and transformative justice systems. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)

*4 units, Aut (Hunter, D)*

**PWR 1DW. Writing & Rhetoric 1: Gangsters, Glamour Girls & Gold-diggers: Dialectic of Am. Culture & Hollywood**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Analysis of the rhetoric of American film and its conversation with American culture. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)

*4 units, not given this year*

**PWR 1EE. Writing & Rhetoric 1: Wishy-Washy or Wise?:**

**The Rhetoric of Ambivalence**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)

*4 units, Aut (Ellis, E), Win (Ellis, E)*

**PWR 1GAC. Writing & Rhetoric 1: Protest Art!: The Rhetoric of Art as Social Activism**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Analysis of the rhetoric of art in drawing our attention to social issues such as racism, poverty, sexism, and homophobia and in moving us to social action. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)

*4 units, not given this year*

**PWR 1GAF. Writing & Rhetoric 1: Little Boxes: The Rhetoric of the American Suburb**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Examination of the suburbs as a site of cultural debate through investigation of the ways that authors and artists imagine the physical landscape of the suburb and the inner lives of suburbanites. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)

*4 units, not given this year*

**PWR 1GAJ. Writing & Rhetoric 1: The Rhetoric of Eating**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)

*4 units, not given this year*

**PWR 1GAT. Writing & Rhetoric 1: Size Matters: The Writing and Rhetoric of Short Stories**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)

*4 units, not given this year*

**PWR 1GAW. Writing & Rhetoric 1: Global Exchange: Rhetoric in a World Context**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. The American cultural apparatus, its limitations, and development of other world views. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)

*4 units, Aut (Watters, A), Spr (Watters, A)*

**PWR 1GAZ. Writing & Rhetoric 1: From Cradle to Grave: The Rhetoric of Age and Aging**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Topics include the history of aging in America; developments in reproductive science; the proverbial mid-life crisis; and how people cope with the ultimate horizon of death. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)

*4 units, not given this year*

**PWR 1GBA. Writing & Rhetoric 1: RHETORIC OF BEN ALLEN**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)

*4 units, Win (Allen, B), Spr (Allen, B)*

**PWR 1GBB. PWR 1: RHET OF BILSKY**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

*4 units, Win (Bilsky, B), Spr (Bilsky, B)*

**PWR 1GBJ. Writing & Rhetoric 1: The Rhetoric of Cultural Memories of Violence**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)

*4 units, not given this year*

**PWR 1GBW. Writing & Rhetoric 1: Deathbeds: Art and the Rhetoric of Disease**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)

*4 units, not given this year*

**PWR 1GCH. Writing & Rhetoric 1: Rhetoric of Dalglish**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

*4 units, Win (Chew, D), Spr (Chew, D)*

**PWR 1GCJ. Writing & Rhetoric 1: El Otro Lado / The Other Side: The rhetoric of real and imagined borders**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. The physical border between the United States and Mexico is the focus of the examination of the artistic, scholarly, and political rhetoric of real and imagined borders. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)

*4 units, not given this year*

**PWR 1GCL. Writing & Rhetoric 1: Rhetoric of Ledbetter**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

*4 units, Win (Ledbetter, A), Spr (Ledbetter, A)*

**PWR 1GCX. Writing & Rhetoric 1: I Do: The Rhetoric of Consent**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Examination of the idea of consent and the underlying principles of free will and autonomy in the fields of law, intellectual property, marriage contracts, political philosophy, medical ethics, and sex. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)

*4 units, not given this year*

**PWR 1GCZ. Writing & Rhetoric 1: It Never Got Weird Enough For Me: The Rhetoric of Intoxication**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)

*4 units, not given this year*

**PWR 1GDM. Writing & Rhetoric 1: Rhetoric of Mong**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [\[bin/drupal\\\_ual/AP\\\_univ\\\_req\\\_PWR\\\_Courses.html\]\(http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\_ual/AP\_univ\_req\_PWR\_Courses.html\).](http://www.stanford.edu/dept/undergrad/cgi-</a></p>
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*4 units, Win (Mong, D), Spr (Mong, D)*

**PWR 1GEJ. Writing & Rhetoric 1: Rhetoric of Johnson**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

*4 units, Win (Johnson, E), Spr (Johnson, E)*

**PWR 1GER. Writing & Rhetoric 1: The Rhetoric of Social Media**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Exploration of the multifaceted and hypertextual rhetoric of social media, the intersection between rhetoric and social media, and how new types of online media have heightened participation, openness, and a sense of community. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)

*4 units, not given this year*

**PWR 1GEV. Writing & Rhetoric 1: All the World's a Stage: The Rhetoric of Theater**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Students investigate the role theater plays in the rhetorical strategies of various literary and non-literary texts as well as visual materials such as films and cartoons. See [http://ual.stanford.edu/AP/univ\\_req/PWR/Req.html](http://ual.stanford.edu/AP/univ_req/PWR/Req.html).

*4 units, not given this year*

**PWR 1GFR. Writing & Rhetoric 1: Rhetoric of Morgan Frank**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

*4 units, Win (Frank, E), Spr (Frank, E)*

**PWR 1GGH. Writing & Rhetoric 1: Understanding American Political Speeches of the 20th and 21st Centuries**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Rhetorical analyses of speeches by a range of 20th-century American political figures and the political rhetoric of the present day. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)

*4 units, not given this year*

**PWR 1GHJ. Writing & Rhetoric 1: The Rhetoric of The Economist**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Analysis of the strategies that produce The Economist magazine's rhetorically effective yet anonymous voice. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)

*4 units, Aut (Janiszewska, H)*

**PWR 1GHW. Writing & Rhetoric 1: Rhetoric of Hannah Walser**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

*4 units, Win (Walser, H), Spr (Walser, H)*

**PWR 1GIF. Writing & Rhetoric 1: Dark Humor: A Rhetoric of Social Taboos**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Study of dark humor as it deals with the most delicate subject matter, topics we designate as sacred and beyond criticism:

violence and bodily damage, illness, aging and death, race and ethnicity, and gender and sexuality. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)  
*4 units, not given this year*

**PWR 1GJD. Writing & Rhetoric 1: Rhetoric of J.D. Porter**  
 Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).  
*4 units, Win (Porter, J), Spr (Porter, J)*

**PWR 1GJE. Writing & Rhetoric 1: Gay Ghettoes, Queer Hoods: The Rhetoric of Race and Urban Sexual Subcultures**  
 Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Study of the rhetoric of urban sexual subcultures, and how the rhetoric in medical science, journalism, and popular entertainment defines queers of color in intellectual thought and pop culture. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)  
*4 units, not given this year*

**PWR 1GJM. Writing & Rhetoric 1: The Rhetoric of California**  
 Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://ual.stanford.edu/AP/univ\\_req/PWR/Courses.html](http://ual.stanford.edu/AP/univ_req/PWR/Courses.html).  
*4 units, not given this year*

**PWR 1GJS. Writing & Rhetoric 1: Our Warded World: The Rhetoric of Conservation**  
 Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)  
*4 units, not given this year*

**PWR 1GJW. Writing & Rhetoric 1: I Know It When I Hear It: The Rhetoric of the Unspeakable**  
 Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)  
*4 units, not given this year*

**PWR 1GKL. Writing & Rhetoric 1: The Use and Abuse of Civil Debate: The Rhetoric of Collective Thinking**  
 Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).  
*4 units, Aut (Ligda, K)*

**PWR 1GLA. Writing & Rhetoric 1: Code Orange: Post-9/11 America and the Rhetoric of Alarm**  
 Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)  
*4 units, not given this year*

**PWR 1GLD. Writing & Rhetoric 1: The Cyborg Body: The Rhetoric of Disability**  
 Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Analysis of disability using the analogy of the cyborg, in an era when the human body has become plastic, digitized and surgically manipulated. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)  
*4 units, not given this year*

**PWR 1GLE. Writing & Rhetoric 1: Rhetoric of Lauren Eidal**  
 Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).  
*4 units, Win (Eidal, L), Spr (Eidal, L)*

**PWR 1GLL. Writing & Rhetoric 1: Wow, that's so postcard: The Rhetoric of Tourism**  
 Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Analysis of tourism as a way of seeing and representing the rest of the world and oneself, touching on some of the most pressing political, economic, and cultural questions facing an increasingly globalized world. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)  
*4 units, not given this year*

**PWR 1GM. Writing & Rhetoric 1: Anywhere That Is Wild: The Making and Unmaking of Rhetoric**  
 Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Exploration of the tension between reverence and science, language and feeling, natural and unnatural in the interrelationship of rhetoric and nature. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).  
*4 units, Win (Moyer, G)*

**PWR 1GMB. Writing & Rhetoric 1: Rhetoric of Mackenzie Barnes**  
 Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).  
*4 units, Win (Barnes, M), Spr (Barnes, M)*

**PWR 1GMG. Writing & Rhetoric 1: Love to Hate: The Rhetoric of Misanthropy**  
 Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).  
*4 units, Aut (Gemma, M)*

**PWR 1GMR. Writing & Rhetoric 1: Fearful Symmetry: The Rhetoric of the Double**  
 Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Exploration of the fictions of the double and the philosophies of personal identity, and how both anticipate and condition contemporary responses to the twin issues of human cloning and intellectual property. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)  
*4 units, not given this year*

**PWR 1GMU. Writing & Rhetoric 1: Rhetoric of Krishna Murali**  
 Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).  
*4 units, Win (Murali, K), Spr (Murali, K)*

**PWR 1GMV. Writing & Rhetoric 1: Don't Take it Personally!: The Rhetoric of The Insult**  
 Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Analysis of how insults function rhetorically in specific situations and how they have catalyzed prolonged confrontations around race, education, politics, sexual orientation, and national

standing. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)

*4 units, not given this year*

**PWR 1GMW. Writing & Rhetoric 1: Legal Rhetoric**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)

*4 units, Aut (Wallis, M)*

**PWR 1GMX. Writing & Rhetoric 1: Too Much Information?: The Rhetoric of Social Networking & Online Privacy**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Critical analysis of the ways in which online life intersects with real life around issues including privacy, authorship, and morality. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)

*4 units, not given this year*

**PWR 1GNL. Writing & Rhetoric 1: Punk Rock and Rhetoric of Protest Music**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)

*4 units, not given this year*

**PWR 1GRA. Writing & Rhetoric 1: Millions Like Us: The Rhetoric of Crowds**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Topics include symbolic meaning of rock, sports, and political events; virtual crowds online; and use of crowds to shape ideology. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)

*4 units, not given this year*

**PWR 1GRH. Writing & Rhetoric 1: 2012 & the Rhetoric of Apocalypse**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Analysis of the rhetoric of apocalypse as a cultural phenomenon. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)

*4 units, not given this year*

**PWR 1GRL. Writing & Rhetoric 1: LGBTQAWTF: Queer Rhetorics**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)

*4 units, not given this year*

**PWR 1GRN. Writing & Rhetoric 1: Lasting Only One Day: The Rhetoric of Ephemera and Other Discarded Things**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Exploration of ephemera and how they argue for their meaning as they collect and preserve the past while reflecting humantransience. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)

*4 units, not given this year*

**PWR 1GRW. Writing & Rhetoric 1: Rhetoric of Rebecca Wilbanks**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)

*4 units, Win (Wilbanks, R), Spr (Wilbanks, R)*

**PWR 1GRY. Writing & Rhetoric 1: Fashionable Fables: The Rhetoric of Modern Mythology**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)

*4 units, not given this year*

**PWR 1GSA. Writing & Rhetoric 1: Freakonomics and the Case Study: The Rhetoric of the Business Bestseller**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)

*4 units, Aut (Allison, S)*

**PWR 1GSD. Writing & Rhetoric 1: Masters of Style - The Rhetoric of Sophistication**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Examination of how style is mastered and deployed in a range of genres. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)

*4 units, not given this year*

**PWR 1GTM. Writing & Rhetoric 1: The Rhetoric of Taste**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Examination of the rhetoric of taste as the luxurious product of a sophisticated society and as tedious, stultifying, snobby, or outright offensive. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)

*4 units, not given this year*

**PWR 1GTX. Writing & Rhetoric 1: 'Making My Way Downtown': The Rhetoric of the City**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Through historic, literary, journalistic, and film portrayals of city life, we will analyze the idea of 'the city' as constructed through media and in the imaginations of its residents, and the way life in cities is really lived. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)

*4 units, not given this year*

**PWR 1GVC. Writing & Rhetoric 1: The Rhetoric of Circus**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)

*4 units, not given this year*

**PWR 1GVS. Writing & Rhetoric 1: Rhetoric of Vanessa Seals**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)

*4 units, Win (Seals, V), Spr (Seals, V)*

**PWR 1GWJ. Writing & Rhetoric 1: Rhetoric of William Jones**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)

*4 units, Win (Jones, W), Spr (Jones, W)*

**PWR 1HR. Writing & Rhetoric 1: Fake News and the Rhetoric of Truthiness**

Development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Critical

analysis of the fake news phenomenon, considering its impact on the political process and how we discuss important issues of the day. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)  
*4 units, not given this year*

**PWR 1JB. Writing & Rhetoric 1: From Mad Cow to Mad Corn: The Rhetoric of Food Science and Politics**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Topics include how activists, nutritionists, food scientists, chemical companies, and legislative bodies articulate their concerns and argue their positions and how agribusiness and government respond to consumer concerns about food produced with the aid of chemicals. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)  
*4 units, Aut (Bleakney, J)*

**PWR 1JH. Writing & Rhetoric 1: Lies and the Lying Liars Who Tell Them: Rhetoric and Deception**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Study of untruth, misrepresentation, and deception in journalistic and scientific rhetoric. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)  
*4 units, not given this year*

**PWR 1JJK. Writing & Rhetoric 1: The Rhetoric of Futility**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)  
*4 units, Win (Staff), Spr (Staff)*

**PWR 1JL. Writing & Rhetoric 1: Rhetoric and Humanitarian Intervention**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Examination of how media representations of world crises are crafted to persuade us to action, appealing to our senses of justice, pragmatism, outrage, and compassion. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)  
*4 units, Win (Lee, J)*

**PWR 1JP. Writing & Rhetoric 1: The Rhetoric of Consumer Culture**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Students explore what consumerism says about the larger culture and the segmented groups within it, analyzing popular and scholarly texts as well as current trends in pop culture, to research how the activities of consumerism shape culture. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)  
*4 units, not given this year*

**PWR 1JPA. Writing & Rhetoric 1: Contemplation or Action: The Rhetoric of a Liberal Arts Education**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Engagement with debates and issues related to liberal arts education, including the tension between education as training for a career and as a venue for developing the life of the mind. See [http://ual.stanford.edu/AP/univ\\_req/PWR/Courses.html](http://ual.stanford.edu/AP/univ_req/PWR/Courses.html)  
*4 units, Spr (Peterson, J)*

**PWR 1JT. PWR 1: RHETORIC HEALTH CARE**

*4 units, not given this year*

**PWR 1KB. Writing & Rhetoric 1: Authentic Experience: The Rhetoric of Tourism**

Rhetorical and contextual analysis of readings; research; and

argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)  
*4 units, not given this year*

**PWR 1KBA. Writing & Rhetoric 1: On Display: The Rhetoric of Museums and Exhibition Spaces**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)  
*4 units, not given this year*

**PWR 1KD. Writing & Rhetoric 1: the Feature Article: Writing and Change**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. How various feature article writers argue the issues of soaring energy and food prices, serious market volatility, climate change, an ongoing war in the Middle East, and how terms like *‘crisis’* or *‘change’* impact the discussion. See [http://ual.stanford.edu/AP/univ\\_req/PWR/Courses.html](http://ual.stanford.edu/AP/univ_req/PWR/Courses.html)  
*4 units, Spr (DiPirro, K)*

**PWR 1KE. Writing & Rhetoric 1: The Science of Sports**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Topics include sports at the level of cells and psychology, the science of sports equipment and sports spaces, the ethics of performance enhancement, and sports-related research projects on the Stanford campus. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)  
*4 units, Spr (Myers, K)*

**PWR 1KM. Writing & Rhetoric 1: If These Walls Could Talk: The Rhetoric of Places and Spaces**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Explores the *‘language’* of man-made environments such as universities, theme parks, monuments, shopping malls, museums, and public buildings. Students analyze space through physical exploration and critical inquiry and discover the applications of rhetoric not only to traditional texts but to physical structures and spaces as well. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)  
*4 units, not given this year*

**PWR 1KMA. Writing & Rhetoric 1: Metaphor and Motion: The Rhetoric of Sacred Space**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)  
*4 units, not given this year*

**PWR 1KMB. Writing & Rhetoric 1: Cradle to Cradle: the Rhetoric of Sustainability**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)  
*4 units, not given this year*

**PWR 1KS. Writing & Rhetoric 1: Imagining Others: 21st Century Cosmopolitanism**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Exploration of cosmopolitanism, questions related to globalization, nationalism, citizenship, cultural values, aesthetics, and identity. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)



4 units, not given this year

**PWR 1KSA. Writing & Rhetoric 1: Constructing Childhood**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

4 units, Win (Savelson, K)

**PWR 1LK. Writing & Rhetoric 1: The Rhetoric and Politics of Satire**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Explores the ways that satirists use irony, exaggeration, and humor--among other rhetorical techniques--to make serious statements about the world. Juxtaposes historical and recent satirical writing to illuminate intellectual problems that are thousands of years old and sharply contemporary. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

4 units, not given this year

**PWR 1LKA. Writing & Rhetoric 1: Rhetoric, Social Media, and Virtual Worlds**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Exploration of the effects of social media and how we shape our identities and develop new habits of mind when we enter virtual worlds. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

4 units, not given this year

**PWR 1MF. Writing & Rhetoric 1: The Rhetoric of Urban Life**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

4 units, not given this year

**PWR 1MFA. Writing & Rhetoric 1: Shades of Green: The Rhetoric of Contemporary Environmentalism**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

4 units, Spr (Feldman, M)

**PWR 1MJ. Writing & Rhetoric 1: Rock 'n' Rhetoric**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Topics include rhetorical strategies and meaning of the lyrics of songs with multiple interpretations and how rock musicians construct arguments in their songs. Analysis of how surrounding cultural and historical contexts influence the significance and meaning of rock, pop, and hip-hop songs. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

4 units, Aut (Ford, M), Win (Ford, M)

**PWR 1PB. Writing & Rhetoric 1: Supreme Court Rhetoric**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Analysis of the rhetoric of Supreme Court opinions, *amicus curiae* briefs, editorials about Court opinions, and pertinent lower court decisions. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

4 units, Win (Bator, P)

**PWR 1PH. Writing & Rhetoric 1: He Said, She Said: The Rhetoric of Gender Politics**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Topics include the ways in which news articles, movie

clips, magazine advertisements, television commercials, and other texts present gender roles, and how the roles and bodies of both sexes are presented as objects open to scrutiny, critique, exploitation, abuse, and awe. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

4 units, Aut (Hanlon-Baker, P)

**PWR 1PL. Writing & Rhetoric 1: Writing Wrongs: Human Rights in the Age of Facebook**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

4 units, Aut (Pell, J), Win (Pell, J)

**PWR 1RS. Writing & Rhetoric 1: Rhetoric and Stereotyping: American Indians and Others**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

4 units, Aut (Shaw, D), Win (Shaw, D), Spr (Shaw, D)

**PWR 1RT. Writing & Rhetoric 1: The War Between Wars: the isms of modernism**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Analysis of the rhetoric of modernism in art, literature, and thought between the two world wars. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

4 units, Aut (Taylor, R)

**PWR 1SB. Writing & Rhetoric 1: The Rhetoric of Technology**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Topics include the arguments we make about technology, the arguments various technologies produce about us, and the ways in which rhetoric itself might be productively viewed as a technology for producing arguments. Students explore the social, economic, political, and psychological consequences of rapidly developing technologies. See [http://www.stanford.edu/AP\\_univ\\_req/PWR/Req.html](http://www.stanford.edu/AP_univ_req/PWR/Req.html).

4 units, Win (Brawn, S)

**PWR 1SG. Writing & Rhetoric 1: Body and Mind: The Rhetoric of Gesture**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

4 units, Aut (Streit, S)

**PWR 1SH. Writing & Rhetoric 1: Strange Art, Stranger Politics: Absurdism and the Rhetoric of Social Action**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Topics include the benefits and drawbacks of deploying strange art as artistic and political protest, how breaking the aesthetic rules sometimes serves to argue for social change, and how absurdist protests succeed or fail to gain social traction. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

4 units, not given this year

**PWR 1SL. Writing & Rhetoric 1: New Media Rhetoric and Web 2.0**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Students define new media and debate the ideas of web 2.0; the virtue of Web 2.0 in digital game modifications and the potential subversive effects of web 2.0 on advertising restrictions; and look into the possibilities and limitations of democracy 2.0.



See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

*4 units, not given this year*

**PWR 1SLA. Writing & Rhetoric 1: Advertising R Us: The Rhetoric of Advertising**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

*4 units, Win (Lee, S)*

**PWR 1SM. Writing & Rhetoric 1: The Elephant, the Tiger, and the Cellphone: Rhetoric of India and Indian Film**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Study of the rhetoric of the India of the new millennium, including issues of gender, caste, class, religion, sexuality, nationalism, diaspora, outsourcing, and globalization. Service Learning Course (certified by Haas Center). See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

*4 units, not given this year*

**PWR 1SMA. Writing & Rhetoric 1: Humans and Things: The Rhetoric of Commodities and Commodification**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

*4 units, not given this year*

**PWR 1SMB. Writing & Rhetoric 1: The Jewel in the Crown: The Rhetoric of (Post)Colonialism**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

*4 units, not given this year*

**PWR 1SP. Writing & Rhetoric 1: Growing Up Global: The Rhetoric of Children's Culture Today**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

*4 units, Aut (Pittock, S), Spr (Pittock, S)*

**PWR 1SS. Writing & Rhetoric 1: Soap Operas and Soapboxes: The Rhetoric of Performance**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Students explore identity as a social, political, and cultural performance; how different situations call for particular styles of rhetorical performance; and how people evaluate and analyze different types of performances, including artistic and political performances, as well as the performances of everyday life. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

*4 units, Spr (Schuyler, S)*

**PWR 1SSA. Writing & Rhetoric 1: Real and Imagined Lives: Narrative, Rhetoric, and Identity**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Analysis of the rhetoric of identity as constructed in a range of narrative forms including fiction, memoirs, political campaigns, and social media. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

*4 units, not given this year*

**PWR 1ST. Writing & Rhetoric 1: The Rhetoric of Biomedical Ethics**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

*4 units, Aut (Starkman, R), Win (Starkman, R)*

**PWR 1SU. Writing & Rhetoric 1: The World According to Bollywood: Indian Cinema and its Representations**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Analysis of representations of India's culture through Indian film and how such representations have coincided with India's economic success over the last two decades of the twentieth century, giving rise to a new trend in global popular culture. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

*4 units, not given this year*

**PWR 1SUA. Writing & Rhetoric 1: Such a Long Journey: South Asian Diaspora in the World**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

*4 units, not given this year*

**PWR 1SW. Writing & Rhetoric 1: Scandals, Private Lives, and Public Faces: The Rhetoric of Stanford**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Study of the early history and rhetoric of the public face of Stanford University, from the post-Gold Rush and Big Four railroad era to the building of the University. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

*4 units, Spr (Wyle, S)*

**PWR 1VS. Writing & Rhetoric 1: Eating-Animals: The Rhetoric of Animals, Food, and the Environment**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

*4 units, Aut (Stanescu, V)*

**PWR 1WG. Writing & Rhetoric 1: Reading Minds: The Rhetoric of Consciousness**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Examination of states of mind ranging from the radical self-possession cultivated through practice to altered states induced through drugs and trauma, illness, and religion. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

*4 units, not given this year*

**PWR 2AH. Writing & Rhetoric 2: Ethnic Narratives and the Rhetoric of American Identity**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Exploration of how race and ethnicity in America have become subjects of personal negotiations and public perception. Addresses various topics such as biracial and bicultural identity, acculturation, and stereotyping. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

*4 units, Aut (Heredia, A), Spr (Heredia, A)*

**PWR 2AO. Writing & Rhetoric 2: Rhetoric and Global Leadership**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Analysis of

styles of leadership across the globe and communication strategies used to bring about change. Exploration of how global leaders learn cross-cultural rhetoric skills to adapt to dynamic and unfamiliar situations. See

[http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)  
4 units, *Win (O'Brien, A), Spr (O'Brien, A)*

**PWR 2CA. Writing & Rhetoric 2: Networked Rhetoric: Social Networks, Participatory Media and the Future of Wr**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Exploration of the issues surrounding participatory media and social networking in contemporary digital culture from the perspective of both theory and practice. See

[http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)  
4 units, *Win (Alfano, C)*

**PWR 2CK. pwr 2: rhetoric of kamrath**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

4 units, *Win (Kamrath, C)*

**PWR 2CR. Writing & Rhetoric 2: Revolutions in Environmental Rhetoric**

Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Examination of the motivations and appeals of environmental arguments, considering underlying assumptions and contexts of time, culture, audience, purpose, and mode of delivery. Participation in Community Writing Project, working with local nonprofit environmental organizations to produce real-world writing, multimedia, and/or speaking projects on these organizations' behalf. Work in the community will form the basis of the major research project. Service Learning Course (certified by Haas Center). Prerequisite: PWR 1. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

4 units, *not given this year*

**PWR 2CRA. Writing & Rhetoric 2: The State of California: Rhetoric of a Dream**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Service Learning Course (certified by Haas Center). See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

4 units, *not given this year*

**PWR 2DC. Writing & Rhetoric 2: The Popular Science of Sex**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Exploration of the intersection between social debate and scientific research about sex and gender; how social debates draw on, represent, respond to, and influence scientific studies; and how the process shapes our knowledge and beliefs about sex and gender. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)

4 units, *not given this year*

**PWR 2DCA. Writing & Rhetoric 2: Race/Gender in the Obama Age**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Analysis of perceptions of race and gender seen through the political lens of the 2008 presidential campaign. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)

4 units, *not given this year*

**PWR 2DH. Writing & Rhetoric 2: Me and My iPod: The Rhetoric of Identity**

Prerequisite: PWR 1. Further work in developing skills in

argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Study of the message, performance, and construction of identity, electronic renditions of the self, and the constant or changing nature of identity. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

4 units, *Spr (Hunter, D)*

**PWR 2DHA. Writing & Rhetoric 2: Scholar Activists Fix the World? The Rhetoric of Scholarship and Activism**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

4 units, *Win (Hunter, D)*

**PWR 2EE. PWR 2: RHETORIC OF ELLIS**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

4 units, *Spr (Ellis, E)*

**PWR 2GAW. Writing & Rhetoric 2: The Rhetoric of Cross-Cultural Communication**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Exploration of how rhetoric functions in various cultures, considering body language, symbols, visual media, and the Internet. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

4 units, *Win (Watters, A)*

**PWR 2GM. Writing & Rhetoric 2: Unpredictable Dialogue: Art of the Interview, Art of the Essay**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Study of the rhetorical craft of the interview, exploring structure, language, timing, and development in a range of forums, including documentaries, radio, transcription, campus conversations, and television. Research of a Stanford professor's work, including interview. Presentation of findings from research and interview to the class. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

4 units, *Aut (Moyer, G), Spr (Moyer, G)*

**PWR 2HR. Writing & Rhetoric 2: What's So Funny? Humor, Race, Class and Gender**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Analysis of cartoons and jokes about and by feminists, LGBTs, ethnic minorities, and rednecks. Discussion of how jokes reflect important moral values about race, sex, gender, and religion. Exploration of how satire works as social criticism. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

4 units, *Aut (Rytkonen, H), Win (Rytkonen, H), Spr (Rytkonen, H)*

**PWR 2JB. Writing & Rhetoric 2: Rhetoric of Ethics in Research and Technology**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Study of the rhetoric of ethical discourse, including the ethical standards guiding research at Stanford and examples of ethical misconduct. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

4 units, *not given this year*

**PWR 2JH. Writing & Rhetoric 2: Cred: Rhetoric and Credibility in Research, Politics, and Everyday Life**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Work on making students more effective researchers and communicators in

their areas of interest, with a focus on gaining and projecting credibility. Exploration of how speakers and writers gain and lose credibility, how people evaluate the credibility of others, and how the rules of credibility are different in politics, in scholarship, and in popular culture. See

[http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

*4 units, not given this year*

**PWR 2JL. Writing & Rhetoric 2: Domsday Rhetoric**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Investigation of how the doomsday epic expresses real concerns emerging from fields like technology, environmental studies, pathobiology, and politics. Consideration of apocalypticism as a mode of argument. Examination of how belief in the imminent destruction of the present world order influences our political decisions and personal behavior. Topics in religious eschatology and apocalypticism illuminate the genre's origins. See

[http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

*4 units, not given this year*

**PWR 2JLA. Writing & Rhetoric 2: Speaking About Art: Narrating the Collections of the Cantor Art Center**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Exploration and theory of successful strategies of oral communication, considering how words and images (in this case works of art) work together to create meaning, culminating in creation of an audio guide for the Cantor Arts Center. See

[http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

*4 units, not given this year*

**PWR 2JLB. Writing & Rhetoric 2: Rhetoric and Education Reform**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Analysis of social, ideological, and pedagogical perspectives on education reform. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html)

*4 units, Aut (Lee, J), Spr (Lee, J)*

**PWR 2JM. Writing & Rhetoric 2: Criminal Matters: Evidence, Detection, Expertise**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

*4 units, not given this year*

**PWR 2JP. Writing & Rhetoric 2: The Rhetoric of Art and Commerce**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Examination of unspoken rules regarding the separation of creativity and commerce and arguments about how consumer culture influences the work of the artist. See

[http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

*4 units, Aut (Peterson, J), Win (Peterson, J)*

**PWR 2KD. Writing & Rhetoric 2: Un-Performing Ourselves: The Design and Craft of Presentations**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Exploration of how the application of performance techniques makes academic or professional presentations more compelling. See

[http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

*4 units, Aut (DiPirro, K), Win (DiPirro, K)*

**PWR 2KE. Writing & Rhetoric 2: Olympic Rhetoric: Studying the Spirit of the Games**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Analysis of Olympic media, looking specifically at race and gender in Olympic coverage; technological innovation and ethics in the Games; and Olympic history. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

*4 units, Win (Myers, K)*

**PWR 2KEA. Writing & Rhetoric 2: Competitive Women: Opportunity, Exposure, and Resistance in the World of Sports**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Examination of women in sports, looking specifically at issues of opportunity, exposure, and resistance; arguments made by, for, and against women playing sports; and the fight for equality in sports. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

*4 units, Aut (Myers, K)*

**PWR 2KEB. Writing & Rhetoric 2: Sports Appeal: Packaging and Promoting Stanford Athletics**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

*4 units, not given this year*

**PWR 2KM. Writing & Rhetoric 2: Power Shift:: The Rhetoric of Sustainable Energy**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Focus on the rhetoric and ethics of sustainable energy, investigating both the alarmism and optimism which fuel this debate. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

*4 units, Win (Moekle, K), Spr (Moekle, K)*

**PWR 2KMA. Writing & Rhetoric 2: Natural Enemies: The Rhetoric of Invasion Biology**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Study of the use of metaphors and argument in the context of invasion biology and species conservation, especially the effects those metaphors and claims have on practice and policy outcomes. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

*4 units, not given this year*

**PWR 2KS. Writing & Rhetoric 2: Happy Now? The Anatomy of Happiness**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. How the emerging field of happiness studies involves psychologists, economists and policy-makers in defining what happiness is and determining how society might create the conditions in which it can flourish. Exploration of how happiness studies can uncover happiness at the heart of arguments about democracy, religion, and personal lifestyles, exploring what makes people happy across cultural, social, and national contexts. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

*4 units, not given this year*

**PWR 2KSA. Writing & Rhetoric 2: The Rhetoric of Childhood and Children's Culture**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

*4 units, not given this year*

**PWR 2KSB. Writing & Rhetoric 2: The Rhetoric of Design**

**Thinking**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

4 units, Aut (Savelson, K), Spr (Savelson, K)

**PWR 2LK. Writing & Rhetoric 2: Rhetoric in Crisis!**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

4 units, Spr (Konstantinou, L)

**PWR 2MF. Writing & Rhetoric 2: Speaking About Art: Narrating the Cantor's Collections**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Study of strategies for developing museum audio guides, including analysis of existing guides and behind-the-scenes work in the Cantor Arts Center. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

4 units, not given this year

**PWR 2MFA. Writing & Rhetoric 2: Searching for San Jose: Urban Studies Audio Walking Tours**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

4 units, not given this year

**PWR 2MFB. Writing & Rhetoric 2: Sustainability: Making an Impact with Research and Rhetoric**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

4 units, Aut (Feldman, M), Win (Feldman, M)

**PWR 2MR. Writing & Rhetoric 2: Technology and the Demonic: Rhetoric Against the Machine**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

4 units, not given this year

**PWR 2PB. Writing & Rhetoric 2: The Power of Political Photography**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Topics include the role of photographers and photo-journalists in helping viewers see the world differently and the political implications of fashion photography, environmental photography, music photography, and fashion photography. Traditional readings as well as archival and field research. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

4 units, Aut (Bator, P), Spr (Bator, P)

**PWR 2PH. Writing & Rhetoric 2: Equal Treatment: The Rhetoric of Public Health**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Study of how public health discourses influence policymaking, practitioners, and community members, how the public understands the rhetoric of public health, and how that understanding affects public and government support of health-related research. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

4 units, not given this year

**PWR 2PHA. Writing & Rhetoric 2: You Go Girl: The Rhetoric of Gender Equality**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

4 units, not given this year

**PWR 2PHB. Writing & Rhetoric 2: Indecision 2012: The Rhetoric of Politics**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

4 units, Win (Hanlon-Baker, P), Spr (Hanlon-Baker, P)

**PWR 2PL. PWR 2: RHETORIC OF PELL**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

4 units, Spr (Pell, J)

**PWR 2RS. Writing & Rhetoric 2: Rhetoric of Delphine Red Shirt**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

4 units, Spr (Staff)

**PWR 2RT. Writing & Rhetoric 2: Stepping Out of the Shadows: Music, Bass Guitar, and the Rhetoric of Revoluti**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Analysis of how the emergence of the electric bass in the fifties helped usher in a revolution that challenged commonplace assumptions concerning nationality, race, gender, and sexuality. Exploration of the history of the electric bass as a case study of musical revolutions, focusing on how music revolutions reflect emerging ideologies in any given culture. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

4 units, Spr (Taylor, R)

**PWR 2RTA. Writing & Rhetoric 2: Postmodernism and the Rhetoric of Uncertainty**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Inquiry into major theories of the postmodern and analysis of postmodernism's effect on culture. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

4 units, Win (Taylor, R)

**PWR 2SB. Writing & Rhetoric 2: Writing the Future: The Rhetoric of Popular Science and Science Fiction**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Analysis of science fiction and popular writing about science and technology as arguments about where we are headed, where we are, who we are, and what we value. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

4 units, Aut (Brawn, S), Spr (Brawn, S)

**PWR 2SG. PWR 2: RHETORIC OF STREIT**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

4 units, Win (Streit, S), Spr (Streit, S)

**PWR 2SH. Writing & Rhetoric 2: The Ugly American: Tourism and the Rhetoric of Power**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Analysis of the Ugly American in aesthetics and culture, in films and novels, tourist locations and business conferences, to illuminate America's complex role in the world. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).  
4 units, not given this year

**PWR 2SL. Writing & Rhetoric 2: Got Ads: Visual Design in Print Advertising**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Introduction to the rhetorical interplay of visuals, text, and design layout in print advertising, and narrative, classificatory, and dynamic patterns in print advertisement campaigns. Culminates in design and presentation of an original ad campaign. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).  
4 units, Spr (Lee, S)

**PWR 2SM. Writing & Rhetoric 2: Dirty, Pretty Things: The Rhetoric of Objects and Objectification**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Study of objects and objectification, from the relationships shared by cultures, objects, and people to how human beings have been objectified through colonialism, enslavement, sex-trafficking, and organ trade. Material objects discussed in terms of staging, collecting, design, location, inheritance, and cultural meaning. Service Learning Course (certified by Haas Center). See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).  
4 units, not given this year

**PWR 2SMA. Writing & Rhetoric 2: Love and Longing in Bombay: Romance and Rebellion in Indian Film**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).  
4 units, not given this year

**PWR 2SP. PWR 2: RHETORIC OF PITTOCK**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).  
4 units, Win (Pittock, S)

**PWR 2SS. Writing & Rhetoric 2: The Rhetoric of Mass Audiences**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Exploration of how the ability to reproduce a work for increasingly large audiences has fundamentally changed the nature of art and its effect on culture. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).  
4 units, Aut (Schuyler, S), Win (Schuyler, S)

**PWR 2SSA. Writing & Rhetoric 2: Rhetoric of Reality Culture**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).  
4 units, not given this year

**PWR 2ST. PWR 2: RHETORIC OF STARKMAN**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See [\[bin/drupal\\\_ual/AP\\\_univ\\\_req\\\_PWR\\\_Courses.html\]\(http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\_ual/AP\_univ\_req\_PWR\_Courses.html\).  
4 units, Spr \(Starkman, R\)](http://www.stanford.edu/dept/undergrad/cgi-</a></p>
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**PWR 2SU. Writing & Rhetoric 2: Hollywood Bollywood: Rhetoric of India in Global Cinema**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Exploration of how the rhetoric of India is constructed for an international audience through films and how such representations have coincided with India's recent economic success to give rise to a new trend in global popular culture. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).  
4 units, not given this year

**PWR 2SW. Writing & Rhetoric 2: The Rhetoric of World War II: Strategies of Persuasion in War Time**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Through work with the Hoover Archives, exploration of how written, visual, and film sources were used by a variety of countries to influence their citizens during WWII. Topics include the rhetoric of eugenics, political speeches, war posters, and how advertising during WWII pursued clear agendas to support government goals. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).  
4 units, Aut (Wyle, S), Win (Wyle, S)

**PWR 2WG. Writing & Rhetoric 2: All That Jazz: The Rhetoric of American Musical Theater**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Exploration of the conventions and strategies that define the genre of American musical theater. Analysis of how contemporary musicals mirror, revise, and even subvert traditional rules while addressing a range of current issues. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).  
4 units, Win (Goldberg, W), Spr (Goldberg, W)

**PWR 4. Directed Writing**

Further work on developing writing. Analysis and research-based argument, writing for a range of audiences and in varied disciplinary contexts. Workshops and individual conferences. May be repeated for credit. Prerequisite: first two levels of the writing requirement or equivalent transfer credit.  
3-4 units, not given this year

**PWR 5. Independent Writing**

Individual writing project under the guidance of a PWR instructor. May be repeated for credit. Prerequisite: first two levels of the writing requirement or equivalent transfer credit.  
1-5 units, Aut (Staff), Win (Diogenes, M), Spr (Staff), Sum (Staff)

**PWR 6. Writing Workshop**

1-2 units, not given this year

**PWR 91. Intermediate Writing**

For students who have completed the first two levels of the writing requirement and want further work in developing writing abilities, especially within discipline-specific contexts and nonfiction genres. Individual conferences with instructor and peer workshops. Prerequisite: first two levels of the writing requirement or equivalent transfer credit. For topics, see [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_pwr/advanced\\_pwr](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_pwr/advanced_pwr).  
3 units, not given this year

**PWR 91A. Intermediate Writing: The Art of Storytelling**

A variety of storytelling forms to build a repertoire of tools for telling stories, oral, textual, visual, sonic, or a combination. For students who have completed the first two levels of the writing requirement and want further work in developing writing abilities, especially within discipline-specific contexts and nonfiction genres. Individual conferences with instructor and peer workshops. Prerequisite: first two levels of the writing requirement or equivalent transfer credit. For more information, see [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_pwr/advanced\\_pwr](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_pwr/advanced_pwr).  
3 units, Aut (Willihnganz, J)

**PWR 91B. Intermediate Writing: Digital Rhetoric, New Media, and Transformations in Writing**

Writing operates in multiple modes (word, image, sound) in the new media environment. Examples of texts - invention, drafting, revision, and communication - governed by the evolving conditions of a new, digital rhetoric. For students who have completed the first two levels of the writing requirement and want further work in developing writing abilities, especially within discipline-specific contexts and nonfiction genres. Individual conferences with instructor and peer workshops. Prerequisite: first two levels of the writing requirement or equivalent transfer credit. For more information, see [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_pwr/advanced\\_pwr](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_pwr/advanced_pwr).

*3 units, Win (Alfano, C)*

**PWR 91C. Intermediate Writing: The Stanford Daily Show**

Class will study fake news programs such as the Daily Show, the Colbert Report and the Onion, and will produce The Stanford Daily Show, our own version of a fake news program. For students who have completed the first two levels of the writing requirement and want further work in developing writing abilities, especially within discipline-specific contexts and nonfiction genres. Individual conferences with instructor and peer workshops. Prerequisite: first two levels of the writing requirement or equivalent transfer credit. For more information, see [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_pwr/advanced\\_pwr](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_pwr/advanced_pwr).

*3 units, Spr (Rytkonen, H)*

**PWR 191. Advanced Writing**

Open to undergraduates and graduate students. Crafting nonfiction prose in a range of genres. Focus is on the relationship of genre and form; attention to developing stylistic versatility. Individual conferences with instructor. Prerequisite: first two levels of the writing requirement or equivalent transfer credit.

*3 units, not given this year*

**PWR 192. Projects in Research, Writing, and Rhetoric**

Advanced work on research projects, early drafts of theses, proposals. Shared work, discussions, and examination of methods, rhetorics, and styles in all disciplines. May be repeated for credit. Prerequisite: first two levels of the writing requirement or equivalent transfer credit.

*1-5 units, not given this year*

**PWR 193. Writing the Honors Thesis**

For students from all majors in the process of writing an honors thesis. Review of key elements of thesis process, including literature reviews, structure, argumentation, style, and documentation. Group and individual workshops. Prerequisite: first two levels of the writing requirement or equivalent transfer credit.

*1-5 units, not given this year*

**PWR 194. Topics in Writing and Rhetoric**

Understanding rhetoric as readers and interpreters of texts and to develop skills as writers and speakers. Prerequisite: first two levels of the writing requirement or equivalent transfer credit. For topics, see [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_pwr/advanced\\_pwr](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_pwr/advanced_pwr).

*4 units, not given this year*

**PWR 194A. The Rhetoric of Social and Political Movements**

Analyzing the rhetorical foundation of social and political movements informs our awareness of how terms such as feminist, conservative, activist, queer, and policy maker are differently understood and used among those movements. This advanced rhetoric course will ask students to examine how rhetors and rhetorical positions shape and are shaped by social and political movements. Prerequisite: first two levels of the writing requirement or equivalent transfer credit. For details, see [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_pwr/advanced\\_pwr](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_pwr/advanced_pwr).

*3 units, Spr (Hanlon-Baker, P)*

**PWR 194B. Advanced Writing**

Prerequisite: first two levels of the writing requirement or equivalent transfer credit. For details, see [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_pwr/advanced\\_pwr](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_pwr/advanced_pwr).

*4 units, not given this year*

**PWR 195. Writing Center Peer Tutor Seminar**

(Same as ENGLISH 195W) For students selected to serve as peer writing tutors in the Stanford Writing Center and/or at other campus sites. Readings on and reflection about writing processes, the dynamics of writing and tutoring situations, tutoring techniques, learning styles, diversity, and ethics. Observation of tutoring sessions, written responses to readings, and other written work.

*3 units, Spr (Bleakney, J)*

# CENTERS, LABORATORIES, AND INSTITUTES

Independent research laboratories, centers, and institutes perform multidisciplinary research that extends beyond the scope of any one of the University's organized schools. Consult the links below for full information on these units.

Information on academic programs for undergraduates is provided by following the links on the right.

## OFFICE OF VICE PROVOST AND DEAN OF RESEARCH

*Vice Provost and Dean of Research and Dean of the Independent*

*Laboratories, Centers, and Institutes: Ann M. Arvin*

*Offices: 450 Serra Mall, Main Quadrangle, Building 60*

*Mail Code: 94305-2064*

*Office Phone: 650-723-8789*

*Office Fax: 650-723-0662*

*Web Site: <http://stanford.edu/dept/DoR>*

The following independent Laboratories, Centers, and Institutes report to the Vice Provost and Dean of Research:

## BIOLOGICAL AND LIFE SCIENCES

- Bio-X, the interdisciplinary program related to bioengineering, biomedicine, and biosciences, <http://biox.stanford.edu>
- Spectrum (formerly the Stanford Center for Clinical and Translational Education and Research), <http://spectrum.stanford.edu>

## ENVIRONMENTAL SCIENCES

- Precourt Institute for Energy, <http://pie.stanford.edu/>
  - Precourt Energy Efficiency Center, <http://peec.stanford.edu>
  - Global Climate and Energy Project (G-CEP), <http://gcep.stanford.edu>
- Woods Institute for the Environment, <http://woods.stanford.edu>

## HUMANITIES AND SOCIAL SCIENCES

- Center for Advanced Study in the Behavioral Sciences (CASBS), <http://www.casbs.org>
- Center for the Study of Language And Information (CSLI), <http://www-csli.stanford.edu>
- Freeman Spogli Institute for International Studies (FSI), <http://fsi.stanford.edu>
  - Center on Democracy, Development, and the Rule of Law (CDDRL), <http://cddrl.stanford.edu>
  - Stanford Health Policy (Center for Health Policy/Center for Primary Care and Outcomes Research), <http://healthpolicy.stanford.edu>
  - Center for International Security and Cooperation (CISAC) <http://cisac.stanford.edu>
  - Walter H. Shorenstein Asia-Pacific Research Center (Shorenstein APARC), <http://aparc.stanford.edu>
  - The Europe Center, <http://fce.stanford.edu>
  - Program on Food Security and the Environment, <http://fse.stanford.edu>
  - Inter-University Center for Japanese Language Studies (IUC), <http://www.stanford.edu/dept/IUC>
  - Program on Energy and Sustainable Development (PESD), <http://pesd.stanford.edu>

- Stanford Program on International and Cross-Cultural Education (SPICE), <http://spice.stanford.edu>
- Human-Sciences and Technologies Advance Research Institute (H-STAR), <http://hstar.stanford.edu>
  - Media-X, <http://mediax.stanford.edu>
  - Stanford Center for Innovations in Learning (SCIL), <http://scil.stanford.edu>
- Stanford Center on Longevity (SCL), <http://longevity.stanford.edu>
- Stanford Humanities Center, <http://shc.stanford.edu>
- Stanford Institute for Economic Policy Research (SIEPR), <http://siepr.stanford.edu>

## PHYSICAL SCIENCES

- Edward L. Ginzton Laboratory, <http://stanford.edu/group/ginzton>
- Geballe Laboratory for Advanced Materials (GLAM), <http://stanford.edu/group/glam>
- Kavli Institute for Particle Astrophysics and Cosmology (KIPAC), <http://www-group.slac.stanford.edu/kipac>, operated jointly with SLAC National Accelerator Laboratory
- Photon Ultrafast Laser Science and Engineering (PULSE), <http://pulse.slac.stanford.edu>, operated jointly with SLAC National Accelerator Laboratory
- Stanford Institute for Materials and Energy Sciences (SIMES), <http://simes.slac.stanford.edu>, operated jointly with SLAC National Accelerator Laboratory
- W. W. Hansen Experimental Physics Laboratory (HEPL), <http://hepl.stanford.edu>

## CENTERS REPORTING TO THE DEAN OF HUMANITIES AND SCIENCES

- Center for Space Science and Astrophysics, <http://www.stanford.edu/group/CSSA>
- Institute for Research in the Social Sciences (IRiSS), <http://iriss.stanford.edu>
  - Stanford Center for Population Research (SCPR), <http://iriss.stanford.edu/scpr>
  - Stanford Center for the Study of Poverty and Inequality (CPI), <http://iriss.stanford.edu/CPI>
  - Stanford Center for American Democracy (SCAD) (web site in development)
  - Stanford Center on Philanthropy and Civil Society (PACS), <http://pacscenter.stanford.edu>
- Michelle R. Clayman Institute for Gender Research, <http://gender.stanford.edu>
- Morrison Institute for Population and Resource Studies, <http://www.stanford.edu/group/morrinst>

## OTHER ACADEMIC PROGRAMS AND CENTERS, AND INDEPENDENT RESEARCH LABORATORIES, CENTERS, AND INSTITUTES

- Hoover Institution on War, Revolution and Peace, <http://www.hoover.org>
- SLAC National Accelerator Laboratory (SLAC), <http://www.slac.stanford.edu>
- Stanford Synchrotron Radiation Laboratory (SSRL), <http://ssrl.slac.stanford.edu>

## CENTER FOR SPACE SCIENCE AND ASTROPHYSICS

*Emeriti: (Professors)* Robert Cannon, I-Dee Chang, Daniel B. DeBra, W. Gary Ernst, Von R. Eshleman, Robert A. Helliwell, Bruce B. Lusignan, Ronald J. P. Lyon, Laurence A. Manning, Bradford W. Parkinson, J. David Powell, Peter A. Sturrock, G. Leonard Tyler, Robert V. Wagoner; *(Professors, Research)* Donald L. Carpenter, Aldo V. daRosa, Antony Fraser-Smith

*Director:* Roger W. Romani

*Associate Directors:* Umran S. Inan, Philip H. Scherrer

*Professors:* Roger Blandford (Physics, SLAC), Elliot Bloom (SLAC), Lambertus Hesselink (Electrical Engineering), Umran S. Inan (Electrical Engineering), Steven Kahn (Physics, SLAC), Tune Kame (SLAC), Peter F. Michelson (Physics), Vahé Petrosian (Physics), Roger W. Romani (Physics), Norman H. Sleep (Geophysics), Howard Zebker (Electrical Engineering, Geophysics)

*Associate Professors:* Tom Abel (Physics, SLAC), Steve Allen (Physics, SLAC), Sarah Church (Physics), Guenther Walther (Statistics)

*Assistant Professors:* Stefan Funk (Physics, SLAC), Chao-Lin Kuo (Physics, SLAC), Risa Wechler (Physics, SLAC)

*Professors (Research):* C-W. Francis Everitt (HEPL), Philip H. Scherrer (Physics)

*Consulting Professor:* Martin Walt (Electrical Engineering)

*SLAC Staff Physicist:* Grzegorz Madejski

*Center Offices:* Varian, Room 316

*Mail Code:* 94305-4060

*Phone:* (650) 723-1439

*Email:* danav@stanford.edu

*Web Site:* <http://www.stanford.edu/group/CSSA>

The Center for Space Science and Astrophysics is an interdepartmental organization coordinating research in space science and astrophysics. Its members are drawn from the Department of Geological and Environmental Sciences in the School of Earth Sciences; the departments of Aeronautics and Astronautics, Electrical Engineering, and Mechanical Engineering in the School of Engineering; the departments of Applied Physics, Physics, and Statistics in the School of Humanities and Sciences; the W. W. Hansen Experimental Physics Laboratory; and the SLAC National Accelerator Laboratory. Its membership also includes all faculty and appropriate staff at the Kavli Institute for Particle Astrophysics and Cosmology, located at SLAC and the Physics department.

The facilities of the center are available to any interested and qualified student, who must be admitted by and registered in a department. The departments of Aeronautics and Astronautics, Applied Physics, Electrical Engineering, Mechanical Engineering, and Physics offer opportunities leading to an M.S. or Ph.D. degree for work in space science or astrophysics. The center also offers opportunities to undergraduates who may, for instance, participate in research projects in their junior or senior years, on a part-time basis during the school year or on a full-time basis during the summer. The Astronomy Course Program operates a small student observatory where students may gain practical experience in astronomical observing.

## FREEMAN SPOGLI INSTITUTE FOR INTERNATIONAL STUDIES (FSI)

The Freeman Spogli Institute for International Studies (FSI) provides opportunities for undergraduate research through the

CISAC Interschool Honors Program in International Security Studies and the CDDRL Undergraduate Honors Program. For information on the institute that manages student fellowship programs, see <http://fsi.stanford.edu/fellowships/>.

### INTERSCHOOL HONORS PROGRAM IN INTERNATIONAL SECURITY STUDIES

*Co-Directors:* Martha Crenshaw, Coit D. Blacker

The Center for International Security and Cooperation (CISAC) coordinates a University-wide Interschool Honors Program in International Security Studies. Students chosen for the honors program intern with a security-related organization, attend the program's honors college in Washington, D.C., in September, attend a year-long core seminar on international security research, and produce an honors thesis with policy implications. Upon fulfilling individual department course requirements and completing the honors program, students graduate in their major with a certificate in Honors in International Security Studies. To be considered for the program, students must demonstrate sufficient depth and breadth of international security course work. Successful applicants to the program are expected to have taken: POLISCI 114S, International Security in a Changing World; MS&E 193, Technology in National Security; and at least one related course such as ECON 150/PUBLPOL 104, Economic Policy Analysis; STS 110/MS&E 197/PUBLPOL 103B, Ethics and Public Policy; SOC 160, Formal Organizations; PUBLPOL 102/SOC 166, Organizations and Public Policy; POLISCI 110B, Strategy, War, and Politics; POLISCI 110D, War and Peace in American Foreign Policy; POLISCI 123/PUBLPOL 101, Politics and Public Policy; or POLISCI 114T, Major Issues in International Conflict Management. Students in the program enroll in IIS 199, Interschool Honors Program in International Security Studies, in Autumn, Winter, and Spring quarters. Information about and applications to this program may be obtained from the Center for International Security and Cooperation, C206-7 Encina Hall Central, telephone (650) 725-9132 or <http://cisac.stanford.edu>.

### INTERSCHOOL HONORS PROGRAM IN DEMOCRACY, DEVELOPMENT, AND THE RULE OF LAW

*Directors:* Kathryn Stoner-Weiss (AY 2011-12), Francis Fukuyama (AY 2012-13)

The Center on Democracy, Development, and the Rule of Law (CDDRL) Undergraduate Senior Honors Program provides students majoring in any Stanford academic department the opportunity to conduct an independent research project focused on the fields of democracy, development, and the rule of law under CDDRL faculty guidance. Students are required to complete a year-long honors research seminar that begins autumn quarter of the junior year. They will spend the last quarter of the senior year working independently with their faculty advisor to complete and submit their honors thesis ahead of their formal defense in mid-May. Upon fulfilling individual department course requirements and completing the honors program, students graduate with a certificate in Honors in Democracy, Development, and the Rule of Law.

Students interested in the program consult with their prospective honors advisers in their junior year to determine the tentative thesis topic, which should have some degree of policy relevance. Prerequisites for the program include: a 3.5 grade-point average at the time they apply; a strong overall academic record; sufficient depth and breadth in the fields of democracy, economic and social development, rule of law, and human rights course work; and demonstrated skills in writing and conducting independent research.

Students are required to attend honors college in Washington, D.C. in September before autumn quarter classes begin. Applicants are discouraged from studying abroad during the duration of the CDDRL Undergraduate Honors program.



- Required course work includes:
- INTNLREL/POLISCI 114D (5 units) CDDRL's flagship undergraduate lecture course taught during Autumn Quarter, which ideally should be completed before the student enters the honors program.
  - DDRL Honors Research Methods Seminars: Students meet their peers and faculty on a weekly basis to present their project theses and receive feedback.
    - Spring Quarter, Junior Year
      - DDRL 189 (3 units) Honors Research
    - Autumn Quarter, Senior Year
      - DDRL 190 (3 units) Honors rResearch
    - Winter Quarter, Senior Year
      - DDRL 190 (3 units) Honors Research
  - Two additional courses that relate to the fields of democracy, development, and the rule of law (please see the program application for a list of examples).

Admitted students must be able to fulfill all course requirements in their individual majors by the time they graduate, in addition to the units required for the honors program.

For more information, contact Sarina Beges, CDDRL Program Manager at sbeges@stanford.edu or see <http://cddrl.stanford.edu>.

## WOODS INSTITUTE FOR THE ENVIRONMENT: GOLDMAN INTERSCHOOL HONORS PROGRAM IN ENVIRONMENTAL SCIENCE, TECHNOLOGY, AND POLICY

The Woods Institute for the Environment coordinates a University-wide interschool honors program in environmental science, technology, and policy. Undergraduates planning to participate in the honors program are required to pursue studies in environmental sciences, technology, and policy, with a concentration in a single discipline. After completion of the prerequisite units, students join small group honors seminars to work with faculty members in the environmental field on an honors thesis that incorporates both scientific principles and policy aspects of environmental issues.

Courses in environmental studies appear under the course listings of the schools of Earth Sciences, Engineering, and Humanities and Sciences. Information about and applications to this program may be obtained by phoning (650) 723-5697 and at <http://woods.stanford.edu/education/goldman>.

The Woods Institute provides support for student group projects focusing on the environment and sustainability. For details, see <http://woods.stanford.edu/students/projects.html>.

The Woods Institute also sponsors a weekly series of talks on a broad range of energy topics under the rubric of CEE/ENERGY 301, Energy Seminar. For more information, see <http://woods.stanford.edu/cgi-bin/energyseminar.php>.

# LIBRARIES AND COMPUTING RESOURCES

## STANFORD UNIVERSITY LIBRARIES AND ACADEMIC INFORMATION RESOURCES

*University Librarian and Director of Academic Information Resources:* Michael A. Keller  
*Web Site:* <http://library.stanford.edu>

Stanford University Libraries and Academic Information Resources (SULAIR) includes more than 30 libraries and programs supporting research, teaching, and learning at Stanford University. SULAIR acquires and delivers library collections in all formats, establishes policies and standards to guide the use of academic information resources, develops training and support programs for academic uses of computers, and maintains a broad array of electronic information resources, including the online library catalog and several hundred article and indexing databases and electronic journal subscriptions.

In each library unit, knowledgeable professional staff provide assistance in locating and using print and online information resources. Subject specialists and reference librarians are available for individual consultation, group classes, demonstrations, and special workshops by request.

Libraries throughout campus provide group and individual study spaces, public computers, personal laptop connections, photocopy machines, and digital scanners for use by Stanford faculty, staff, and students.

For information about library hours, see <http://libraryhours.stanford.edu>.

In support of the University's academic mission, Academic Computing Services provides technology expertise, resources and services to students and faculty. Academic Computing Services supports the use of technology in teaching, learning, research, and community; operates and manages technology-enabled teaching and learning environments including classrooms and public study spaces, the Multimedia Studio in Meyer Library, the Digital Language Lab, and computer clusters in Green Library, Tresidder Union, and the student residences; provides technology education, consulting support, and multimedia services at Meyer and in the residences; provides faculty-specific computing resources through the Academic Technology Specialist Program and Academic Technology Lab; and provides technology support to Stanford University Libraries' services.

Information about the library collections, facilities, services, and policies is available at <http://library.stanford.edu>.

Further information about library services and resources is available from the Information Center staff in Cecil H. Green Library at <http://infocenter.stanford.edu>, and from reference staff in all University libraries.

### CENTRAL CAMPUS LIBRARIES

The Cecil H. Green Library (East and Bing Wings) maintains research collections in the humanities, social sciences, area studies, and interdisciplinary areas. These collections number approximately 2.8 million volumes. Major services in Green Library include: the Information Center, the Media Microtext

Center, the Jonsson Reading Room, the Lane Reading Room, the Bender Room, Loan Desk and Privileges, Interlibrary Services, course reserves, the Department of Special Collections, and the University Archives.

The J. Henry Meyer Memorial Library houses the East Asia Library as well as the Academic Computing Services group of SULAIR and provides study, multimedia, consulting, and instructional support services. In addition, Meyer Library houses the University's Digital Language Lab, technology enabled study spaces and classrooms, the Academic Technology Lab, and the central offices of Student Computing and Academic Computing Services.

## BRANCH LIBRARIES

Humanities and Social Sciences Branch Libraries include the Art and Architecture Library, Cubberley Education Library, East Asia Library, Music Library, and Archive of Recorded Sound.

Science Branch Libraries include the Branner Earth Sciences Library, Engineering Library, Falconer Biology Library, Mathematical and Computer Sciences Library, Harold A. Miller Library at the Hopkins Marine Station, Physics Library, and Swain Library of Chemistry and Chemical Engineering.

For a complete list of campus libraries, see: <http://libraries.stanford.edu>.

## COORDINATE LIBRARIES

**J. Hugh Jackson Library, Graduate School of Business**

*Director:* Kathy Long

**Lane Medical Library**

*Director:* Debra Ketchell

**Crown Law Library**

*Director:* Paul Lomio

**SLAC National Accelerator Laboratory Library**

*Director of Technical Information Services:* Patricia Kreitz

## HOOVER INSTITUTION ON WAR, REVOLUTION AND PEACE

*Director:* John Raisian

*Web Site:* <http://www.hoover.org>

Since its founding by Herbert Hoover in 1919 as a special collection dealing with the causes and consequences of World War I, the Hoover Institution has become an international center for documentation, research, and publication on political, economic, social, and educational change in the 20th and 21st centuries.

The Hoover Library and Archives include one of the largest private archives in the world and contain outstanding area collections on Africa, East Asia, Eastern Europe, Russia and the former Soviet Union, Latin America, the Middle East, North America, and Western Europe.

Holdings include government documents, files of newspapers and serials, manuscripts, memoirs, diaries, and personal papers of men and women who have played significant roles in the events of these centuries, the publications of societies and of resistance and underground movements, the publications and records of national and international bodies, both official and unofficial, and books and pamphlets, many of them rare and irreplaceable. The materials are open to all Stanford students, faculty, and staff, to scholars from outside the University, and to the public at large.

## INFORMATION TECHNOLOGY SERVICES (IT SERVICES)

*Web Site:* <http://it-services.stanford.edu>

IT Services manages the University's central information technology infrastructure and provides hundreds of services and applications for use in academic and business activities. Support is provided in four layers:

- Participation and client-focused leadership in institutional IT planning, including strategies for data center expansion, centrally managed storage and backup, and business continuity and disaster recovery.
- Applications and services for departments and end-users including email, calendaring, wireless connectivity, web authentication, and Windows and Linux server hosting. These services are supported by a help desk, contract-support consultants, online self-help, and training.
- Applications and services that support other campus service providers, including the help desk, change management, and network registration systems.
- A communications and collaboration infrastructure robust enough to support advanced network, voice, and web-based services.

To learn about the variety of information technology resources available at Stanford, see <http://computing.stanford.edu>. For assistance with technology services at Stanford, contact the Stanford IT Help Desk at (650) 725-HELP (5-4357) or submit a request through <http://helpsu.stanford.edu>.

## THE CONTINUING STUDIES PROGRAM

*Dean and Associate Provost:* Charles Junkerman

*Associate Dean and Director:* Dan Colman

*Program Offices:* 482 Galvez Mall

*Mail Code:* 94305-6079

*Phone:* (650) 725-2650; *Fax:* (650) 725-4248

*Email:* [continuingstudies@stanford.edu](mailto:continuingstudies@stanford.edu)

*Web Site:* <http://continuingstudies.stanford.edu>

The Continuing Studies Program provides adults from Stanford and surrounding communities the opportunity to take classes on a part-time basis for intellectual enrichment, both personal and professional. Courses and events are offered in all four academic quarters, with over 350 courses planned throughout the year.

The faculty are primarily drawn from the ranks of the University's professoriate. The program presents a wide variety of courses, with a central concentration in the liberal arts, including literature, history, art and architecture, and music.

Tuition discounts are available to University employees, Stanford students and faculty, Stanford Alumni Association members, educators, and those over age 65.

For a course catalogue, contact the Continuing Studies Program by mail, phone, or email as above.

The Continuing Studies Program also administers the Master of Liberal Arts Program and Summer Session.

# MASTER OF LIBERAL ARTS PROGRAM

*Associate Dean and Director:* Linda Paulson

*Participating Faculty:* Russell Berman (Comparative Literature, German Studies), Marc Bertrand (French and Italian, emeritus), Jay Bhattacharya (Medicine), Eamonn Callan (Education), Gerry Dorfman (Hoover Institution, Political Science), Michele Elam (English), Martin Evans (English), Paula Findlen (History), Larry Friedlander (English), Kenneth Fields (English), Hester Gelber (Religious Studies), Albert Gelpi (English, emeritus), Barbara Gelpi (English, emerita), Robert Gregg (Religious Studies, emeritus), Tom Grey (Music), Hans Ulrich Gumbrecht (French and Italian), Van Harvey (Religious Studies, emeritus), Gavin Jones (English), Charles Junkerman (Continuing Studies Program), Nancy Kollmann (History), Marsh McCall (Classics, emeritus), Mark Mancall (History, emeritus), Scotty McLennan (Religious Life), David Palumbo-Liu (Comparative Literature), Linda Paulson (English), Denis Phillips (Education, emeritus), Ronald Rebolz (English, emeritus), Rush Rehm (Drama, Classics), John Rick (Anthropology), John Rickford (Linguistics), Paul Robinson (History, emeritus), Ramón Saldívar (English), Paul Seaver (History, emeritus), Thomas Sheehan (Religious Studies), Robert Siegel (Microbiology and Immunology), Peter Stansky (History, emeritus), Stephen Stedman (Freeman Spogli Institute for International Studies), Thomas Wasow (Linguistics), Ernlé Young (Medicine, emeritus), Steven Zipperstein (Jewish Culture and History)

*Program Offices:* 482 Galvez Mall

*Mail Code:* 94305-6079

*Phone:* (650) 725-0061

*Email:* mlaprogram@stanford.edu

*Web Site:* <http://mla.stanford.edu>

Courses offered by the Master of Liberal Arts Program are listed under the subject code MLA on the *Stanford Bulletin's* ExploreCourses web site.

*Program Description*—The Master of Liberal Arts (MLA) program aims to provide a flexible, interdisciplinary program for returning adult students who seek a broad education in the liberal arts. The underlying premise of the MLA program is that knowledge gained through an interdisciplinary course of study leads to intellectual independence and satisfaction not always found in discipline-based programs of study. The goals of the MLA program are to develop advanced critical thinking, to foster intellectual range and flexibility, and to cultivate an individual's ability to find the connections among different areas of human thought: art, history, literature, music, philosophy, political science, science, and theology.

The program is designed with part-time students in mind: seminars meet in the evening, and students complete the degree in 4-5 years. All master's seminars are taught by members of the Stanford faculty. Seminar size is limited to 20 students.

*Degree Requirements*—Candidates for the MLA degree must complete a minimum of 50 units of course work with at least a grade point average of 3.3 (B+). These units must include a three-quarter foundation course (equal to 12 units total), one 4-unit core introductory seminar for second-year students, at least seven 4-unit MLA seminars, and a 6-unit master's thesis. Students must also fulfill distribution requirements in each of the following areas: humanities; social science or social policy; and science, engineering, or medicine.

*Foundation Course*—During the Autumn, Winter, and Spring following admission to the program, a three-quarter foundation course is required of all students. The purpose of this course is to lay the groundwork for the interdisciplinary, intercultural studies the student will shortly undertake. The foundation course will

introduce students to the broad framework of history, literature, philosophy, political science, and art.

*Core Seminar*—During the first quarter of the second year, students take the core introductory seminar, MLA 102, An Introduction to Interdisciplinary Graduate Study. This seminar prepares students for interdisciplinary graduate work at Stanford. Students concentrate on writing a critical graduate paper, conducting library research, presenting the results of their research, and productively participating in a collaborative seminar.

*MLA Seminars*—Students are required to take at least seven MLA seminars of four units each. Each year, at least nine seminars are offered in the MLA program. Each MLA course requires a substantial seminar paper. Students are encouraged to use these papers as a way to investigate new fields of interest, as well as a way to develop different perspectives on issues in which they have an ongoing interest.

*Master's Thesis*—The MLA program culminates in the master's thesis. Students approaching the end of the program write a thesis, approximately 75-100 pages in length, that evolves out of work they have pursued during their MLA studies. The thesis is undertaken with the prior approval of the MLA program, and under the supervision of a Stanford faculty member. During the process of writing the thesis, students are members of a work-in-progress group, which meets regularly to provide peer critiques, motivation, and advice. Each student presents the penultimate draft of the thesis to a colloquium of MLA faculty and students, in preparation for revising and submitting the final draft to the adviser and to the MLA program.

*Enrollment Requirements*—MLA students must enroll for each academic year from the time of original matriculation until conferral of the degree. To remain active, students must either: (a) complete a minimum of two courses (eight units) in one academic year, defined as from the beginning of Autumn Quarter through the end of the following Summer Quarter; or (b) be actively working on their thesis and regularly attend a minimum of three quarters of the work-in-progress meetings from the time the student enrolls in work-in-progress through graduation.

*Timeline for Completion*—All requirements for the Master of Liberal Arts degree must be completed within five years after the student's first term of enrollment in the program. If extraordinary circumstances prevent completion within five years, a student may submit a written petition for a maximum one-year extension to the Associate Dean and Director. This petition is reviewed by a committee which makes a recommendation to the Director; the final decision is at the discretion of the Director. To be considered, the petition must be submitted on or before May 1 of the student's fifth year in the program.

*Registration*—Master of Liberal Arts students enroll in courses through Stanford's Axess system.

## SUMMER SESSION

*Associate Dean:* Patricia Brandt

*Assistant Dean of Summer College:* Jim Sirianni

*Program Offices:* 482 Galvez Mall

*Mail Code:* 94305-6079

*Phone:* (650) 723-3109; *Fax:* (650) 725-6080

*Email:* [summersession@stanford.edu](mailto:summersession@stanford.edu)

*Web Site:* <http://summer.stanford.edu>

Students attending Stanford Summer Session are enrolled in either a regular degree program, the Summer Visitor Program, or the High School Summer College.

The regular degree program is for students who are candidates for a Stanford degree and who are continuing their academic work in Summer Quarter. Degree-seeking Stanford students should indicate on Axess during Spring Quarter that they intend to register for Summer Quarter. Separate application is not required.

The Summer Visitor Program is for students who are not presently candidates for a Stanford degree. It is open to students

and adults who have taken at least one course at another college or university. Qualified high school students who have completed at least their sophomore year may apply to the High School Summer College program.

Students in Stanford Summer Session, in general, enjoy the privileges of students in the regular degree programs except that work completed cannot be applied toward a Stanford degree or credential until the student has been admitted to regular standing. Admission as a summer visitor does not imply later admission to matriculated status. However, should the visitor matriculate at a later date through normal admission procedures, the summer work may be applied toward the requirements for a Stanford degree or credential at the discretion of the University or academic department.

Students in the Summer Visitor Program or the High School Summer College are not matriculated Stanford University students, and not all University student policies apply to such students. The University reserves the right, at its discretion, to withhold registration from or require withdrawal from the program of any Summer Visitor Program or High School Summer College student or applicant.

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

For more information, contact Summer Session by email, mail, phone, or fax using the listings above. Information is updated annually in January and may also be found online at <http://summer.stanford.edu>.

## STUDENT AFFAIRS

*Vice Provost for Student Affairs:* Greg Boardman  
*Associate Vice Provost and Dean of Student Life:* Chris Griffith  
*Associate Vice Provost and Dean of Educational Resources:* Sally Dickson  
*Associate Vice Provost and Director of Vaden Health Center:* Ira Friedman  
*Associate Vice Provost and University Registrar:* Thomas C. Black  
*Associate Vice Provost and Dean of Residential Education:* Deborah Golder  
*Web Site:* <http://studentaffairs.stanford.edu/>

The Student Affairs division encompasses a broad range of programs and services for undergraduates and graduate students, including the Office of Residential Education, University Registrar, Student Life, Educational Resources, Vaden Health Center, Career Development Center, Office of Accessible Education, Graduate Life Office, Haas Center for Public Service, Judicial Affairs, Bechtel International Center, Asian American Activities Center, Black Community Services Center, El Centro Chicano, LGBT Community Resources Center, Native American Cultural Center, Women's Community Center, Office of Student Activities and Leadership, Diversity and First Gen Programs, Office of Sexual Assault and Relationship Abuse Education and Response, and the Office of Alcohol Policy and Education.

The Vice Provost for Student Affairs reports directly to the Provost and is responsible for providing leadership, policy direction, and administrative support for budget, personnel, facilities, and development, as well as oversight of the efficiency and effectiveness of each of the division's units. The Vice Provost interacts with the President, the Provost, the Vice Provosts, faculty, schools, department representatives, students, and parents. The Vice Provost is a member of the Stanford University Cabinet, and ex officio member of the Stanford Alumni Association Board of Directors, Stanford Athletic Board, and Haas Center for Public Service National Advisory Board. The Vice Provost also attends the Senate meetings of the Academic Council.

## STUDENT SERVICES CENTER

*Office:* Tresidder Memorial Union, 2nd floor  
*Contact* via *HelpSU:*  
<https://remedyweb.stanford.edu/helpsu/helpsu?pcat=StuAcct&tag=10772>  
*Phone:* (650) 723-7772 or (866) 993-7772 (toll-free)  
*Web Site:* <http://studentservicescenter.stanford.edu>  
*The AskJane Online Answers Resource:* <http://askjane.stanford.edu>

The Student Services Center (SSC) is committed to providing a single point of friendly, professional service for answers to questions concerning administrative and financial issues. The center strives to resolve 90% of students' issues upon first contact. The SSC represents Student Financial Services, the Office of the University Registrar, the University Cashier's Office, the Financial Aid Office, and Stanford ID Card Services, and is able to assist students with questions including those related to University billing, financial aid disbursements, refunds, payroll deductions, payment plan, enrollment, Stanford degree policies and procedures, Stanford ID card, and forms pickup and submission.

## DEAN OF STUDENT LIFE

*Dean of Student Life:* Chris Griffith  
*Office:* Old Union  
*Phone:* (650) 723-2733  
*Web Site:* <http://studentaffairs.stanford.edu/studentlife>

The Dean of Student Life has responsibility for overseeing the development, implementation, and monitoring of comprehensive student life programs. The unit consists of the Graduate Life Office, Office of Student Activities and Leadership, Judicial Affairs, Organization Conduct Board, Office of Sexual Assault and Relationship Abuse Education & Response, Old Union, and 5-SURE. The Dean reports to the Vice Provost for Student Affairs and is a member of his executive group.

## DEAN OF EDUCATIONAL RESOURCES

*Dean of Educational Resources:* Sally Dickson

*Office:* Old Union

*Phone:* (650) 721-4037

*Web Site:* <http://studentaffairs.stanford.edu/educationalresources>

The Dean of Educational Resources is responsible for overseeing the development, implementation, and monitoring of comprehensive programs relating to ethnic, gender, career, and learning needs and interests of student groups. The unit is comprised of the Asian American Activities Center, Black Community Services Center, El Centro Chicano, LGBT Community Resources Center, Native American Cultural Center, Women's Community Center, Diversity and First Gen Programs, Bechtel International Center, Career Development Center, and the Office of Accessible Education. The Dean also has oversight responsibility for the Haas Center for Public Service, as well as responsibility for the Acts of Intolerance Protocol. The Dean reports to the Vice Provost for Student Affairs and serves as a member of his executive group.

## OFFICE OF ACCESSIBLE EDUCATION (OAE)

*Offices:* 563 Salvatierra Walk

*Phone:* (650) 723-1066; TDD (650) 723-1067

*Web Site:* <http://studentaffairs.stanford.edu/oae>

The Office of Accessible Education (OAE) is the campus office designated to work with students, faculty, and staff to put in place appropriate accommodations for all Stanford students with disabilities, at both the undergraduate and graduate levels (including the professional schools). The OAE provides a wide array of support services, accommodations, and programs to remove barriers to full participation in the life of the University.

In reaching its determinations about appropriate accommodations, the OAE considers factors such as the documentation from professionals specializing in the area of the student's diagnosed disability, the student's functional limitations, and the student's input and accommodation history in regard to particular needs and limitations. The OAE then works with the student and relevant faculty and staff through an interactive process designed to achieve an accommodation that meets the needs of all parties.

## CAREER DEVELOPMENT CENTER

*Center Office:* 563 Salvatierra Walk

*Web Site:* <http://cardinalcareers.stanford.edu>

*Counseling Services*—Monday through Friday, 9 a.m. to 12 noon, 1 p.m. to 5 p.m.; (650) 725-1789.

*Employment Services*—Monday through Friday, 8:15 a.m. to 4:30 p.m.; (650) 723-9014.

*Reference File Services*—Monday through Friday, 10 a.m. to 12 noon, 1 p.m. to 4 p.m.; (650) 723-1548.

The Career Development Center (CDC) offers services such as counseling, workshops, presentations, on-campus recruiting, job/internship databases, reference file services, library resources, and alumni networking, to help students make informed decisions and to plan for life after Stanford.

Services are available to undergraduate and graduate students, and all students are encouraged to visit in person or via the web. Programs and services are free to students; limited services are available to alumni and student spouses/domestic partners.

The following suggestions may assist students in getting the most out of the CDC:

- Visit early in a Stanford career.
- Register with the CDC's Cardinal Career online system to access internships, part-time and full-time.
- Gather general career information through the career resource library, jobs and internship database, handouts, and alumni network.
- Inquire about individual counseling for all stages of career planning and development.
- Participate in workshops and other programs to clarify career goals.
- Use the Reference File Service to ease the management of applications for graduate school or employment.

## COMMUNITY CENTERS

There are six ethnic and community centers that support students who seek services associated with a particular group or community. Each center has its own site and professional staff who advise and counsel students. In addition, the centers sponsor programs throughout the year that foster intellectual, personal, and cultural growth. Detailed information is available on the following web sites:

- Asian American Activities Center: <http://stanford.edu/group/a3c>
- Black Community Services Center: <http://stanford.edu/dept/BCSC>
- El Centro Chicano: <http://stanford.edu/dept/elcentro>
- LGBT Community Resources Center: <http://lgbt.stanford.edu>
- Native American Cultural Center: <http://stanford.edu/dept/nacc>
- Women's Community Center: <http://womenscntr.stanford.edu>

## DIVERSITY AND FIRST GEN PROGRAMS

*Director:* Tommy Lee Woon

*Office:* Old Union, Suite 206

*Phone:* (650) 721-6870

*Email:* [tlw@stanford.edu](mailto:tlw@stanford.edu)

Established in 2010 to serve first generation and low-income students and help them be successful, the Office of Diversity and First Gen Programs provides:

- a *Thrive Guide* to publicize the abundance of support available
- contact information for student groups, staff, faculty, and alumni for networking and mentoring
- signature programs and special events to build community
- administrative support and advocacy for diversity programs, especially those highlighting socioeconomic issues

## GRADUATE LIFE OFFICE

*Graduate Life Office:* Escondido Village Office, 859 Comstock Circle

*Graduate Life Office, Graduate Community Center:* 750 Escondido Road

*Phone:* (650) 736-7078

*Email:* [graduatelife@stanford.edu](mailto:graduatelife@stanford.edu)

*Web Site:* <http://glo.stanford.edu>

The Graduate Life Office (GLO) works with students on and off campus and with student groups, including Community Associates (student residence staff), the Graduate Student Programming Board, and the Graduate Student Council, to create an inclusive environment through programs in the residences and campus-wide. The Graduate Community Center (GCC) serves as a focal point for meetings and activities in the graduate community.

The GLO staff also works with individual students who need information and support or who may be experiencing personal difficulties. Staff members are knowledgeable about and have access to support and resources available throughout the University. Staff work closely with student services administrators in academic departments to provide consultation and services to students in need.

### GRADUATE STUDENT RESIDENCE PROGRAM

The University's philosophy of graduate student housing is based on the premise that supporting high quality graduate scholarship and research is central to the mission of the University. By providing affordable housing in proximity to academic resources, the University creates an environment conducive to research and intellectual dialogue among students, their peers, and faculty members. The Community Associate (CA) program in the residences serves as a supportive resource for residents and to connect student neighbors through social events and activities to build a sense of community in the residences.

## HAAS CENTER FOR PUBLIC SERVICE

*Center Offices:* 562 Salvatierra Walk

*Mail Code:* 8620

*Phone:* (650) 723-0992

*Web Site:* <http://haas.stanford.edu>

The Haas Center for Public Service connects academic study with public service to strengthen communities and develop effective public leaders. The center aspires to develop aware, engaged, and thoughtful citizens who contribute to the realization of a more just and humane world.

To accomplish these objectives, the center collaborates with associated units at Stanford to implement programs in the following areas of work.

- Through the center's fellowship programs, undergraduates perform summer internships in nonprofit organizations, foundations, and government agencies locally, nationally, and internationally. Postgraduate fellowships allow graduating seniors to work with a mentor in a nonprofit or public agency for a year.
- The Public Service Leadership Fellows Program provides an opportunity for students who want to be intentional about their leadership development. Center staff also provides leadership development through training, advising, and resources to Stanford in Government, Alternative Spring Break, and other student groups engaged in service.

- With support from the center, Stanford faculty members have created service-learning courses that involve Stanford students in providing direct service and community-based research efforts in collaboration with local schools and other partner agencies. The center's Public Service Scholars Program supports seniors writing honors theses that combine academic research with service to communities.
- Faculty from Stanford's School of Education collaborate with center staff to provide curriculum guidance and training for tutors and mentors at nearby schools. Another program trains Stanford students to bring results of scientific research to neighborhood programs. The federally supported Community Service Work-Study program, administered in conjunction with the University's Financial Aid Office, allows students to satisfy work-study obligations year-round by working in community organizations and public agencies.
- The postgraduate and alumni programs help students, particularly graduating seniors, identify opportunities to assist in launching their public service careers in nonprofit and government agencies, and in the private sector in service-related positions. The Haas Center houses the Center on Philanthropy and Civil Society, a program of the Institute for Research in the Social Sciences (IRiSS).

Students interested in public service fellowships, service-learning courses, community-based research, public and community service internships for youth and education, or service organization leadership development should contact the center.

## BECHTEL INTERNATIONAL CENTER

*Web Site:* <http://icenter.stanford.edu>

The Bechtel International Center (I-Center) is a meeting place for students and senior research scholars at Stanford from throughout the world and for internationally oriented U.S. students, faculty, and short-term visitors on the campus. Through a variety of social, cultural, and educational programs, I-Center facilities are used to acquaint students and scholars with the life of the University and the community, and to bring them together in activities of mutual interest.

The Center believes that international educational exchange nurtures a lifelong global perspective, and plays a key role in supporting Stanford's standing as a truly international university in the following ways:

- Provides information about and assistance with obtaining and maintaining legal status in the U.S. to foreign students, scholars, and Stanford departments.
- Advises U.S. students who are pursuing scholarships for study and research abroad.
- Enables foreign students, scholars, and their family members at Stanford to receive maximum academic, cultural, and personal benefit from their stays in the U.S.
- Contributes to international activities at Stanford by helping to create a welcoming and supportive environment that is responsive to the needs of the international community.
- Facilitates professional meetings between visiting international delegations and their Stanford counterparts.
- Provides opportunities for Stanford students, faculty, staff, and members of the local community to broaden their horizons by interacting with people from different cultures through programs to increase international awareness and understanding.

# JUDICIAL AFFAIRS AND STUDENT CONDUCT

Office: Tresidder Memorial Union, 2nd floor  
Mailing Address: 459 Lagunita Drive, Suite 9  
Mail Code: 94305-3010  
Phone: (650) 725-2485  
Fax: (650) 736-0247  
Web Site: <http://judicialaffairs.stanford.edu>  
Email: [judicial.affairs@stanford.edu](mailto:judicial.affairs@stanford.edu)

The primary codes of conduct for students are the Fundamental Standard and Honor Code. Cases of alleged violations of the University's Honor Code, Fundamental Standard, and other student conduct or University policies now proceed through an established student judicial process based upon the Student Judicial Charter of 1997, which can be found in its entirety at the University's Office of Judicial Affairs web site at <http://judicialaffairs.stanford.edu>. The web site also contains the policies, rules, and interpretations, as well as the University's Student Conduct Penalty Code, applicable to those students found responsible for violating the Honor Code, the Fundamental Standard, or other University policy or rule.

Through at least December 2011, allegations of sexual misconduct, sexual harassment, stalking, or dating violence proceed through the Dean's Alternate Misconduct Review Process. See <http://www.stanford.edu/dept/vpsa/judicialaffairs/judicialprocess/ar.htm>.

When a violation of the Fundamental Standard, Honor Code, or other University policy or rule governing student conduct is alleged, or whenever a member of the University community believes such a violation has occurred, he or she should contact the Office of Judicial Affairs.

## FUNDAMENTAL STANDARD

Students at Stanford are expected to know, understand, and abide by the Fundamental Standard, which is the University's basic statement on behavioral expectations articulated in 1896 by Stanford's first President, David Starr Jordan, as follows:

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

*Actions that have been found to be in violation of the Fundamental Standard include:*

- Physical assault
- Property damage
- Forgery
- Theft
- Sexual harassment or other sexual misconduct
- Misrepresentation in seeking financial aid, University housing, University meals, or other University benefits
- Driving on campus while under the influence of alcohol
- Misuse of computer equipment or email
- Sending threatening or obscene messages

There is no standard penalty which applies to violations of the Fundamental Standard. Penalties range from a formal warning to expulsion. Each case is fact specific; considerations include the nature and seriousness of the offense, the motivation underlying the offense, and precedent in similar cases.

## HONOR CODE

The Honor Code is the University's statement on academic integrity. It is essentially the application of the Fundamental Standard to academic matters. Provisions of the Honor Code date from 1921, when the honor system was established by the

Academic Council of the University Faculty at the request of the student body and with the approval of the President. The Honor Code reads:

- A. The Honor Code is an undertaking of the students, individually and collectively:
  1. that they will not give or receive aid in examinations; that they will not give or receive unpermitted aid in class work, in the preparation of reports, or in any other work that is to be used by the instructor as the basis of grading;
  2. that they will do their share and take an active part in seeing to it that others as well as themselves uphold the spirit and letter of the Honor Code.
- B. The faculty on its part manifests its confidence in the honor of its students by refraining from proctoring examinations and from taking unusual and unreasonable precautions to prevent the forms of dishonesty mentioned above. The faculty will also avoid, as far as practicable, academic procedures that create temptations to violate the Honor Code.
- C. While the faculty alone has the right and obligation to set academic requirements, the students and faculty will work together to establish optimal conditions for honorable academic work.

*Examples of conduct that has been found to be in violation of the Honor Code include:*

- Copying from another's examination paper or allowing another to copy from one's own paper
- Unpermitted collaboration
- Plagiarism
- Revising and resubmitting a quiz or exam for regrading without the instructor's knowledge and consent
- Representing as one's own work the work of another
- Giving or receiving aid on an academic assignment under circumstances in which a reasonable person should have known that such aid was not permitted

For more information, see the Interpretations and Applications of the Honor Code at <http://stanford.edu/dept/vpsa/judicialaffairs/guiding/honorcode>.

The standard penalty for a first offense is a one quarter suspension from the University and 40 hours of community service. In addition, many faculty members issue a 'No Pass' for the course in which the violation occurred.

## OLD UNION

Stanford's student union, known as the Old Union, serves as a hub for student activities on campus. The central structure in a three-building complex, the Old Union has administrative offices for ASSU, Office of Student Activities (OSA), Dean of Student Life, and Dean of Educational Resources. It also houses a multifunction center known as CIRCLE (Center for Inter-Religious Community, Learning, and Experiences), meeting rooms for student use, and the Axe and Palm which offers casual dining. Adjoining the Old Union, the Nitery houses a black-box theater and El Centro Chicano, and the Clubhouse is home to the Asian American Activities Center and the Native American Cultural Center.

## OFFICE OF RESIDENTIAL EDUCATION

Web Site: <http://www.stanford.edu/dept/resed/>

The Office of Residential Education is responsible for developing the policies, programs, and staffing which support the intellectual, educational, and community-building activities in student residences. The conviction behind the Stanford residence

program is that formal teaching, informal learning, and personal support in residences play an important role in a Stanford education.

## RESIDENTIAL EDUCATION PROGRAM

The Residential Education program provides Stanford undergraduates with a small community experience within a large research university. Residential Education programs extend the classroom into the residences and complement the academic curriculum with activities and experiences that contribute to students' preparation for a life of leadership, intellectual engagement, citizenship, and service. An extensive network of staff, including many who live in the residence halls, supports students during their undergraduate careers.

## RESIDENCE DEANS

Residence Deans provide assistance to on- and off-campus undergraduate students. They can advise students about personal matters, occasionally intervene directly in behavioral problems or mental health concerns, and assist with personal emergencies. Advice is also available on issues of academic probation or suspension, leaves of absence, special concerns of students, and administrative matters. Residence Deans work closely with the Dean of Student Life and other University offices. They are assigned to specific residences and to off-campus students. For further information, undergraduates should call Residential Education at (650) 725-2800. For assistance, graduate students can consult Assistant Deans in the Graduate Life Office at (650) 736-7078.

## SEXUAL ASSAULT AND RELATIONSHIP ABUSE EDUCATION AND RESPONSE

*Web Site:* <http://www.stanford.edu/group/svab>  
*Email:* [saraoffice@stanford.edu](mailto:saraoffice@stanford.edu)

The Office of Sexual Assault and Relationship Abuse Education and Response (SARA) addresses policies, programs, protocols, and services related to interpersonal relationship violence on campus. The office is designed to coordinate response to reports of sexual assault, relationship abuse, and stalking to ensure the delivery of compassionate, comprehensive, and consistent services. The office also assists with educational outreach and training to increase awareness, sensitivity, and community accountability in the prevention of these acts. Questions and concerns can be addressed to [saraoffice@stanford.edu](mailto:saraoffice@stanford.edu).

## STUDENT ACTIVITIES AND LEADERSHIP

*Web Site:* <http://studentaffairs.stanford.edu/sal>

The Office of Student Activities and Leadership (SAL), located in Old Union, supports student activities, over 600 student organizations and the ASSU through publications, workshops, one-on-one consultation, advising and major event planning support. SAL also provides fundraising expertise for student groups and leadership opportunities for students.

## VOLUNTARY STUDENT ORGANIZATIONS

There are over 600 different Voluntary Student Organizations

(VSOs) at Stanford. VSOs are those organizations: (1) in which membership is not mandatory and is nondiscriminatory, (2) in which membership is both open and limited to current Stanford students registered in a degree-granting program, (3) in which students make all organizational decisions, and (4) whose purposes and procedures are consistent with the goals and standards of the University. In order to use University facilities, the Stanford name, or to receive ASSU funding, all voluntary student organizations must register with the University through the Office of Student Activities, Old Union, room 206.

As a condition of registration, each voluntary student organization must file and have approved each of the following:

1. A statement of purpose and organizational constitution.
2. A statement about membership eligibility.
3. Clear procedures for officer elections.
4. Identification of the authorized representatives of the group, who must be a currently registered student, and at least five active members in the organization who are currently registered students.

Each voluntary student organization must renew its registration with the University annually, early in Autumn Quarter, by submitting new registration materials.

If a voluntary student organization that is registered with the University seeks to use University facilities for meetings open to more than its own members and to specifically invited guests, such meetings shall be subject to the regulations of the Committee on Public Events. All organization events held in University facilities must receive event approval from the Office of Student Activities and Stanford Events.

A voluntary student religious organization may hold open meetings in University facilities only with the approval of the Office of the Dean for Religious Life.

A registered voluntary student organization may advocate publicly a position on a public issue, provided the organization clearly identifies itself, and provided such an organization in any public statement makes clear it does not represent or speak for the University or for the Associated Students.

No student group may use University space or facilities or receive other University support for purposes of supporting candidates for public office. Groups may use public places such as White Plaza for tables, speeches, and similar activities; may have intermittent use of on-campus meeting rooms; and may request to reserve auditoriums and similar space for public events including speeches by political candidates as long as all University guidelines are followed.

## TRESIDDER MEMORIAL UNION

Tresidder Memorial Union (TMU) is a center of community activity on the Stanford campus. It houses a variety of restaurants and meeting rooms, a ticket office and campus information center, a convenience store, banking and credit union offices with ATMs, a fitness center, FedEx/Kinkos and a hair salon.

TMU is also the home of several administrative offices: Meeting Services, Judicial Affairs, Residential Education, Student Services Center, Stanford Catering, Stanford Dining (Meal Card program), the LAIR computer center and the Office of the Vice Provost for Student Affairs.

## VADEN HEALTH CENTER

*Center Office:* 866 Campus Drive  
*Web Site:* <http://vaden.stanford.edu>

The Allene G. Vaden Health Center strictly protects the confidentiality of information obtained in medical care and counseling.



## MEDICAL SERVICES

Medical Services (650-498-2336, ext. 1) is the first stop for diagnosis and treatment of illness, injury, and ongoing conditions, as well as preventive counseling and education. Services available without additional charge for students who have paid the Campus Health Service fee include:

- Medical appointments in general medicine and sports medicine.
- Medical advice for routine concerns throughout the day. When Medical Services is closed, advice for urgent conditions is available from the on-call physician.
- Referral to specialists, primarily at Stanford Hospital and Clinics and Menlo Medical Clinic.

Additional services (fees apply):

- Allergy injections, immunizations, travel services, physical exams for employment and scholarships, HIV testing, laboratory, X-rays, drug screening (academic year only).
- Pharmacy (650-498-2336, ext. 3) and physical therapy (650-723-3195) are available on site.

## COUNSELING AND PSYCHOLOGICAL SERVICES (CAPS)

CAPS (650-723-3785) helps students who experience a wide variety of personal, academic, and relationship concerns. Services available without additional charge for students who have paid the Campus Health Service Fee include:

- Evaluation and brief counseling, including personal, couples and group therapy. Students requesting or requiring longer, ongoing therapy incur fees.
- Workshops and groups that focus on students' social, personal and academic effectiveness.
- Crisis counseling for urgent situations 24 hours a day.
- Consultation and outreach to faculty, staff, and student organizations.

## YWCA SEXUAL ASSAULT CENTER AT STANFORD

The YWCA Sexual Assault Center at Stanford assists students, staff, faculty and other Stanford campus affiliates who are victims of sexual assault. Located on the first floor of Vaden Health Center, it is open by appointment or drop-in office hours, Monday through Thursday, 2:00-4:00 PM. The center also can be reached at its 24-hour campus telephone line (650) 725-9955.

## HEALTH PROMOTION SERVICES

Health Promotion Services (650-723-0821) educates and supports students to help them make informed, healthy decisions about their lifestyle. Services include:

- Individual preventive counseling and resource referral concerning nutrition, weight management, eating and body image, alcohol, tobacco and other drug use, sexual assault and harassment, relationships, intimacy and gender issues, and sexual health.
- Health education speakers, programs, and events and workshops at student residences, community centers, student organizations, and for new students (such as Real World: Stanford).
- Academic courses and internships.
- Student groups and volunteer opportunities including Peer Health Educators, HIV Peer Anonymous Counseling and Testing (HIV\*PACT), Sexual Health Peer Resource Center (SHPRC), and CPR/First Aid classes.

## HEALTH INSURANCE

All registered students are required to have health insurance. Call (650) 723-2135 for more information. Cardinal Care, the University-sponsored plan for students, fulfills this requirement. Insured by Aetna Student Health (medical), and ValueOptions (mental health), Cardinal Care features comprehensive, worldwide coverage, services by referral at Stanford University Medical Center and Menlo Medical Clinic, and lowest costs when one initiates care at Vaden Health Center. Stanford does not sponsor a health insurance plan for dependents; for available options, see <http://vaden.stanford.edu/insurance/dependent.html>. Options for voluntary dental insurance are also offered.

# OTHER SERVICES AND PROGRAMS

## BOOKSTORE

*Web Site:* <http://stanfordbookstore.com>

Organized in 1897, Stanford Bookstore, (650) 329-1217, located at 519 Lasuen Mall (White Plaza), provides a diverse selection of books, course materials, and supplies to the students, faculty, staff, and community in and surrounding Stanford. The bookstore carries over 130,000 titles, including a wide selection of medical books and books written by Stanford authors, making it one of the largest bookstores in the nation. The bookstore also carries medical instruments, Stanford logo apparel, gifts and souvenirs, periodicals, and features a café that provides an enhanced shopping experience. The Computer Store, in the main branch, sells academically priced computer hardware and software. Other services include shipping of purchases, gift cards, book buyback, fax service, postage stamp sales, an ATM, and Enterprise Rent-A-Car hotline. There are four branches in addition to the Stanford Bookstore that also serve the community: the Stanford Athletics Shop (formerly the Track House Sports Shop), (650) 327-8870, underneath the Cobb Track and Angell Field bleachers, is the headquarters for Stanford Athletic Gear; Tresidder Express convenience store, (650) 723-9224 in Tresidder Union; the Stanford Shop, (650) 614-0295, at the Stanford Shopping Center, provides Stanford apparel; and the Bookshop, (650) 725-2775, at the Cantor Center for the Arts, carries books on the arts, fine gifts, apparel, and jewelry.

## DIVERSITY AND ACCESS OFFICE

*Office:* Mariposa House, 585 Capistrano Way

*Mail Code:* 94305-8230

*Phone:* (650) 723-0755; *TTY:* (650) 723-1216

*Email:* [equal.opportunity@stanford.edu](mailto:equal.opportunity@stanford.edu),  
[disability.access@stanford.edu](mailto:disability.access@stanford.edu)

*Web Site:* <http://stanford.edu/dept/diversityaccess>

The Diversity and Access Office has two primary missions:

1. To oversee University compliance with nondiscrimination and equal opportunity laws (including but not limited to Title VI, Title VII, and Title IX), as well as the regulations relating to affirmative action. This includes collecting, monitoring, reporting, and analyzing personnel data regarding the hiring, promotion, and retention of women and minorities.
2. To oversee University compliance with federal and state disability-related laws, including (but not limited to) the Americans with Disabilities Act, and Sections 503 and 504 of the Rehabilitation Act. This includes providing certain non-academic services (and accommodations) to students with disabilities, and providing assistance and information to staff and faculty with disabilities needing workplace accommodations. The office also provides auxiliary aids and services to the public visiting Stanford and attending public events. In addition, the office monitors disability access on campus and provides information regarding web accessibility.

## STANFORD CONFERENCE SERVICES

*Phone:* (650) 723-3126

*Email:* [conferenceinquiries@stanford.edu](mailto:conferenceinquiries@stanford.edu)

*Web Site:* <http://conference.stanford.edu>

A conference is defined as any student, youth, or adult group that convenes for part of a day (including a luncheon), overnight, or for several days, outside the regular or summer academic sessions for registered students. Policies concerning conferences are the responsibility of the offices of the President and the Provost.

To make arrangements for hosting a new, academically sponsored residential summer conference during the mid-June through late-August time frame, contact Stanford Conference Services by phone or email as listed above. Stanford Conference Services also offers meeting planning services on a year-round basis for academically sponsored conference groups seeking assistance with planning and managing residential and non-residential conferences. In addition, conference organizers seeking to conduct conferences outside of the late August to early June time frame can also contact the non-academic facilities scheduling in the Office of the University Registrar, (650) 723-6755 or [reg-events@stanford.edu](mailto:reg-events@stanford.edu), or contact Stanford Events, (650) 723-2551 or [stanfordevents@stanford.edu](mailto:stanfordevents@stanford.edu).

Academic sponsorship by a Stanford dean or department head is required for first time conferences hosted by University departments or by conferences hosted by external organizations interested in meeting at Stanford. Conferences initiated by University departments or external organizations must demonstrate consistency with the University's academic mission. For summer conferences, the sponsoring department submits its proposal to the Director of Stanford Conference Services for review in terms of available facilities and for the approval of the President's Office. At least half of the participants in any summer conference at Stanford hosted by an external organization must be housed in Stanford's campus residences and participate in daily meal plans provided by Stanford Dining. On-campus residential housing and dining services are normally available from the Sunday following Commencement through late August.

Summer conference groups should contact Stanford Conference Services concerning arrangements for tables, chairs, audio-visual aids, signage, janitorial services, trash pick-up and removal, sprinkler shutoffs, and other conference-related products/services. During the academic year, housing arrangements for University-sponsored visitors can be made through the Stanford Guest House, (650) 926-2800, or at <http://guesthouse.stanford.edu>.

## OMBUDS

*Stanford University Ombuds:* David Rasch

*Ombuds Office:* Mariposa House, 585 Capistrano Way, Room 210

*Phone:* (650) 723-3682

*Fax:* (650) 725-7288

*Mail Code:* 94305-8200

*Email:* [rasch@stanford.edu](mailto:rasch@stanford.edu)

*Web Site:* <http://stanford.edu/dept/ombuds>

*School of Medicine Ombuds:* <http://med.stanford.edu/ombuds>

The charge to the Ombuds office at Stanford is: "The Ombudsperson's task is to protect the interests and rights of members of the Stanford community from injustices or abuses of discretion, from gross inefficiency, from unnecessary delay and complication in the administration of University rules and regulations, and from inconsistency, unfairness, unresponsiveness, and prejudice in the individual's experience with University activities. The Ombudsperson's office exists to receive, examine, and channel the complaints and grievances of members of the

Stanford community, and to secure expeditious and impartial redress."

Any troublesome matter in the University community may be discussed in confidence with the University Ombuds. Services of the office are available to students, staff, and faculty. Although possessing no decision making authority, the Ombuds has wide powers of inquiry. The Ombuds refers matters to the proper person or office expeditiously and also provides conflict resolution services. For the role of the office of the Ombuds in cases of sexual harassment, see the "Non-Academic Regulations" section of this bulletin.

## POLICE SERVICES

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*Department Office:* Corner of Campus Drive and Serra Street  
*Phone:* (650) 723-9633  
*Web Site:* <http://police.stanford.edu>

The Stanford Department of Public Safety is a full service police department that operates 24 hours a day, 7 days a week. For police, fire, or ambulance response, dial 9-1-1, or 9-9-1-1 from a University phone. Emergency assistance can also be obtained by using one of the nearly 100 Blue Emergency Phone Towers strategically placed around campus.

The department is composed of the following divisions:

The Field Services Division consists of sworn and non-sworn officers who patrol the campus and respond to calls for service. Sworn officers receive their police powers through the Santa Clara County Sheriff's Office. Sworn officers have the legal authority to stop vehicles, make arrests, and enforce all laws. Non-sworn officers assist the sworn officers with security patrols, evidence collection, crime prevention presentations, and other assigned tasks.

Community Service Division: Community Service Officers (CSOs) enforce the parking rules and regulations on campus, and provide traffic control at special events, construction zones, and accident scenes. CSOs also provide building security during emergency or critical incidents.

The Support Services Division provides logistical, technical, and accounting support to the department. Special events are handled through this division as well. Special Events Personnel (SEPs) provide security at campus events including athletic events, concerts, student-sponsored events, and dignitary visits. SEPs are available for hire by groups needing security at their University events. Contact the special events office at (650) 723-4924, or email [event\\_security@stanford.edu](mailto:event_security@stanford.edu), for more information.

The Administrative Support Division supports the department through training, recruiting, payroll, human resources, and other business functions.

For additional safety information or to view the yearly crime statistics, see the Stanford Safety and Security Almanac, available free from Public Safety, or see <http://police.stanford.edu>.

## OFFICE FOR RELIGIOUS LIFE

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*Office:* Memorial Church  
*Phone:* (650) 723-1762  
*Web Site:* <http://religiouslife.stanford.edu>

The mission of the Office for Religious Life (ORL) is to guide and enhance spiritual, religious, and ethical life within the Stanford University community. Multifaith exploration and dialogue, central in Stanford's history from its founding, is a vital part of both its ethos and education.

The ORL is committed to welcoming students of all genders and sexual identities, all religious and non-religious traditions, and all cultural backgrounds, striving to ensure that students, faculty, and staff have access to supportive contexts in which to pursue their spiritual journeys on the Stanford campus.

The ORL oversees and provides support for Stanford Associated Religions (SAR), more than thirty religious organizations that offer their spiritual services to the campus, as well as the Center for Inter-Religious Community, Learning, and Experiences (the CIRCLE). Located on the third floor of the remodeled Old Union, the CIRCLE offers an interfaith sanctuary, a seminar room, a common room, a student lounge, a non-lending library, and offices housing many SAR member groups.

## STANFORD ALUMNI ASSOCIATION

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*Web Site:* <http://stanfordalumni.org>  
*Phone:* (800) 786-2586 or (650) 723-2021

The Stanford Alumni Association (SAA) seeks to serve all Stanford alumni and students by offering programs and services such as reunions, regional events, *Stanford Magazine*, online services, volunteer and learning opportunities, and the alumni directory.

The Stanford Alumni Association's alumni and student class outreach department (ASCO) provides undergraduates and graduate students with networking opportunities, celebratory and social events, and programs that enhance their Stanford experience and help connect them to the 200,000 alumni worldwide who make up the Stanford alumni community. ASCO programs bring students and alumni together through Reunion Homecoming Weekend each autumn and Commencement weekend in the spring, along with alumni networking events throughout the year.

For students, SAA sponsors events such as student tailgates, alumni panels, Senior Send-off, Senior Dinner on the Quad, and Class Day. The Alumni Association gives out the J.E. Wallace Sterling Award and the Stanford Award of Excellence annually to honor graduating seniors for exemplary service to the University. For more information on student programs at the Stanford Alumni Association, see <http://www.stanfordalumni.org/students/home.html>.

## STANFORD EVENTS

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Stanford Events supports the mission and goals of Stanford University through open engagement of the campus community and the worldwide public. The department has three divisions: Public Events, Stanford Lively Arts, and the Stanford Ticket Office.

Public Events oversees, advises, and produces University events and ceremonies as designated by the President's office such as: Commencement, Baccalaureate, the University President's inaugurations, New Student Orientation Convocation, Community Day/Founders' Celebration, and other high-profile university events. This division also serves in an advisory capacity to the schools, departments, and student groups on campus, and oversees University policy and procedure regarding campus events. The Public Events office has final approval authority of Stanford facility and open space use for non-academic public events on campus. For information about University event planning, policies, procedures, and University facilities, see <http://stanfordevents.stanford.edu>, or call (650) 723-2551.

Stanford Lively Arts, the University's presenting program, annually brings to campus a full season of music, dance, and theater by world-famous artists and exceptional newcomers. It furthers research and creativity through world premieres, collaborations, and commissions. In addition to on-stage performances, Lively Arts extends and supplements the academic life of the University through master classes, extended residencies, workshops, lectures and demonstrations, and group discussions. Internationally acclaimed artists perform serious work with Stanford students in classrooms as well as in residence halls.

Discounts on performances are available for faculty, staff, and students. For tickets and more information, see <http://livelyarts.stanford.edu>, or call (650) 725-ARTS (2787).

Stanford Ticket Office provides ticketing services for the arts and entertainment events of Stanford University. Tickets for Stanford Lively Arts, Stanford music and drama departments, Stanford Jazz Workshop/Festival, and the ASSU Concert Network are among the event tickets that are available through this office. For more information, see <http://tickets.stanford.edu>, or call (650) 725-ARTS (2787).

## AWARDS AND HONORS

### FACULTY AND STAFF AWARDS

#### KENNETH M. CUTHBERTSON AWARD

The Kenneth M. Cuthbertson Award was established in 1981 to recognize exceptional service to Stanford University. It was established by members of the faculty who wish to remain anonymous. All members of the Stanford community are eligible for the award; the sole criterion is the quality of the contribution that the recipients have made to the University. The award provides a way of honoring members of the staff and faculty for their efforts on behalf of the University.

Ordinarily, one award is made each year. The award was first presented in 1981 to the person for whom it is named. Kenneth M. Cuthbertson was one of the early architects of Stanford's long-term financial planning and fundraising program. His service to Stanford set an enduring standard for those who will come after him. The award is made annually at the University Commencement Ceremony.

#### LLOYD W. DINKELSPIEL AWARDS

The Lloyd W. Dinkelspiel Awards recognize distinctive and exceptional contributions to undergraduate education at Stanford University. The two principal awards are made to the faculty or staff members adjudged to have made the most distinctive contribution to the development and enrichment of undergraduate education in its broadest sense. Two awards are also made to graduating seniors who combine academic achievement with effective contributions to undergraduate student life. Preference is given to service in the School of Humanities and Sciences in the area of liberal education. The awards are made from an endowment fund established in memory of Lloyd W. Dinkelspiel, a Stanford alumnus and trustee. The awards are made annually at the University Commencement Ceremony.

#### WALTER J. GORES AWARDS

The Walter J. Gores Faculty Achievement Awards for excellence in teaching were established by bequest of Walter J. Gores, Stanford Alumnus of the Class of 1917 and a professor at the University of Michigan for 30 years. Teaching is understood in its broadest sense and includes, in particular, lecturing, leading discussions, tutoring, and advising at the undergraduate or graduate levels. Any member of the teaching staff of the University is eligible for an award, including all faculty of professorial rank, instructors, lecturers, teaching fellows, and teaching and course assistants. Ordinarily, awards are made to a senior faculty member (associate or full professor) or senior lecturer; a junior faculty member or member of the teaching staff; and a teaching assistant (graduate or undergraduate student). The awards are made annually at the University Commencement Ceremony.

#### ALLAN COX MEDAL FOR FACULTY EXCELLENCE FOSTERING UNDERGRADUATE RESEARCH

The Allan Cox Medal for Faculty Excellence Fostering Undergraduate Research is awarded annually to a faculty member

who has established a record of excellence directing undergraduate research over a number of years. It may also go to a faculty member who has done an especially outstanding job with just one or two undergraduates who have demonstrated superior work. The medal was established in memory of the former professor of Geophysics and Dean of the School of Earth Sciences, a strong supporter of faculty-student research collaboration.

#### HERBERT HOOVER MEDAL FOR DISTINGUISHED SERVICE

David Starr Jordan's belief that every academic degree should represent work actually done in or under the direction of the institution granting it has meant that, since its founding, Stanford has awarded no honorary degrees. As a means of recognizing extraordinary individuals who deserve special acknowledgment, the Stanford Alumni Association in 1962 voted to establish the Herbert Hoover Medal for Distinguished Service. The name pays tribute to the former President's example of service to his University, to his country, and to the cause of world humanitarianism. Indeed, Mr. Hoover was the first award recipient. The gold medal is presented following selection by an anonymous committee appointed by the Chair of the Board of Directors of the Alumni Association.

### STUDENT AWARDS

#### BOOTHE PRIZE FOR EXCELLENCE IN WRITING

Awarded during the freshman year, the Boothe Prize recognizes excellence in writing. Students are selected for this honor on the basis of essays written for courses fulfilling the Introduction to the Humanities or Writing and Rhetoric requirements. The prize is named for Mr. and Mrs. D. Power Boothe, Jr., whose gifts to the University reflect their interest in the humanities.

#### PRESIDENT'S AWARD FOR ACADEMIC EXCELLENCE IN THE FRESHMAN YEAR

The President's Award honors students in the top 3% of the class who have exceptionally distinguished academic records that exemplify a strong program of study in the freshman year. Students eligible for the award normally have completed Writing and Rhetoric and Introduction to the Humanities requirements during their first year at Stanford.

#### DEANS' AWARD FOR ACADEMIC ACHIEVEMENT

The Deans of Earth Sciences, Engineering, and Humanities and Sciences recognize from five to ten undergraduate students each year for their academic endeavors. Honorees are cited for noteworthy accomplishments which represent more than a high grade point average or success in course work. Faculty nominate students who have exceptional tangible achievements in classes or independent research, national academic competitions, a presentation or publication for a regional or national audience, or exceptional performance in the creative arts.

#### FIRESTONE MEDAL FOR EXCELLENCE IN RESEARCH

The Firestone Medal is awarded to seniors in recognition of excellence in undergraduate research. Departments in the School of Humanities and Sciences nominate students who have completed outstanding honors projects in the social, physical, and natural sciences.

## **ROBERT M. GOLDEN MEDAL FOR EXCELLENCE IN THE HUMANITIES AND CREATIVE ARTS**

The Golden Medal recognizes outstanding achievement in the humanities and the creative arts. Seniors receive these medals upon nomination by their major department.

## **HOEFER PRIZE FOR EXCELLENCE IN UNDERGRADUATE WRITING**

The Hoefer Prize recognizes students and faculty for their work in courses that meet the University Writing Requirement for writing in the major. Prizes are awarded in each of the five areas of the undergraduate curriculum: humanities, social sciences, natural sciences, engineering, and earth sciences.

## **FREDERICK EMMONS TERMAN ENGINEERING SCHOLASTIC AWARD**

The School of Engineering annually presents the Terman Award to seniors for outstanding academic achievement. The awardees share their award with a high school teacher of their nomination.

## **PHI BETA KAPPA**

Phi Beta Kappa is a nationwide society honoring students for the excellence and breadth of their undergraduate scholarly accomplishments. Membership in the Stanford Chapter (Beta of California) is open to undergraduates of all majors. To be elected to Phi Beta Kappa at Stanford, a student must achieve academic distinction in the major as well as in courses across a broad range of fields.

Approximately a tenth of the members of a graduating class are elected to Phi Beta Kappa. Of this number, about one fifth are chosen in their junior year, the remainder in their senior year.

The chapter's election guidelines define breadth of study as excellence beyond the major field. To be considered for election, a student must have taken at least three courses of 3 units or more at Stanford by the time elections are held early in the Spring Quarter with a letter grade of 'B-' or better in each of the following three major domains of knowledge: humanities; science, engineering, and math; and social sciences. Students who transfer in their junior year must have taken at least two courses at Stanford in two of the major domains and at least one course in the third domain, and must have completed a minimum of 75 units of academic work at Stanford by the end of Winter Quarter. Students who transfer in their sophomore year must have taken at least two courses at Stanford in each of the major domains.

There is no direct correlation between Stanford University General Education Requirements (GERs) and Phi Beta Kappa breadth requirements. The elections committee analyzes the content of individual courses to determine which major domain requirement they may satisfy. IHUM, PWR, and first-year language courses do not satisfy the PBK breadth criterion.

A grade of '+' or 'CR' is not considered a sign of distinction. Minimally satisfying the breadth criterion is not considered a sign of distinction.

The academic records of eligible students are automatically reviewed, so no special action is required for students wishing to be considered for membership. Anonymity in the election process is ensured by removal of the students' names from their academic records before consideration. Students who desire that their records not be made available for consideration by the Stanford chapter of Phi Beta Kappa should inform the Registrar, 630 Serra Street, Suite 120, Stanford, CA 94305-6032.

## **EXCHANGE PROGRAMS AND CROSS-ENROLLMENT AGREEMENTS**

Stanford has exchange programs and cross-enrollment agreements with a number of other colleges and universities. The purpose of these programs and agreements is to offer Stanford students courses and training that are not available in the Stanford curriculum.

### **EXCHANGE PROGRAMS**

#### **UNDERGRADUATE**

Stanford has exchange programs with four colleges and universities that allow students to exchange schools for a quarter/semester or for a year, depending on the school. These programs are best suited to students in their junior year, when the major area of study has been determined. Stanford students register for zero units at Stanford during the quarter(s) in which they are attending another college or university and pay the regular Stanford tuition. Courses taken at the other institution are treated as transfer credit back to Stanford. Students should contact the External Credit Evaluation section of the Office of the University Registrar to determine whether the courses taken through an exchange program may qualify for credit toward a Stanford degree. Only the number of units accepted in transfer, not the course titles or the grades received, are recorded on the Stanford transcript.

Exchange programs are currently available at three historically black institutions: Howard University in Washington D.C.; and Morehouse College and Spelman College in Atlanta, Georgia. The exchange program at Dartmouth College in Hanover, New Hampshire, focuses on Native American Studies. Further information is available at the Undergraduate Advising and Research Center.

#### **GRADUATE**

The Exchange Scholar Program is open to doctoral students in the fields of humanities, social sciences, and sciences who have completed one full year of study at one of the participating institutions. These students may apply to study at Stanford, and Stanford students may apply to one of these other institutions, for a maximum of one academic year (Autumn, Winter, and Spring quarters) to take advantage of particular educational opportunities not available on the home campus. The participating institutions are Brown University, University of Chicago, Columbia University, Cornell University, Harvard University, Massachusetts Institute of Technology, Princeton University, Stanford University, University of Pennsylvania, and Yale University. Further information on the program may be obtained from the Office of the University Registrar, or the graduate dean's office at participating institutions. Some institutions may place restrictions on specific departments.

Stanford also has separate exchange programs with the University of California, Berkeley, and the University of California, San Francisco. Further information may be obtained at the Office of the University Registrar.

### **CROSS-ENROLLMENT AGREEMENTS FOR ROTC**

Stanford currently has cross-enrollment agreements for the Reserve Officers' Training Corps (ROTC) with the Navy and Marine Corps ROTC program at the University of California at Berkeley, the Army ROTC program at Santa Clara University, and the Air Force ROTC program at San Jose State University. The purpose of these agreements is to allow Stanford students to engage in military training while working on their degrees from

Stanford. Courses taken in ROTC programs are offered by and through UC Berkeley, Santa Clara, and San Jose State. The courses do not qualify to be used towards the 12-unit requirement for full-time registration status or satisfactory academic progress requirements for Stanford undergraduates. Certain ROTC courses may be eligible to be used as transfer credit if they qualify under Stanford's transfer credit practices.

Normally, students who participate in ROTC training complete a four-year course of instruction at the respective institution that consists of two years of basic courses during the freshmen and sophomore years, and an advanced course of instruction during the junior and senior years. Students who accept ROTC scholarships are generally subject to a service obligation, depending on the regulation of the particular service.

Stanford students who are enrolled in ROTC programs under the cross-enrollment agreements are eligible to compete for scholarships to include full tuition and a monthly stipend (Navy and Air Force), or other varying amounts (Army). Students normally compete for national scholarships as high school seniors, although current Stanford students may be eligible to enroll in ROTC on a non-scholarship basis. Non-scholarship ROTC students are eligible to compete for scholarships, and individual services may offer additional scholarship programs to current qualifying undergraduate and graduate students. Interested students should contact the appropriate military professor at the host institution to obtain information on these programs and to initiate application procedures (see below).

Students who satisfactorily complete an ROTC program and are awarded a Stanford degree qualify for a commission as a Second Lieutenant in the U.S. Army, an Ensign in the U.S. Navy, a Second Lieutenant in the U.S. Marines, or a Second Lieutenant in the U.S. Air Force.

For questions concerning the ROTC programs, Stanford students should consult one of the following: Air Force ROTC, San Jose State University, San Jose, CA 95192-0051, telephone (408) 924-2960; Army ROTC, Department of Military Science, Santa Clara University, Santa Clara, CA 95053, telephone (408) 554-4034; Naval ROTC, 152 Hearst Gym, University of California, Berkeley, CA 94720-3640, telephone (510) 642-3551.

## AIR FORCE ROTC

The following are offered by San Jose State University. See also <http://info.sjsu.edu/web-dbggen/catalog/departments/AS.html>.

### AS 001A,B. The Foundation of the United States Air Force

Freshman year. Introduces students to the Air Force and AFROTC. The characteristics, missions, and organization of the Air Force. Officership and professionalism, career opportunities, military customs and courtesies, and communication skills. Required leadership lab.

### AS 002A,B. The Evolution of the United States Air And Space Power

Sophomore year. Air and space power through historical study and analysis. The capabilities, function, and doctrinal employment of aerospace forces. Emphasis is on oral and written communication skills. Required leadership lab.

### AS 131A,B. Air Force Leadership Studies

Junior year. Leadership, management fundamentals, professional knowledge, Air Force personnel system, ethics, and communication skills. Application-level knowledge of skills required of junior Air Force officer through case studies, practical exercises, and seminar discussion. Required leadership lab. Prerequisites: AS 001A,B, AS 002A,B, or as determined by department chair.

### AS 141A. National Security Affairs

Senior year. The national security process, international and regional relations, advanced leadership ethics, and Air Force doctrine with focus on the military as a profession, officership, military justice, civilian control of the military, and current issues affecting military professionalism. Required leadership lab. Pre- or corequisites: AS 131A, or as determined by department chair.

### AS 141B. Preparation for Active Duty

Senior year. The role of the Air Force officer in contemporary society emphasizing skills to facilitate a smooth transition from civilian to military life. Required leadership lab. Pre- or corequisites: AS 131A,B, or as determined by department chair.

### Leadership Laboratory (LLAB)

Mandatory. Hands-on. Drill and ceremony; Air Force customs and courtesies; leadership and followership skills. Guest speakers.

## ARMY ROTC

See also <http://scu.edu/rotc>.

### FRESHMAN YEAR

#### MILS 11. Leadership and Personal Development

Taught on Stanford campus. Personal challenges and competencies for effective leadership. How life skills such as goal setting, time management, physical fitness, and stress management relate to leadership and officership. Development of a personal fitness program under the guidance of an Army master fitness trainer. Two 60-minute classes per week. Weekly 3-hour leadership labs required. One four-day weekend field exercise away from the University.

#### MILS 12. Foundations in Leadership I

Taught on Stanford Campus. Leadership fundamentals such as setting direction, problem solving, listening, presenting briefs, providing feedback, and effective writing skills. Leadership dimensions and values. Two 60-minute classes per week. Weekly 3-hour leadership labs required. One evening military formal dinner.

#### MILS 13. Foundations in Leadership II

Taught on Stanford campus. Leadership framework; practical applications in fundamentals such as problem solving, listening, presenting briefs, and effective writing skills. Values, attributes, skills, and actions in the context of practical and interactive exercises. Two 60-minute classes per week. Weekly 3-hour leadership labs required. One four-day weekend field training exercise away from the University.

### SOPHOMORE YEAR

#### MILS 21. Innovative Leadership

Taught on Stanford campus. Creative and innovative leadership strategies and styles through historical cases and interactive exercises. Personal motivation and team building through team exercises. Focus is on leadership values and attributes through organizational customs and courtesies. Leadership case studies; individual creeds and organizational ethos. Two 60-minute classes per week. Weekly 3-hour labs required. One four-day weekend field training exercise away from the University.

#### MILS 22. Leadership in Changing Environments

Taught on Stanford campus. The challenges of leading in contemporary operational environments. Crosscultural challenges and applications to leadership tasks and situations. Case studies. Two 60-minute classes per week. Weekly 3-hour labs required. One evening military formal dinner.

#### MILS 23. Team Leading Procedures

Taught on Stanford campus. Plans and orders that enable small units to complete assigned tasks and the decision making process. Planning techniques to develop orders, briefing plans, and decisions. Two 60-minute classes per week. Five 3-hour labs per quarter. One four-day weekend field training exercise away from the University.

### JUNIOR YEAR

#### MILS 131. Adaptive Team Leadership

Taught at Santa Clara University. Adaptive leadership skills and the demands of the ROTC Leader Development Assessment Course (LDAC). Scenarios related to small-unit tactical operations to develop self awareness and thinking skills. Feedback on student leadership abilities. Two 90-minute classes per week. Weekly 3-hour labs required. One mandatory four-day field training exercise away from the University. Prerequisites: MILS 11, 12, 13, 21, 22, and 23, or consent of department chair.

**MILS 132. Situational Leadership I**

Taught at Santa Clara University. Skills in leading small units, including decision making, persuading, and motivating team members when under fire. Two 90 minute classes per week. Weekly 3-hour labs required. One evening military formal dinner. Prerequisite: MILS 131, or consent of department chair.

**MILS 133. Situational Leadership II**

Taught at Santa Clara University. Applications of situational leadership challenges in decision making, persuading, and motivating team members when under fire. Preparation for ROTC Leader Development Assessment Course (LDAC). Two 90-minute classes per week. Weekly 3-hour labs required. One mandatory four-day field training exercise away from the University. Prerequisite: MILS 132, or consent of department chair.

**SENIOR YEAR****MILS 141. Developing Adaptive Leaders**

Taught at Santa Clara University. Planning, executing, and assessing complex operations, functioning as a member of staff, and providing leadership performance feedback to subordinates. Situational opportunities to assess risk, make ethical decisions, and provide coaching to fellow ROTC students. Responsibilities of key staff. Two 90-minute seminars per week. Weekly 3-hour labs required. One mandatory four-day weekend field training exercise away from the University. Prerequisite: MILS 133, or consent of department chair.

**MILS 142. Leadership in a Complex World I**

Taught at Santa Clara University. Differences in customs and courtesies, military law, principles of war, and rules of engagement in the face of international terrorism. Interacting with nongovernmental organizations, civilians on the battlefield, and host nation support. Two 90-minute seminars per week. Weekly 3-hour labs required. One evening military formal dinner. Prerequisite: MILS 141.

**MILS 143. Leadership in a Complex World II**

Taught at Santa Clara University. Preparation for first unit of assignment and transition to Lieutenant. Case studies, scenarios, and exercises to prepare for complex ethical and practical demands as commissioned officers in the U.S. Army. Two 90-minute seminars per week. Weekly 3-hour labs required. One mandatory four-day weekend field training exercise away from the University. Prerequisite: MILS 142.

**MILITARY HISTORY****MILS 199. Dynamics of Leadership in Military History**

Taught at Santa Clara University. Dynamics that drive decisions made by history's military leaders and followers. Wars and battles from 1861 to present. Techniques and innovations in military training, weapon systems, political timing, and their effect they have on strategies. Combined arms experiences.

**NAVAL ROTC**

The Department of Naval Science at UC Berkeley offers programs of instruction for men and women leading to active duty commissions in the U.S. Navy or U.S. Marine Corps.

**COURSES**

Navy option students enrolled in one of the four-year programs normally complete the following courses during the first two years. Students should consult <http://navyrotc.berkeley.edu> for more information and changes to course offerings. Click on the Courses link to access course descriptions.

**FRESHMAN YEAR**

**NS 1. Introduction to Naval Science**

**NS 2. Sea Power**

**SOPHOMORE YEAR**

**NS 3. Leadership and Management**

**NS 10. Naval Ship Systems I: Engineering**

Navy option students enrolled in either the four- or two-year program normally complete the following courses during their junior and senior years.

**JUNIOR YEAR**

**NS 12A. Navigation and Naval Operations I**

**NS 12B. Navigation and Naval Operations II**

**SENIOR YEAR**

**NS 401. Naval Ship Systems**

**NS 412. Leadership and Ethics**

In addition to the above courses, Navy option ROTC students are required to participate in weekly professional development laboratories (drill) at UC Berkeley and complete a number of other courses at Stanford including one year of calculus, physics, and English, and one quarter of world cultural studies, and military history or national security policy.

In lieu of NS 401, NS 10, NS 12A and NS 12B, Marine option students participate in Marine Seminars and complete MA 154, History of Littoral Warfare, and MA 20, Evolution of Warfare, or a designated equivalent course. Marine option students also participate in the weekly professional development laboratories.

# NONACADEMIC REGULATIONS

## NONDISCRIMINATION POLICY

Stanford University admits qualified students of any race, color, national or ethnic origin, sex, age, disability, religion, sexual orientation, and gender identity to all the rights, privileges, programs, and activities generally accorded or made available to students at the University. Consistent with its obligations under the law, Stanford prohibits unlawful discrimination, including harassment, on the basis of race, color, national or ethnic origin, sex, age, disability, religion, sexual orientation, gender identity, or any other characteristic protected by applicable law in the administration of the University's programs and activities. The following person has been designated to handle inquiries regarding this nondiscrimination policy: the Director of the Diversity and Access Office, Mariposa House, 585 Capistrano Way, Stanford University, Stanford, CA 94305-8230; (650) 723-0755 (voice), (650) 723-1216 (TTY), (650) 723-1791 (fax), equal.opportunity@stanford.edu (email).

## ADA (AMERICANS WITH DISABILITIES ACT)/SECTION 504 GRIEVANCE PROCEDURE (STUDENT)

For information concerning policies and procedures for students with disabilities, see <http://www.stanford.edu/dept/diversityaccess>, or the ADA/Section 504 Compliance Officer, Diversity and Access Office, Mariposa House, 585 Capistrano Way, Stanford University, Stanford CA, 94305-8230, (650) 723-0755 (voice), (650) 723-1216 (TTY), (650) 723-1791 (fax), equal.opportunity@stanford.edu (email); see also the Office for Accessible Education (OAE) at <http://studentaffairs.stanford.edu/oea>.

### POLICY

*The following is quoted from the policy:*

#### I. Policy

Stanford University, in compliance with state and federal laws and regulations, including the Americans with Disabilities Act of 1990 (ADA; as amended 2008) and Section 504 of the Rehabilitation Act of 1973 (Section 504), does not discriminate on the basis of disability in administration of its education-related programs and activities, and has an institutional commitment to provide equal educational opportunities for disabled students who are otherwise qualified.

Students who believe they have been subjected to unlawful discrimination on the basis of disability, or have been denied access to services or accommodations required by law, have the right to use this grievance procedure.

#### II. Applicability

The grievance procedure set forth below is applicable to undergraduate and graduate students of the University. In general, it is designed to address disputes concerning the following:

1. Disagreements regarding a requested service, accommodation, or modification of a University practice or requirement;
2. Inaccessibility of a program or activity;
3. Harassment or discrimination on the basis of disability;
4. Violation of privacy in the context of disability.

As a general proposition, this grievance procedure supplants the Student Academic Grievance Procedure and the Student Non-Academic Grievance Procedure (both of which are set forth in this bulletin) for disability-related grievances. Questions of applicability will be decided by the Director of the Diversity and Access Office.

#### III. Compliance Officers

Stanford University's Compliance Officers are responsible for administering this grievance procedure as well as ensuring compliance with applicable laws. The Director of the Diversity and Access Office is the designated ADA / Section 504 Compliance Officer. That office is located in the Mariposa House, 585 Capistrano Way, Stanford, CA 94305-8230, 650-725-0326 (Voice), 650-723-1216 (TTY), 650-723-1791 (Fax), email: [disability.access@stanford.edu](mailto:disability.access@stanford.edu). Additional Compliance Officers may be designated from time to time by the Provost from those faculty and staff members knowledgeable concerning disability issues and the legal mandates of state and federal disability statutes.

#### IV. Informal Resolution

Prior to initiating the formal complaint procedure set forth below, the student should, in general, first discuss the matter orally or in writing with the individual(s) most directly responsible. If no resolution results, or if direct contact is inappropriate under the circumstances, the student should then consult with the Compliance Officer at the Diversity and Access Office who will attempt to facilitate a resolution. (The informal resolution process may involve consultation with the Dean of Educational Resources.)

If the Compliance Officer is not successful in quickly achieving a satisfactory resolution (that is, generally within seven calendar days), the Compliance Officer will inform the student of his or her efforts and the student's right to file a formal complaint.

#### V. Formal Complaint

If the procedure set forth above for informal resolution does not yield a successful resolution, then the student may file a formal complaint in the following manner:

- A. *When to File Complaint:* Complaints must be filed as soon as possible, but in no event later than 10 days after the end of the quarter in which the concern arose.
- B. *What to File:* a complaint must be in writing and include the following:
  1. The grievant's name, address, email address and phone number;
  2. A full description of the problem;
  3. A description of what efforts have been made to resolve the issue informally;
  4. A statement of the remedy requested.
- C. *Where to File Complaint:* the complaint is to be filed with the Compliance Officer at the Diversity and Access Office, Mariposa House, 585 Capistrano Way, Stanford CA 94305-8230, 650-725-0326 (Voice), 650-723-1216 (TTY), 650-723-1791 (Fax), email: [disability.access@stanford.edu](mailto:disability.access@stanford.edu).
- D. *Notice of Receipt:* upon receipt of the complaint, the Compliance Officer reviews the complaint for timeliness and appropriateness for this grievance procedure, and provides the grievant with written notice acknowledging its receipt.



- E. *Investigation*: the Compliance Officer will promptly initiate an investigation and may refer the matter (or any part of it) to a grievance officer or other designee, who will look into and/or address the matter as the Compliance Officer directs. In undertaking the investigation, the Compliance Officer or grievance officer may interview, consult with, and/or request a written response to the issues raised in the grievance from any individual the grievance officer believes to have relevant information, including faculty, staff, and students.
- F. *Representation*: the grievant and the party against whom the grievance is directed each have the right to have a representative. The party shall indicate whether he or she is to be assisted by a representative and, if so, the name of that representative. For purposes of this procedure, an attorney is not an appropriate representative.
- G. *Findings and Notification*: upon completion of the investigation, the grievance officer will prepare and transmit to the student, and to the party against whom the grievance is directed, a final report containing a summary of the investigation, written findings, and a proposed disposition. This transmission will be expected within 45 calendar days of the filing of the formal complaint. The deadline may be extended by the Compliance Officer for good cause (including for reasons relating to breaks in the academic calendar), and will nearly always be extended during summers and the winter closure. The final report may also be provided, where appropriate, to any University officer whose authority will be needed to carry out the proposed disposition or to determine whether any personnel action is appropriate.
- H. *Final Disposition*: the disposition proposed by the Compliance Officer will be put into effect promptly. The grievant or any party against whom the grievance or the proposed disposition is directed may appeal. The appeal to the Provost (as set forth below) will not suspend the implementation of the disposition proposed by the grievance officer, except in those circumstances where the Provost decides that good cause exists making the suspension of implementation appropriate.

#### VI. *Urgent Matters*

Whenever the application of any of the time deadlines or procedures set forth in this grievance procedure creates a problem due to the nature of the complaint, the urgency of the matter, or the proximity of the upcoming event, the Compliance Officer will, at the request of the grievant, determine whether an appropriate expedited procedure can be fashioned.

#### VII. *Remedies*

Possible remedies under this grievance procedure include corrective steps, actions to reverse the effects of discrimination or to end harassment, and measures to provide a reasonable accommodation or proper ongoing treatment. As stated above, a copy of the Compliance Officer's report may, where appropriate, be sent to University officer(s) to determine whether any personnel action should be pursued.

#### VIII. *Appeal*

Within ten calendar days of the issuance of the final report, the grievant or the party against whom the grievance is directed may appeal to the Provost the grievance officer's determination.

An appeal is taken by filing a written request for review with the Compliance Officer at the Diversity and Access Office, Mariposa House, 585 Capistrano Way, Stanford CA 94305-8230; (650) 723-0755 (Voice), (650) 723-1216 (TTY), (650) 723-1791 (Fax), email: [disability.access@stanford.edu](mailto:disability.access@stanford.edu).

The written request for review must specify the particular substantive and/or procedural basis for the appeal, and must be made on grounds other than general dissatisfaction with the proposed disposition. Furthermore, the appeal must be directed only to issues raised in the formal complaint as filed or to procedural errors in the conduct of the grievance procedure itself, and not to new issues.

The Compliance Officer will forward the appeal to the Provost, and also provide copies to the other party or parties.

If the grievance involves a decision that is being challenged, the review by the Provost or his or her designee usually will be limited to the following considerations:

1. Were the proper facts and criteria brought to bear on the decision? Were improper or extraneous facts or criteria brought to bear that substantially affected the decision to the detriment of the grievant?
2. Were there any procedural irregularities that substantially affected the outcome of the matter to the detriment of the grievant?
3. Given the proper facts, criteria, and procedures, was the decision a reasonable one?

A copy of the Provost's written decision will be expected within 30 calendar days of the filing of the appeal and will be sent to the parties, the Compliance Officer and, if appropriate, to the University officer whose authority will be needed to carry out the disposition. The deadline may be extended by the Provost for good cause (including for reasons relating to breaks in the academic calendar), and will nearly always be extended during summers and the winter closure. The decision of the Provost on the appeal is final.

## TITLE IX OF THE EDUCATION AMENDMENTS OF 1972

It is the policy of Stanford University to comply with Title IX of the Education Amendment of 1972 and its regulations, which prohibit unlawful discrimination on the basis of sex. The Title IX Compliance Officer is the Director of the Diversity and Access Office, who has been appointed to coordinate the University's efforts to comply with the law. Anyone who believes that Stanford is not in compliance with Title IX and its regulations should contact the Director of the Diversity and Access Office, Mariposa House, 585 Capistrano Way, Stanford, CA 94305-8230, (650) 723-0755 (voice), (650) 723-1216 (TTY), (650) 723-1791 (fax), [equal.opportunity@stanford.edu](mailto:equal.opportunity@stanford.edu) (email). The Compliance Officer serves as a resource to provide accommodations and services to address the effects of sexual harassment and sexual violence. Grievance procedures to address complaints of discrimination on the basis of sex are set forth in the "Student Non-Academic Grievance Procedure". See also Administrative Guide Memo 23 at <http://adminguide.stanford.edu/23.pdf>.

## TITLE VI OF THE CIVIL RIGHTS ACT OF 1964

It is the policy of Stanford University to comply with Title VI of the Civil Rights Act of 1964 and its regulations, which prohibit unlawful discrimination on the basis of race, color, and national origin. The Title VI Compliance Officer is the Director of the Diversity and Access Office, who has been appointed to coordinate the University's efforts to comply with the law. Anyone who believes that Stanford is not in compliance with Title VI and its regulations should contact the Director of the Diversity and Access Office, Mariposa House, 585 Capistrano Way, Stanford University, Stanford, CA 94305-8230; (650) 723-0755 (voice), (650) 723-1216 (TTY), (650) 723-1791 (fax), [equal.opportunity@stanford.edu](mailto:equal.opportunity@stanford.edu) (email). Grievance procedures to address complaints of discrimination on the basis of race, color, and national origin are set forth in the "Student Non-Academic Grievance Procedure." See also Administrative Guide Memo 23 at <http://adminguide.stanford.edu/23.pdf>.

# GRIEVANCES

A Stanford undergraduate or graduate student who believes that he or she has been subject to an improper decision on an academic matter may file a grievance pursuant to the Student Academic Grievance Procedure (in the "Academic Policies and Statements" section of this bulletin). For other types of grievances, students should review the section that follows on the Student Non-Academic Grievance Procedure, and consult concerning applicable procedures with the Director of the Diversity and Access Office, Mariposa House, 585 Capistrano Way, Stanford University, Stanford, CA 94305-8230; (650) 723-0755 (voice), (650) 723-1216 (TTY), (650) 723-1791 (fax), equal.opportunity@stanford.edu (email).

## STUDENT NON-ACADEMIC GRIEVANCE PROCEDURE

### POLICY

The following is the policy:

#### 1. *Applicability*

- a. It is perhaps inevitable in any university that some students may at times feel improperly treated, and that concerns about unfairness (including potential discrimination and harassment) may also at times arise.

In this regard (and although this grievance procedure is not limited to concerns of discrimination), Stanford University's Nondiscrimination Policy provides in part: "Stanford University admits qualified students of any race, color, national or ethnic origin, sex, age, disability, religion, sexual orientation, and gender identity to all the rights, privileges, programs, and activities generally accorded or made available to students at the University. Consistent with its obligations under the law, Stanford prohibits unlawful discrimination, including harassment, on the basis of race, color, national or ethnic origin, sex, age, disability, religion, sexual orientation, gender identity, or any other characteristic protected by applicable law in the administration of the University's programs and activities."

- b. At Stanford, there are a number of grievance procedures through which students can raise and seek redress for what they believe to be unfair, improper or discriminatory decisions, actions, or treatment. For example:
  1. If the matter involves an academic decision, the Student Academic Grievance Procedure may be the applicable procedure.
  1. If the matter involves a disability-related concern, the Student ADA/Section 504 Grievance Procedure may be applicable.
  2. If the matter involves a student-athlete and his or her sport, the Student-Athlete Grievance Procedure may be applicable.
- c. The purpose of the Student Non-Academic Grievance Procedure is to provide a process for students to seek resolution of disputes and grievances that may not fall within the scope of one of the other grievance processes, including those which may arise in a student's capacity as a student-employee.
- d. This procedure is available to undergraduates and graduate students at Stanford University. It is designed to address individual decisions or individual actions that affect the grievant personally in his or her capacity as a student, but it does not apply to matters proceeding through the Office of Judicial Affairs or through the involuntary leave policy. This is likewise not a grievance procedure to address the concerns of student groups. Similarly and as a general

proposition, dissatisfaction with a departmental, school, or University policy or practice of broad or general application is not grounds for a grievance under this procedure; the Director of the Diversity and Access Office (hereafter "the Director") may, in his or her discretion, entertain such a grievance in exceptional circumstances, such as where (for example) the policy or practice is alleged to be contrary to law. In the same way, the Director may entertain a grievance under this procedure brought by a non-student, in an appropriate case or as required by law.

- e. The Director is responsible for administering this Student Non-Academic Grievance Procedure.

1. The Director may be contacted at: Director of the Diversity and Access Office, Mariposa House, 585 Capistrano Way, Stanford University, Stanford, CA 94305-8230; (650) 723-0755 (voice), (650) 723-1216 (TTY), (650) 723-1791 (fax), equal.opportunity@stanford.edu (email), <http://www.stanford.edu/dept/ocr>.

2. The Director in his or her sole discretion can decide whether to refer a grievance brought under this procedure to another grievance process. In cases involving allegations of sexual harassment in particular, the Director may wish to consult with the Director of the Sexual Harassment Policy Office as to the most appropriate way to proceed; see Section 5.d below. In cases involving student employment, the Director may wish to consult with the University's Department of Human Resources.

#### 2. *Informal Resolution*

- a. As a general proposition (and although particular circumstances may warrant an exception), the student should first discuss the problem and seek a solution with the individual(s) most directly involved.
- b. If no resolution results (or if circumstances make discussion inappropriate with the person most directly involved), the student should then consult with the individual at the next (higher) administrative level in the department, school, residence or University administrative unit. Serious efforts should be made to resolve the issue locally at an informal level without resort to a formal grievance; such efforts may continue even after the formal process is underway.

#### 3. *Formal Grievance*

- a. If informal means of resolution prove inadequate, the student should set forth in writing the substance of the complaint, the grounds for it and the evidence on which it is based, and the efforts taken to date to resolve the matter. It is at this stage that the complaint becomes a formal grievance.
- b. The grievance document should be submitted to the Director. A grievance should be filed in a timely fashion, i.e., normally within thirty days of the end of the academic quarter in which the action that is the subject of the grievance occurred. Except in extraordinary circumstances, delay in filing a grievance will be grounds for rejection of that grievance.
- c. The Director will promptly initiate a review, which should normally be completed within sixty days. The Director may attempt to resolve the matter informally, and may refer the matter (or any part of it) to a grievance officer or other designee, who will look into and/or address the matter as the Director directs. The Director may also, in appropriate cases, remand the matter to the appropriate administrator (including to the administrative level at which the grievance arose) for further consideration.
- d. In undertaking this review, either the Director, his or her designee, or the grievance officer may request a response to the issues raised in the grievance from any individuals believed to have information the reviewer considers relevant, including faculty, staff and students.

# AGE DISCRIMINATION ACT OF 1975

- e. The Director (or his or her designee) will issue his or her decision in writing, and take steps to initiate such corrective action as is called for (if any). Conduct meriting discipline will be brought to the attention of the appropriate disciplinary process.
4. *Appeal*
    - a. If the student is dissatisfied with the disposition by the Director (or his or her designee), he or she may appeal to the Provost (Office of the President and Provost, Building 10, Stanford, CA 94305-2061; phone 650-725-4075; fax 650-725-1347). The appeal should be filed in writing with the Provost within ten days of the issuance of the decision by the Director (or his or her designee); a delay in filing the appeal may be grounds for rejection of that appeal.
    - b. The Provost may attempt to resolve the matter informally, and may refer the matter (or any part of it) to a grievance appeal officer, who will review the matter at the Provost's direction. The Provost may also, in appropriate cases, remand the matter to the appropriate administrator (including to the administrative level at which the grievance arose) for further consideration.
    - c. The Provost should normally complete his or her review of the appeal and issue his or her decision in writing within forty-five days. That decision is final.
  5. *General Provisions*
    - a. *Time Guidelines*—The time frames set forth herein are guidelines. They may be extended by the Director or Provost, as applicable, in his or her discretion for good cause (including for reasons relating to breaks in the academic calendar), and will nearly always be extended during summers and the winter closure.
    - b. *Advisers*—A student initiating or participating in a grievance under this procedure may be accompanied by an adviser in any discussion with the Director, the Provost or their designees, or a grievance or grievance appeal officer under this procedure; any adviser must be a current Stanford faculty, staff member or student.
    - c. *Ombuds*—Students should be aware that the University Ombuds (<http://www.stanford.edu/dept/ocr/ombuds>) is available to discuss and advise on any matters of University concern and frequently help expedite resolution of such matters. Although it has no decision making authority, the Ombuds' Office has wide powers of inquiry.
    - d. *Sexual Harassment and Sexual Assault*—For information and resources concerning sexual harassment, students should refer to the web page of the Sexual Harassment Policy Office at <http://harass.stanford.edu>. For information and resources concerning sexual assault and relationship abuse, students should refer to the web page of the Sexual Violence Advisory Board at <http://www.stanford.edu/group/svab/help.shtml>.
    - e. *No retaliation*—Stanford University prohibits retaliation or reprisals against individuals based on their pursuit in good faith of a grievance under this procedure, or their participation in good faith in the grievance process.
    - f. *Standards for Review*—If the grievance involves a decision that is being challenged, the review by the Director, as well as the review by the Provost on appeal, usually will be limited to the following considerations:
      1. Were the proper facts and criteria brought to bear on the decision? Were improper or extraneous facts or criteria brought to bear that substantially affected the decision to the detriment of the grievant?
      2. Were there any procedural irregularities that substantially affected the outcome of the matter to the detriment of the grievant?
      3. Given the proper facts, criteria, and procedures, was the decision one which a person in the position of the decision maker might reasonably have made?

1. *Policy*

It is the policy of Stanford University to comply with the Age Discrimination Act of 1975 and its regulations, which prohibit unlawful discrimination on the basis of age. The Age Discrimination Act Compliance Officer is the Director of the Diversity and Access Office ("the Director"), who has been appointed to coordinate the University's efforts to comply with the law. Anyone who believes that Stanford is not in compliance with the Age Discrimination Act and its regulations ("the Act") should contact the Director at the Diversity and Access Office, Mariposa House, 585 Capistrano Way, Stanford University, Stanford, CA 94305-8230; (650) 723-0755 (voice), (650) 723-1216 (TTY), (650) 723-1791 (fax), [equal.opportunity@stanford.edu](mailto:equal.opportunity@stanford.edu) (email).

2. *Grievance Procedure*

- a. An individual who believes that Stanford is not acting in compliance with the Act and who wishes to file a grievance should set forth in writing the substance of his or her complaint, the grounds for it and the evidence on which it is based, and the efforts (if any) taken to date to resolve the matter. It is at this stage that the complaint becomes a formal grievance.
- b. The grievance document should be submitted to the Director. A grievance should be filed in a timely fashion, i.e., normally within thirty days of the end of the academic quarter in which the action that is the subject of the grievance occurred. Except in extraordinary circumstances, delay in filing a grievance will be grounds for rejection of that grievance.
- c. The Director will promptly initiate a review, which should normally be completed within sixty days. The Director may attempt to resolve the matter informally, and may refer the matter (or any part of it) to a grievance officer or other designee, who will look into and/or address the matter as the Director directs. The Director may also, in appropriate cases, remand the matter to the appropriate administrator (including to the administrative level at which the grievance arose) for further consideration.
- d. In undertaking this review, either the Director, his or her designee, or the grievance officer may request a response to the issues raised in the grievance from any individuals believed to have information the reviewer considers relevant, including faculty, staff and students.
- e. The Director (or his or her designee) will issue his or her decision in writing, and take steps to initiate such corrective action as is called for (if any).

3. *Appeal*

- a. If the grievant is dissatisfied with the disposition by the Director (or his or her designee), he or she may appeal to the Provost (Office of the President and Provost, Building 10, Stanford, CA 94305-2061; phone 650-725-4075; fax 650-725-1347). The appeal should be filed in writing with the Provost within ten days of the issuance of the decision by the Director (or his or her designee); a delay in filing the appeal may be grounds for rejection of that appeal.
- b. The Provost may attempt to resolve the matter informally, and may refer the matter (or any part of it) to a grievance appeal officer, who will review the matter at the Provost's direction. The Provost may also, in appropriate cases, remand the matter to the appropriate administrator (including to the administrative level at which the grievance arose) for further consideration.
- c. The Provost should normally complete his or her review of the appeal and issue his or her decision in writing within forty-five days. That decision is final.

#### 4. *General Provisions*

- a. *Time Guidelines*—The time frames set forth herein are guidelines. They may be extended by the Director or Provost, as applicable, in his or her discretion for good cause (including for reasons relating to breaks in the academic calendar), and will nearly always be extended during summers and the winter closure.
- b. *No Retaliation*—Stanford University prohibits retaliation or reprisals against individuals based on their pursuit in good faith of a grievance under this procedure, or their participation in good faith in the grievance process.
- c. *Standards for Review*—If the grievance involves a decision that is being challenged, the review by the Director, as well as the review by the Provost on appeal, usually will be limited to the following considerations:
  1. Were the proper facts and criteria brought to bear on the decision? Were improper or extraneous facts or criteria brought to bear that substantially affected the decision to the detriment of the grievant?
  2. Were there any procedural irregularities that substantially affected the outcome of the matter to the detriment of the grievant?
  3. Given the proper facts, criteria, and procedures, was the decision one which a person in the position of the decision maker might reasonably have made?

## OWNERSHIP AND USE OF STANFORD NAME AND TRADEMARKS

Stanford registered marks, as well as other names, seals, logos, and other symbols and marks that are representative of Stanford, may be used solely with permission of Stanford. Merchandise bearing Stanford's names and marks, such as t-shirts, glassware, and notebooks, must be licensed. For complete text of the currently applicable policy, including the University officers authorized to grant permission to use the Stanford name and marks, see Administrative Guide Memo 15.5, Ownership and Use of Stanford Name and Trademarks at [http://adminguide.stanford.edu/15\\_5.pdf](http://adminguide.stanford.edu/15_5.pdf).

## COPYRIGHT

Copyright laws protect original works of authorship and give the owners of copyrights the exclusive right to do and to authorize others to do certain things in regard to a copyrighted work, including: make copies, distribute the work, display or perform the work publicly, and create derivative works. Copyright laws apply to nearly all forms of captured content, including traditional works like books, photographs, music, drama and sculpture. The laws also adapt to changes in technologies, and include in their scope modern forms of works like motion pictures, web sites, electronic media, software, multimedia works and some databases. Registration is not required to obtain a copyright, so if in doubt, assume a copyright applies.

Unless an exception to the copyright owner's exclusive rights applies, you must obtain permission from the copyright owner to copy, distribute, display or perform a copyrighted work in any medium for any purpose. Be especially mindful of copyright principles when using the Internet. Just because a work is posted on the Internet does not mean that the owner of the copyright has given you permission to use it. And, you should not be posting material onto the Internet without copyright clearance.

Stanford University Libraries have licenses with many publishers, which permit copying of materials in accordance with the educational, research or administrative functions of the

University. In addition, there are four major exceptions to the copyright owner's exclusive rights, which (if applicable) permit limited use without permission. These are: the fair use exception, the library exception, the face-to-face teaching exception, and the distance-learning exception. For a more detailed explanation of these exceptions, the copyright laws and Stanford's copyright policies, please review the University's Copyright Reminder at [http://www-sul.stanford.edu/libraries\\_collections/copyright\\_reminders/](http://www-sul.stanford.edu/libraries_collections/copyright_reminders/). It is each person's responsibility to be aware of and abide by copyright law; violation may result in civil or criminal liability, and constitutes grounds for University discipline, up to and including discharge, dismissal and expulsion.

## PEER-TO-PEER FILE SHARING

The use of file-sharing networks and software to download and share copyrighted works like software, music, movies, television programs, and books can violate copyright laws. Both the person who makes an illegal copy of a copyrighted work available and the person who receives or downloads an illegal copy have violated the law and Stanford policies. Many file-sharing programs have default settings that share copyrighted files, such as music and movies, through the Internet. Before enabling any of these programs students, faculty, or staff must read the fine print, make sure to understand the program itself, and only use such programs lawfully. Under the Digital Millennium Copyright Act (DMCA), copyright owners are entitled to notify Internet service providers, such as Stanford, that IP addresses linked to the Stanford network are sharing copies of music, movies, or other content without authorization. The law requires the University to respond to such complaints by eliminating access to the infringing materials. Stanford will disconnect students who fail to respond to a DMCA complaint promptly, and Stanford will charge reconnection fees starting at \$100 and going up as high as \$1,000 for successive DMCA complaints. Furthermore, the University also will suspend or terminate computer access to the Stanford network, including termination of the SUNet ID, to members of the community who continue to violate copyright laws. Finally, the University will take action through the student, employee, or faculty disciplinary processes if necessary. Beyond University consequences, copyright holders may file civil lawsuits against copyright infringers seeking extensive monetary damages. If compelled by a lawful subpoena, Stanford may be required to identify students, faculty, staff, or others who have violated copyright law. For more information about file-sharing, refer to Residential Computing's online resource, File-Sharing and Copyright Law at <http://rescomp.stanford.edu/info/dmca>.

Except with permission from the Office of Accessible Education or the instructor in question, students may not audio- or video-record lectures. Even with permission, students may only use such recordings for personal use; no posting or further distribution or use is permitted.

## DOMESTIC PARTNERS

In October 1990, Stanford University adopted a domestic partners policy. This policy, which implements the University's nondiscrimination policy, makes services that have historically been available to married students available on an equal basis to students with same-sex or opposite-sex domestic partners. These services include access to student housing, a courtesy card that provides access to University facilities, and the ability to purchase medical care at Vaden Health Service. A domestic partnership is defined as an established long-term partnership with an exclusive mutual commitment in which the partners share the necessities of life and ongoing responsibility for their common welfare.

# SEXUAL HARASSMENT AND CONSENSUAL SEXUAL OR ROMANTIC RELATIONSHIPS

For the complete text of the currently applicable version of this policy, see Administrative Guide Memo 23.2, Sexual Harassment, [http://adminguide.stanford.edu/23\\_2.pdf](http://adminguide.stanford.edu/23_2.pdf). It is also available from the Sexual Harassment Policy Office homepage, <http://harass.stanford.edu>.

## SUMMARY

Stanford University strives to provide a place of work and study free of sexual harassment, intimidation or exploitation. Where sexual harassment is found to have occurred, the University will act to stop the harassment, prevent its recurrence, and discipline and/or take other appropriate action against those responsible.

## POLICY

The following is quoted from the policy:

1. *In General*
  - a. *Applicability and Sanctions for Policy Violations*—This policy applies to all students, faculty and staff of Stanford University, as well as to others who participate in Stanford programs and activities. Its application includes Stanford programs and activities both on and off-campus, including overseas programs. Individuals who violate this policy are subject to discipline up to and including discharge, expulsion, and/or other appropriate sanction or action.
  - b. *Respect for Each Other*—Stanford University strives to provide a place of work and study free of sexual harassment, intimidation or exploitation. It is expected that students, faculty, staff and other individuals covered by this policy will treat one another with respect.
  - c. *Prompt Attention*—Reports of sexual harassment are taken seriously and will be dealt with promptly. The specific action taken in any particular case depends on the nature and gravity of the conduct reported, and may include intervention, mediation, investigation and the initiation of grievance and disciplinary processes as discussed more fully below. Where sexual harassment is found to have occurred, the University will act to stop the harassment, prevent its recurrence, and discipline and/or take other appropriate action against those responsible.
  - d. *Confidentiality*—The University recognizes that confidentiality is important. Sexual harassment advisers and others responsible to implement this policy will respect the confidentiality and privacy of individuals reporting or accused of sexual harassment to the extent reasonably possible. Examples of situations where confidentiality cannot be maintained include circumstances when the University is required by law to disclose information (such as in response to legal process) and when disclosure is required by the University's outweighing interest in protecting the rights of others.
  - e. *Protection Against Retaliation*—Retaliation and/or reprisals against an individual who in good faith reports or provides information in an investigation about behavior that may violate this policy are against the law and will not be tolerated. Intentionally making a false report or providing false information, however, is grounds for discipline.
  - f. *Relationship to Freedom of Expression*—Stanford is committed to the principles of free inquiry and free expression. Vigorous discussion and debate are fundamental to the University, and this policy is not intended to stifle teaching methods or freedom of

expression generally, nor will it be permitted to do so. Sexual harassment, however, is neither legally protected expression nor the proper exercise of academic freedom; it compromises the integrity of the University, its tradition of intellectual freedom and the trust placed in its members.

## 2. *What Is Sexual Harassment?*

Unwelcome sexual advances, requests for sexual favors, and other visual, verbal or physical conduct of a sexual nature constitute sexual harassment when:

- a. It is implicitly or explicitly suggested that submission to or rejection of the conduct will be a factor in academic or employment decisions or evaluations, or permission to participate in a University activity; *or*
  - b. The conduct has the purpose or effect of unreasonably interfering with an individual's academic or work performance or creating an intimidating or hostile academic, work or student living environment.
- Determining what constitutes sexual harassment depends upon the specific facts and the context in which the conduct occurs. Sexual harassment may take many forms—subtle and indirect, or blatant and overt. For example,
- It may be conduct toward an individual of the opposite sex or the same sex.
  - It may occur between peers or between individuals in a hierarchical relationship.
  - It may be aimed at coercing an individual to participate in an unwanted sexual relationship or it may have the effect of causing an individual to change behavior or work performance.
  - It may consist of repeated actions or may even arise from a single incident if sufficiently egregious.

The University's Policy on Sexual Assault (see Guide Memo 23.3, Sexual Assault, [http://adminguide.stanford.edu/23\\_3.pdf](http://adminguide.stanford.edu/23_3.pdf)) may also apply when sexual harassment involves physical contact.

## 3. *What To Do About Sexual Harassment*

Individuals seeking further information are directed to the following resources:

- The Sexual Harassment Policy Office (Mariposa House, 585 Capistrano Way, Room 208-209, Stanford University, Stanford, CA, 94305-8230; (650) 723-1583; email: [harass@stanford.edu](mailto:harass@stanford.edu) for information, consultation, advice, or to lodge a complaint. Note that anonymous inquiries can be made to the SHPO by phone during business hours.
- The Sexual Harassment Policy Office web page at <http://harass.stanford.edu>.
- Any designated Sexual Harassment Adviser or resource person listed in 3.a or 5.a.

The following are the primary methods for dealing with sexual harassment at Stanford. They are not required to be followed in any specific order. However, early informal methods are often effective in correcting questionable behavior.

- a. *Consultation*—Consultation about sexual harassment is available from the Sexual Harassment Policy Office, Sexual Harassment Advisers (including residence deans), human resources officers, employee relations specialists, counselors at Counseling and Psychological Services (CAPS) or the Help Center, chaplains at Memorial Church, ombudspersons and others. A current list of Sexual Harassment Advisers is available from the Sexual Harassment Policy Office and at <http://harass.stanford.edu/SHadvisers.html>. Consultation is available for anyone who wants to discuss issues related to sexual harassment, whether or not "harassment" actually has occurred, and whether the person seeking information is a complainant, a person who believes his or her own actions may be the subject of criticism (even if unwarranted), or a third party.

Often there is a desire that a consultation be confidential or “off the record.” This can usually be achieved when individuals discuss concerns about sexual harassment without identifying the other persons involved, and sometimes even without identifying themselves. Confidential consultations about sexual harassment also may be available from persons who, by law, have special professional status, such as:

- Counselors at Counseling and Psychological Services (CAPS), <http://caps.stanford.edu>
- Counselors at the Help Center, <http://www.stanford.edu/dept/helpcenter>
- Chaplains at Memorial Church
- The University Ombudsman, <http://www.stanford.edu/dept/ombuds>

In these latter cases, the level of confidentiality depends on what legal protections are held by the specific persons receiving the information and should be addressed with them before specific facts are disclosed. For more information see <http://harass.stanford.edu/confidential.html>.

For further information on confidentiality, see Section 1(d) above.

- b. *Direct Communication*—An individual may act on concerns about sexual harassment directly, by addressing the other party in person or writing a letter describing the unwelcome behavior and its effect and stating that the behavior must stop. A Sexual Harassment Adviser can help the individual plan what to say or write, and likewise can counsel persons who receive such communications. Reprisals against an individual who in good faith initiates such a communication violate this policy.
- c. *Third Party Intervention*—Depending on the circumstances, third party intervention in the workplace, student residence or academic setting may be attempted. Third party intervenors may be the Sexual Harassment Advisers, human resources professionals, the ombudspersons, other faculty or staff, or sometimes mediators unrelated to the University. When third party intervention is used, typically the third party (or third parties) will meet privately with each of the persons involved, try to clarify their perceptions and attempt to develop a mutually acceptable understanding that can insure that the parties are comfortable with their future interactions. Other processes, such as a mediated discussion among the parties or with a supervisor, may also be explored in appropriate cases. Possible outcomes of third party intervention include explicit agreements about future conduct, changes in workplace assignments, substitution of one class for another, or other relief, where appropriate.
- d. *Formal Grievance, Appeal, and Disciplinary Processes*—Grievance, appeal, or disciplinary processes may be pursued as applicable.
  1. *Grievances and Appeals*—The applicable procedure depends on the circumstances and the status of the person bringing the charge and the person against whom the charge is brought. Generally, the process consists of the individual’s submission of a written statement, a process of fact-finding or investigation by a University representative, followed by a decision and, in some cases, the possibility of one or more appeals, usually to Stanford administrative officers at higher levels. The relevant procedure (see below) should be read carefully, since the procedures vary considerably.

If the identified University fact-finder or grievance officer has a conflict of interest, an alternate will be arranged, and the Director of the Sexual Harassment Policy Office or the Director of Employee and Labor Relations can help assure that this occurs.

In most cases, grievances and appeals must be brought within a specified time after the action complained of. While informal resolution efforts will not automatically extend the time limits for filing a grievance or appeal, in appropriate circumstances the complainant and the other relevant parties may mutually agree in writing to extend the time for filing a grievance or appeal.

A list of the established grievance and appeal procedures is located at [http://hrweb.stanford.edu/elr/policies/list\\_grievance\\_procedures.html](http://hrweb.stanford.edu/elr/policies/list_grievance_procedures.html). Copies may also be obtained from the Sexual Harassment Policy Office, <http://www.stanford.edu/group/SexHarass>.

Copies of the following may be obtained from Employee and Labor Relations, 651 Serra Street:

- “Solving Workplace Problems at Stanford: Understanding the Staff Dispute Resolution Policy” (also at <http://hrweb.stanford.edu/forms/staffresolution.pdf>.)
  - “Solving Workplace Problems at Stanford: Information for Academic Staff – Librarians and Academic Staff – Research Associates”
  - “The Dispute Resolution Process (A User’s Guide)”
1. *Disciplinary Procedures*—In appropriate cases, disciplinary procedures may be initiated. The applicable disciplinary procedure depends on the status of the individual whose conduct is in question. For example, faculty are subject to the Statement on Faculty Discipline <http://www.stanford.edu/dept/provost/faculty/policies/handbook/ch4.html#statementonfacultydiscipline>, and students to the Fundamental Standard. For additional information related to student judicial affairs, see <http://www.stanford.edu/dept/vpsa/judicialaffairs>.

The individuals referenced in this section are available to discuss these options and differing methods for dealing with sexual harassment.

#### 4. *Procedural Matters*

- a. *Investigations*—If significant facts are contested, an investigation may be undertaken. The investigation will be conducted in a way that respects, to the extent possible, the privacy of all of the persons involved. In appropriate cases, professional investigators may be asked to assist in the investigation. The results of the investigation may be used in the third party intervention process or in a grievance or disciplinary action.
- b. *Recordkeeping*—The Sexual Harassment Policy Office will track reports of sexual harassment for statistical purposes and report at least annually to the University President concerning their number, nature and disposition. The Sexual Harassment Policy Office may keep confidential records of reports of sexual harassment and the actions taken in response to those reports, and use them for purposes such as to identify individuals or departments likely to benefit from training so that training priorities can be established. No identifying information will be retained in cases where the individual accused was not informed that there was a complaint.
- c. *Indemnification and Costs*—The question sometimes arises as to whether the University will defend and indemnify a Stanford employee accused of sexual harassment. California law provides, in part, “An employer shall indemnify [its] employee for all that the employee necessarily expends or loses in direct consequence of the discharge of his [or her] duties as such . . . .” The issue of indemnification depends on the facts and circumstances of each situation. Individuals who violate this policy, however, should be aware that they and/or their schools, institutes, or other units may be required to pay or contribute to any judgments, costs and expenses incurred as a result of behavior that is wrongful and/or contrary to

the discharge of the employee's duties. In general, see Administrative Guide Memo 15.7 ([http://adminguide.stanford.edu/15\\_7.pdf](http://adminguide.stanford.edu/15_7.pdf)).

5. *Resources for Dealing with Sexual Harassment*

- a. *Advice*—Persons who have concerns about sexual harassment should contact the Sexual Harassment Policy Office, any Sexual Harassment Adviser at <http://harass.stanford.edu/SHadvisers.html> or one of the other individuals listed below. Reports should be made as soon as possible: the earlier the report, the easier it is to investigate and take appropriate remedial action. When reports are long delayed, the University will try to act to the extent it is reasonable to do so, but it may be impossible to achieve a satisfactory result after much time has passed.

Likewise, anyone who receives a report or a grievance involving sexual harassment should promptly consult with the Sexual Harassment Policy Office or with a Sexual Harassment Adviser.

There are a number of individuals specially trained and charged with specific responsibilities in the area of sexual harassment. In brief, they are:

- *Sexual Harassment Advisers* (<http://harass.stanford.edu/SHadvisers.html>) serve as resources to individuals who wish to discuss issues of sexual harassment, either because they have been harassed or because they want information about the University's policy and procedures. There is usually at least one Adviser assigned to each of the schools at the University and to each large work unit; most of the residence deans also have been appointed as Sexual Harassment Advisers. Advisers are also authorized to receive complaints.
- *The Director of the Sexual Harassment Policy Office* is responsible for the implementation of this policy. The Director's Office also provides advice and consultation to individuals when requested; receives complaints and coordinates their handling; supervises the other Advisers; encourages and assists prevention education for students, faculty and staff; keeps records showing the disposition of complaints; and generally coordinates matters arising under this policy. Because education and awareness are the best ways to prevent sexual harassment; developing awareness, education and training programs and publishing informational material are among the most important functions of the Sexual Harassment Policy Office (<http://harass.stanford.edu>).
- As stated above, individuals with concerns about sexual harassment may also discuss their concerns informally with psychological counselors (for example through CAPS or the HELP Center), chaplains (through the Memorial Chapel), or the University ombudsperson. For more information, see <http://harass.stanford.edu/resources.html>.

- b. *External Reporting*—Sexual harassment is prohibited by state and federal law. In addition to the internal resources described above, individuals may pursue complaints directly with the government agencies that deal with unlawful harassment and discrimination claims, e.g., the U.S. Equal Employment Opportunity Commission (EEOC), the Office for Civil Rights (OCR) of the U.S. Department of Education, and the State of California Department of Fair Employment and Housing (DFEH). These agencies are listed in the Government section of the telephone book. A violation of this policy may exist even where the conduct in question does not violate the law.

6. *Consensual Sexual or Romantic Relationships*

- a. *In General*—There are special risks in any sexual or romantic relationship between individuals in inherently unequal positions, and parties in such a relationship

assume those risks. In the University context, such positions include (but are not limited to) teacher and student, supervisor and employee, senior faculty and junior faculty, mentor and trainee, adviser and advisee, teaching assistant and student, coach and athlete, and the individuals who supervise the day-to-day student living environment and student residents. Because of the potential for conflict of interest, exploitation, favoritism, and bias, such relationships may undermine the real or perceived integrity of the supervision and evaluation provided, and the trust inherent particularly in the teacher-student context. They may, moreover, be less consensual than the individual whose position confers power or authority believes. The relationship is likely to be perceived in different ways by each of the parties to it, especially in retrospect.

Moreover, such relationships may harm or injure others in the academic or work environment. Relationships in which one party is in a position to review the work or influence the career of the other may provide grounds for complaint by third parties when that relationship gives undue access or advantage, restricts opportunities, or creates a perception of these problems. Furthermore, circumstances may change, and conduct that was previously welcome may become unwelcome. Even when both parties have consented at the outset to a romantic involvement, this past consent does not remove grounds for a charge based upon subsequent unwelcome conduct.

Where such a relationship exists, the person in the position of greater authority or power will bear the primary burden of accountability, and must ensure that he or she—and this is particularly important for teachers—does not exercise any supervisory or evaluative function over the other person in the relationship. Where such recusal is required, the recusing party must also notify his or her supervisor, department chair or dean, so that such chair, dean or supervisor can exercise his or her responsibility to evaluate the adequacy of the alternative supervisory or evaluative arrangements to be put in place. Staff members may notify their local human resources officers. To reiterate, the responsibility for recusal and notification rests with the person in the position of greater authority or power. Failure to comply with these recusal and notification requirements is a violation of this policy, and therefore grounds for discipline. The University has the option to take any action necessary to insure compliance with the spirit of this recusal policy, including transferring either or both employees in order to minimize disruption of the work group. In those extraordinarily rare situations where it is programmatically infeasible to provide alternative supervision or evaluation, the cognizant Dean or Director must approve all evaluative and compensation actions.

- b. *With Students*—At a university, the role of the teacher is multi-faceted, including serving as intellectual guide, counselor, mentor and advisor; the teacher's influence and authority extend far beyond the classroom. Consequently and as a general proposition, the University believes that a sexual or romantic relationship between a teacher and a student, even where consensual and whether or not the student would otherwise be subject to supervision or evaluation by the teacher, is inconsistent with the proper role of the teacher, and should be avoided. The University therefore very strongly discourages such relationships.

7. *Policy Review and Evaluation*—This policy went into effect on October 6, 1993, and was amended on November 30, 1995, and on May 30, 2002. It is subject to periodic review, and any comments or suggestions should be forwarded to the Director of the Sexual Harassment Policy Office.

## RESOURCES

*The following is a summary of resources concerning sexual harassment available to members of the Stanford Community:*

A brochure containing the policy, a list of current sexual harassment advisers, confidential resources, and other helpful information is available online at <http://harass.stanford.edu>, and in printed form from the Sexual Harassment Policy Office at Mariposa House, 585 Capistrano Way, Room 208-209, Stanford University, Stanford, CA, 94305-8230; (650) 723-1583; email: [harass@stanford.edu](mailto:harass@stanford.edu). Copies of the University policy on sexual assault, which complements this sexual harassment policy, as well as all other documents mentioned in this section, are also available at the Sexual Harassment Policy Office.

All faculty, staff, and students who have questions regarding this policy and its enforcement can consult with a Sexual Harassment Adviser or can be directed to the local Personnel Officer or Regional Human Resources Manager. Faculty members should contact their dean or department chair, and students should contact the Director of the Sexual Harassment Policy Office or the Dean of Student Affairs.

*Sexual Harassment Policy Office*—telephone: (650) 723-1583; email: [harass@stanford.edu](mailto:harass@stanford.edu).

*Director:* Laraine Zappert (Clinical Professor, Psychiatry and Behavioral Sciences)

*Assistant Director:* Nanette Andrews

## SEXUAL ASSAULT

The University's Policy on Sexual Assault is published in complete form in the Administrative Guide Memo 23.3, available at [http://adminguide.stanford.edu/23\\_3.pdf](http://adminguide.stanford.edu/23_3.pdf), and on the Judicial Affairs Office web site at <http://www.stanford.edu/dept/vpsa/judicialaffairs/index.html>.

### SUMMARY

*The following summarizes the policy on Sexual Assault and provides information on resources available to members of the Stanford community.*

*Policy*—Sexual assault is unacceptable and will not be tolerated at Stanford University. Any member of the Stanford community who commits sexual assault at or on the grounds of the University, or at any of the University's off-campus facilities or activities, or at the facilities or activities of any affiliated student organization, will face maximal institutional sanctions, in addition to any prosecutions external authorities may undertake. Stanford University is committed to providing information on services, resources, and treatment available to victims of sexual assault. A comprehensive website containing a list of resources can be found at <http://www.stanford.edu/group/svab/>.

*Definition*—For purposes of this policy, sexual assault is defined as the commission of an unwanted sexual act, occurring without consent of both individuals, or occurring under threat or coercion. It can occur either forcibly and/or against a person's will, or when a person is incapable of giving consent (if under 18 years of age; if intoxicated by drugs or alcohol; if developmentally disabled; if temporarily or permanently mentally or physically unable to do so). Sexual assault includes but is not limited to rape, forcible sodomy, forcible oral copulation, rape with an object, sexual battery, forcible fondling, and threat of sexual assault.

*Notification*—With the consent of the victim, charges of sexual assault received by University offices or personnel shall be communicated promptly to the Department of Public Safety, 711 Serra Street, telephone 9-911 for emergency response or (650) 723-9633 during normal business hours, or, in the case of a student, to the sexual assault response team at YWCA Sexual Assault Center at Stanford at Vaden Health Service, 866 Campus Drive, telephone 725-9955.

*Legal Reporting Requirements*—Health care professionals are expected to fulfill legally mandated reporting requirements.

*Emergency Services Available to Victims*—Victims of sexual assault are urged to seek immediate attention from emergency police, medical, and counseling services. On the Stanford campus and in the immediate vicinity, the following provide 24-hour response and will arrange for police assistance, medical assistance, emotional support services, and advocacy and support:

“911” Emergency Network: dial 9-911 from University phones or 911 from outside phones

Santa Clara Valley Medical Center, 751 South Bascom Avenue, San Jose, telephone (408) 885-5000

YWCA Sexual Assault Center at Stanford, for students, at the Vaden Health Service, telephone (650) 725-9955

Stanford Hospital and Clinics, 300 Pasteur Drive, Stanford, telephone (650) 723-5111

*Non-Emergency Resources*—Additional resources for students are available at Vaden Health Service at (650) 723-3785, including short-term counseling, referral to long-term therapy, follow-up pregnancy testing, and testing and treatment for sexually transmitted diseases. Additional services for faculty and staff are available at the University's HELP Center, Galvez House (723-4577), including general counseling, information, support, and referral. The University ombudsperson (723-3682) is available to all in the Stanford community for general counseling, advice, and advocacy. The Title IX Compliance Officer, Director of Diversity and Access Office, Mariposa House, 585 Capistrano Way, Stanford University, Stanford CA, 94305-8230, (650) 723-0755 (voice), (650) 723-1216 (TTY), (650) 723-1791 (fax), [equal.opportunity@stanford.edu](mailto:equal.opportunity@stanford.edu) (email), is available to assist students to address the effects of sexual harassment and sexual violence

*Ongoing Case Management Procedures*—Both informal procedures and formal grievance procedures for case management of sexual assault charges are given in the University's policy on Sexual Harassment appearing as Administrative Guide Memo 23.2 and published annually in this bulletin. Victims are to be kept informed by those responsible for those procedures of the status of any disciplinary proceedings and the results of any disciplinary action or appeal. The office of the Dean of Student Life is available to help student victims deal with academic difficulties that may arise because of the victimization and its impact.

*Information Requests and Disclosure*—The University offices responding to charges of sexual assault have established protocols for limiting the disclosure of information and for handling inquiries from the press, concerned students, and parents.

*Information about Options*—The University offices responding to charges of sexual assault will inform victims, at a minimum, of the options of: criminal prosecution, civil prosecution, the disciplinary process, the appropriate grievance procedure, alternative housing assignments, and academic assistance alternatives.

## POLITICAL ACTIVITIES

For the complete text of the currently applicable version of this policy, see Administrative Guide Memo 15.1, Political Activities, available at [http://adminguide.stanford.edu/15\\_1.pdf](http://adminguide.stanford.edu/15_1.pdf).

### SUMMARY

*The following summarizes the policy on Political Activities:*

Stanford University, as a charitable entity, is subject to federal, state, and local laws and regulations regarding political activities: campaign activities, lobbying, and the giving of gifts to public officials.

While all members of the University community are naturally free to express their political opinions and engage in political activities to whatever extent they wish, it is very important that they do so only in their individual capacities and avoid even the appearance that they are speaking or acting for the University in political matters.



In the limited circumstances where individuals must speak or act on behalf of the University in the political arena, they must do so in accordance with the provisions of this Guide Memo.

## POLICY

*The following is quoted from the policy:*

### 1. Summary of Legal Requirements and Restrictions

a. *Campaign Activities:* contributions of money, goods, or services to candidates for political office and in support of or opposition to ballot measure campaigns are subject to a wide variety of political laws. Depending on the jurisdiction and the campaign, political contributions may be prohibited or limited and, in nearly all cases, are subject to a complicated series of disclosure rules. Because of the University's tax-exempt status, the University is legally prohibited from endorsing candidates for political office or making any contribution of money, goods, or services to candidates. It is important, therefore, that no person inadvertently cause the University to make such a contribution.

b. *Lobbying:* lobbying can generally be described as any attempt to influence the action of any legislative body (for example, Congress, state legislatures, county boards, city councils, and their staffs) or any federal, state, or local government agency. Laws regulating lobbying exist at the federal, state, and local levels but can differ widely in scope, depending on the jurisdiction. Some laws, for example, only regulate lobbying of the legislative branch. Others, however, also cover lobbying of administrative agencies and officers in the executive branch (for example, lobbying for federally-funded grants). To one degree or another, however, most lobbying laws require registration and reporting by individuals engaged in attempts to influence governmental action.

Tax-exempt organizations are permitted to lobby, and the University engages in lobbying on a limited number of issues, mostly those affecting education, research, and related activities. There is usually some threshold of time or money spent on lobbying that triggers registration and reporting requirements. Regardless of thresholds, however, no University employee—other than the following individuals, on matters under their jurisdiction—may lobby on behalf of the University without specific authorization:

- President
- Provost
- Deans of the Seven Schools
- Vice Provost and Dean of Research
- Vice President for Business Affairs and Chief Financial Officer
- Executive Director of Human Resources
- Director of the Stanford Linear Accelerator Center
- Director of the Hoover Institution
- General Counsel
- Vice President for Public Affairs

The Vice Provost and Dean of Research may grant permission to faculty members to lobby on behalf of the University for specific purposes. The Director of Government and Community Relations may grant permission to staff members to lobby on behalf of the University for specific purposes. All lobbying on behalf of the University should be coordinated with the Director of Government and Community Relations.

c. *Giving of Gifts to Public Officials and Staff:* almost all jurisdictions have strict rules on the extent to which gifts and honoraria may be given to public officials (both elected and non-elected officials and, often, staff). In some cases gifts and honoraria are prohibited; in others they are limited; and in most cases they are subject to detailed disclosure. In addition, in some jurisdictions such as California, gifts to both state and local public officials can

result in a public official's disqualification from participation in any governmental action affecting the interests of the donor. Meals, travel, and entertainment are the most common types of gifts, but gift rules can also apply in cases where public officials attend a reception or receive tickets to sporting or other events.

As a non-profit organization, the University generally does not give gifts to public officials and, in those limited cases where it does give such gifts, it must do so in accordance with all applicable laws and regulations. Therefore, any University employee who, on behalf of the University, wishes to make a gift to a public official must receive prior approval from the Director of Government and Community Relations before making such a gift.

d. *Reporting of Political Activities:* the University must report most of its political activities above certain thresholds. Therefore, any University employee engaging in such activities on behalf of the University should carefully review the remainder of this Guide Memo and should discuss the relevant activities in advance with the Director of Government and Community Relations.

### 2. Prohibited and Restricted Political Activities

a. *In General:*

b. No person may, on behalf of the University, engage in any political activity in support of or opposition to any candidate for elective public office (including giving or receiving funds or endorsements), nor shall any University resources be used for such purpose.

c. No person may, on behalf of the University, lobby (or use University resources to lobby) any federal, state, or local legislative or administrative official or staff member unless specifically authorized to do so. Any lobbying activity, even when authorized, must be conducted in compliance with this Guide Memo, other applicable University policies, and applicable law.

d. No person may, on behalf of the University, give a gift (or use any University resources to give a gift) to any federal, state, or local official or staff member, except in compliance with this Guide Memo, other applicable University policies, and applicable law.

e. No person supporting candidates for public office or engaging in other political activities may use University space or facilities or receive University support, except in the limited ways described in section 3A, below.

f. No person may use for lobbying activities federally-funded contract or grant money received by the University. Even the foregoing activities that are only restricted, rather than prohibited, may be subject to limitations imposed by law. Therefore, any person engaging in the activity, or contemplating doing so, should consult with the Director of Government and Community Relations.

g. *Guidelines for Avoiding Prohibited Partisan Political Activities:* the following guidelines should assist in preventing the involvement or apparent involvement of the University in political activities in support of or opposition to any candidate for elective public office, that is, partisan political activities. Except in the limited circumstances set forth in section 3.b., below:

1. *Use of Name and Seal:* neither the name nor seal of the University or of any of its schools, departments, or institutions should be used on letters or other materials intended for partisan political purposes.

2. *Use of Address and Telephones:* no University office should be used as a return mailing address for partisan political mailings, and telephone service that is paid by the University, likewise, should not be used for partisan political purposes. (Obviously, a student's dormitory room and telephone service that are personal to the student may be used for these purposes.)

3. *Use of Title*: the University title of a faculty or staff member or other person should be used only for identification and should be accompanied by a statement that the person is speaking as an individual and not as a representative of the University.
  4. *Use of Services and Equipment*: University services, such as Interdepartmental Mail; equipment, such as duplicating machines, computers, and telephones; and supplies should not be used for partisan political purposes.
  5. *Use of Personnel*: no University employee may, as part of his or her job, be requested to perform tasks in any way related to partisan political purposes.
3. *Permissible Activities*
- a. *In General*: as noted above, the federal, state, and local laws which limit the partisan political activities that can take place in University facilities and with University support in no way inhibit the expression of personal political views by any individual in the University community. Nor do they forbid faculty, students, or staff from joining with others in support of candidates for office or in furtherance of political causes. There is no restriction on discussion of political issues or teaching of political techniques. Academic endeavors which address public policy issues are in no way affected.  
Because the University encourages freedom of expression, political activities which do not reasonably imply University involvement or identification may be undertaken so long as regular University procedures are followed for use of facilities. Examples of permissible activities are:
    1. Use of areas, such as White Plaza, for tables, speeches, and similar activities.
    2. Use of auditoriums for speeches by political candidates, but subject to rules of the Internal Revenue Service, the Federal Election Commission, and the California Fair Political Practices Commission, and other applicable laws. Arrangements must be made with University Events and Services. (See also Guide Memo 82.1, Public Events, for more information.)
 To reiterate, because tax and political compliance laws impose restrictions, and even prohibitions, on certain political activities and on the use of buildings and equipment at a non-profit institution such as the University, any such activities must be in compliance with these legal requirements. Individuals taking political positions for themselves or groups with which they are associated, but not as representatives of the University, should clearly indicate, by words and actions, that their positions are not those of the University and are not being taken in an official capacity on behalf of the University.
  - b. *Limited University Political Activities*: limited activities relating to specific federal, state, or local legislation or ballot initiatives are permissible where (1) the subject matter is directly related to core interests of the University's activities; (2) the President has determined that the University should take a position; and (3) the individuals who speak or write on the University's behalf are specifically authorized to do so.
4. *Responsibility for Interpretation*: the Director of Government and Community Relations, in consultation with the General Counsel, is the administrative officer responsible for interpretation and application of the above guidelines. Questions on whether planned student activities are consistent with the University's obligations should be directed to the Dean of Students, who will consult with the Director of Government and Community Relations and/or the General Counsel. All other questions on whether planned activities are consistent with the University's obligations should be

addressed directly to the Director of Government and Community Relations or the General Counsel.

## CAMPUS DISRUPTIONS

The University's policy on campus disruption applies to students, faculty, and staff. It is published in its complete form on the Judicial Affairs Office web site at <http://www.stanford.edu/dept/vpsa/judicialaffairs/index.html>.

### POLICY

*The following is quoted from the policy:*

Because the rights of free speech and peaceable assembly are fundamental to the democratic process, Stanford firmly supports the rights of all members of the University community to express their views or to protest against actions and opinions with which they disagree.

All members of the University also share a concurrent obligation to maintain on the campus an atmosphere conducive to scholarly pursuits, to preserve the dignity and seriousness of University ceremonies and public exercises, and to respect the rights of all individuals.

*The following regulations are intended to reconcile these objectives.*

It is a violation of University policy for a member of the faculty, staff, or student body to:

1. prevent or disrupt the effective carrying out of a University function or approved activity, such as lectures, meetings, interviews, ceremonies, the conduct of University business in a University office, and public events.
2. obstruct the legitimate movement of any person about the campus or in any University building or facility.

Members of the faculty, staff, and student body have an obligation to leave a University building or facility when asked to do so in the furtherance of the above regulations by a member of the University community acting in an official role and identifying himself or herself as such; members of the faculty, staff, or student body also have an obligation to identify themselves, when requested to do so by such a member of the University community who has reasonable grounds to believe that the person(s) has violated section (1) or (2) of this policy and who has so informed the person(s).

### APPLICATION

*The following are examples to illustrate the policy:*

The policy has been applied to the following actions: refusal to leave a building which has been declared closed; obstructing the passage into or out of buildings by sitting in front of doorways; preventing University employees from entering their workplace; preventing members of a class from hearing a lecture or taking an examination, or preventing the instructor from giving a lecture, by means of shouts, interruptions, or chants; preventing others from hearing a scheduled speaker by means of shouts, interruptions, or chants; refusing to leave a closed meeting when unauthorized to attend; and intruding upon or refusing to leave a private interview.

It should be understood that while the above are examples of extraordinarily disruptive behavior, the application of the policy also takes situational factors into consideration. Thus, for example, conduct appropriate at a political rally might constitute a violation of the Policy on Campus Disruption if it occurred within a classroom.

There is no "ordinary" penalty which attaches to violations of the Policy on Campus Disruption. Each case is fact-specific; considerations would include: the gravity of the offense, and prior similar misconduct. As a general rule, the more serious the offense, the less it matters that the violation had otherwise not done wrong.

# USE OF THE MAIN QUADRANGLE AND MEMORIAL COURT

## POLICY

*The following is quoted from the policy:*

The Main Quadrangle and Memorial Court are part of Stanford University's academic preserve due to their locations at the heart of the campus. To protect and enhance their historic status, University policy limits activities primarily to established or traditional ceremonies and events.

To schedule an event, approval must be obtained in advance from the Office of Stanford Events (see below). Unscheduled events, protests, or activities are prohibited.

Requests for waivers to this policy must be submitted in advance and in writing to the Office of Stanford Events. Exceptions may be granted only in extraordinary cases.

## RESOURCES

*The following is a summary of resources available:*

For instructions on use of the Main Quadrangle/Memorial Court, contact the Office of Special Events and Protocol (OSEP) at (650) 724-1387, <http://stanfordevents.stanford.edu>.

Note: other venues on campus (such as White Plaza) are made available to Stanford students, faculty, and staff for events other than scheduled "established or traditional ceremonies and events" including those that may involve amplified sound. For further information on the use of such other venues, contact Student Activities and Leadership (SAL) at (650) 723-2733, <http://studentaffairs.stanford.edu/sal>.

## OVAL POLICY

The Oval is considered to be the initial and official visual entrance to the Stanford University campus. Given this historic and aesthetic status, it is in the best interests of the University community and visiting members of the public to maintain its open and pristine space, to help preserve its natural beauty and environmental integrity. The Oval also presents the formal academic image of the University, leading directly to departments, classrooms and other academic space, and faculty and graduate student offices, and thus is subject to the University's Noise Policy.

The University prohibits formal or informal events of any kind to take place in the Oval. Gatherings of Stanford students, faculty, and staff such as demonstrations, rallies, or dances may take place in White Plaza, which can be reserved through the Office of Student Activities. Weddings also are not allowed in the Oval but are in certain circumstances allowed in Memorial Church (refer to Memorial Church wedding ceremony guidelines).

The Oval is considered a pedestrian zone and appropriate use of its space includes walking, running, reading, relaxing, and other limited recreational use of the lawn area (such as quiet, very small picnics and Frisbee), unless or until such use damages or otherwise harms the property.

Cooking food or use of any grill/barbecue or open flame is strictly prohibited. Fireworks or the use of other incendiary devices represent a safety hazard to the area and are therefore prohibited. Amplified sound from items such as boom boxes, musical instruments, or the use of bullhorns or amplified speakers is also prohibited. Only authorized Stanford service vehicles are permitted inside the Oval areas.

As the official entrance to the University, the Oval offers public access to general parking spaces in the marked areas surrounding the outer perimeter of the Oval; drivers are expected to obey all traffic signs and limitations. Buses are subject to additional restrictions.

For further information regarding this policy, contact the Executive Director of Special Events and Protocol, 724-1387 or see <http://osep.stanford.edu/policies/oval.html>.

# NOISE AND AMPLIFIED SOUND

## POLICY

*The following is quoted from the policy:*

Stanford is not only an academic institution but a residential community as well. It is the responsibility of all faculty, students, and staff to moderate noise especially during an event or activity held on campus. Supporting the mission of the University and respecting those who are studying, researching, or otherwise carrying out academic-related activities is a Stanford priority. The campus must require a conducive atmosphere to ensure these endeavors are accomplished and supported. Disturbing noise in or around a residence or other campus buildings which infringe on the rights of other residents or members of the University community is considered a violation of this policy. As part of the event planning process, the event sponsor must obtain all appropriate approvals regarding the use of amplified sound during an event or activity.

## RESOURCES

Information regarding whether and how the use of amplified sound is permitted is available from the following sources, which must be consulted for prior approval:

- The Office of Student Activities: phone: 723-2733, or see <http://studentaffairs.stanford.edu/sal/policies/noise>
- Registrar's Scheduling Office: email [reg-events@stanford.edu](mailto:reg-events@stanford.edu), or see <http://studentaffairs.stanford.edu/registrar/faculty/events>.
- Office of Special Events and Protocol (OSEP) at (650) 724-1387, or see <http://stanfordevents.stanford.edu>.

# PROHIBITION OF THE POSSESSION OF DANGEROUS WEAPONS ON CAMPUS

The University's policy prohibiting weapons on campus is published in its complete form on the Judicial Affairs Office web site <http://stanford.edu/dept/vpsa.judicialaffairs/index.html>.

## POLICY

*The following is quoted from the policy:*

Except for authorized academic purposes, the knowing possession by any student on any Stanford campus of the following is prohibited: firearms, explosives, or any instrument or weapon of the kind commonly known as blackjack, slingshot, billy club, sandclub, sandbag, or metal knuckles.

Notwithstanding the paragraph above, a student who is a resident of a Stanford campus may store a weapon on such campus if both of the following conditions are met:

- The student has complied with all state and federal regulations regarding the use and possession of said weapon, or, in the case of a foreign campus, with the laws of the country in which the campus is located.
- The student stores such weapons with the Stanford Department of Public Safety (SDPS) or, in the case of a foreign campus, in a facility provided by the director of such campus.

Students may remove their weapons from storage only in accordance with regulations established by the SDPS or by the director of the foreign campus at which the weapon is stored. A student who is a resident of a Stanford campus may bring any of the above weapons on campus for purposes of storage only if the student has previously notified the SDPS of the intention to do so,

but in no event more than six hours after arrival on the campus. When the student removes the weapon from storage, it must be taken off campus as soon as is practicable, but in no event more than one hour after such removal.

The term “Stanford campus” shall include all the lands and facilities of Leland Stanford Junior University, whether owned or leased, and whether located in the United States or abroad.

## STUDENT ALCOHOL POLICY

This document clarifies the University’s expectations and approach related to the use of alcohol by students. The University’s Controlled Substances and Alcohol Policy is also applicable. The full text is contained at: [http://adminguide.stanford.edu/23\\_6.pdf](http://adminguide.stanford.edu/23_6.pdf).

### PREAMBLE

The Fundamental Standard has set the standard of conduct for students at Stanford since 1896. It states: “Students at Stanford are expected to show both within and without the University such respect for order, morality, personal honor and the rights of others as is demanded of good citizens.” Implicit in the Standard is the understanding that students are responsible for making their own decisions and accepting the consequences of those decisions.

The University is committed to the health, safety and well-being of each member of the Stanford community. In order to further student learning, development and success and to promote the University’s academic mission, Stanford fosters an environment of personal and collective responsibility and respectful citizenship. This means that all members of the university community—students, faculty and staff—have a role in safeguarding a healthy learning environment free of the consequences of alcohol misuse. The University also strives to create a culture that supports students who do not use alcohol and students who use alcohol in a safe, legal and responsible fashion.

### LEGAL BACKGROUND

Members of the Stanford community are expected to abide by all federal, state and local laws, including those governing alcohol consumption and distribution. Under California law, it is illegal for anyone under the age of 21 to purchase alcohol or to possess alcohol in a public space. It is also illegal for anyone to furnish alcohol to an individual under the age of 21. Other state laws governing the use of alcohol are listed below.

While it is not the responsibility of most Stanford officials to enforce state law, it is the responsibility of the University’s Department of Public Safety, and accordingly they enforce all state alcohol laws when they encounter violations. All community members should understand the law and, as individuals, ensure that they themselves do not violate it.

In addition, it is the responsibility of all community members to ensure that the University does not, through their actions, violate the law. Accordingly, official University functions, including events held by registered student groups, are not allowed to provide alcohol to those under 21, and no University funds may be used to purchase alcohol for that purpose. Violations of this requirement can result in both criminal prosecution and University administrative action, including dismissal from the University.

### RESPONSIBLE ALCOHOL USE

Stanford students are expected to behave responsibly, both in the classroom and outside, both on campus and off. In particular, the University does not tolerate reckless drinking—lawful or unlawful—and its consequent harmful behaviors. The University is especially concerned about the misuse of distilled alcohol products (“hard alcohol”), and the dangers that arise from that misuse.

All students should understand the physical and behavioral effects of alcohol misuse, and should avoid such misuse themselves. In addition, they are expected to do their part to

ensure the safety of fellow students whom they perceive to be engaged in reckless drinking behavior or to be suffering from its consequences.

The University provides educational resources to assure that students understand the effects of alcohol misuse and know how to respond when they perceive others to be engaged in dangerous behavior.

Reckless drinking and encouraging reckless drinking are violations of University policy, and may be subject to disciplinary action. Extreme or repeated violations may result in dismissal from the University.

More generally, students are expected to make healthy, responsible choices concerning their personal use of alcohol and the University supports them in this endeavor through education and other resources. The University sponsors activities and programs focused on students who choose not to drink or to drink lightly, as well as resources and services to assist students who need help for themselves or others related to alcohol use.

### AUTHORITY, APPLICATION AND ENFORCEMENT

Responsibility for application of the Student Alcohol Policy resides with the Vice Provost for Student Affairs. The Office of Alcohol Policy and Education reports to the Vice Provost for Student Affairs and is expected to coordinate and implement alcohol programs. (The University’s Controlled Substances and Alcohol Policy is also applicable. The full text is contained at: [http://adminguide.stanford.edu/23\\_6.pdf](http://adminguide.stanford.edu/23_6.pdf)).

The Stanford University Department of Public Safety enforces federal, state and local laws among students, other community members, guests and visitors.

### ALCOHOL POLICY VIOLATIONS

The Office of Alcohol Policy and Education will work with the following offices to address violations of the University’s alcohol policy as determined by the specifics of each situation.

- The Office of Residential Education for undergraduate students, residential groups, fraternities and sororities
- Graduate Life Office (GLO) for graduate students
- Student Activities and Leadership (SAL) for voluntary student organizations
- Department of Athletics, Physical Education and Recreation (DAPER) for student athletes and athletic groups
- Such other offices as are appropriate under particular circumstances

Violations may be referred to the Office of Judicial Affairs (for individual students) and the Organization Conduct Board (for student groups). The Dean of Student Life may take action as well in certain circumstances.

### GETTING HELP: RESOURCES AVAILABLE TO STUDENTS

Students have access to a variety of University resources.

### ADDITIONAL UNIVERSITY REGULATIONS

- Students living in University residences sign a residence agreement that outlines housing policies and expectations for conduct. Violations of the residence agreement can lead to loss of housing.  
[[http://www.stanford.edu/dept/rde/shs/res\\_agree.htm](http://www.stanford.edu/dept/rde/shs/res_agree.htm)]
- All parties must be registered with the University, and availability of alcohol is regulated by party planning guidelines coordinated by the Office of Student Activities and Leadership.  
[<http://studentaffairs.stanford.edu/sal/planning/party>]  
Other restrictions apply to particular circumstances
- Frosh Housing—Alcoholic beverages are prohibited at all-frosh house events in common area spaces.
- University Funds and the Purchase of Alcohol—No University funds or funds collected by the University may be used in a way that violates the alcohol policy. In student residences,

house funds (funds collected by Student Financial Services or other University offices) may not be used to buy alcohol. Any decision to use student-collected funds to buy alcohol must be made lawfully, thoughtfully, fairly and in a way that respects the views of all students. Students must not be required to contribute to the purchase of alcohol.

- Dining Hall—Students may not possess or consume alcoholic beverages in Stanford Dining Halls during meal times and food service. University Dining staff can deny admission, access or meal service to anyone who is believed to be intoxicated by the Dining Management staff.
- White Plaza—Alcoholic beverages in White Plaza are prohibited.
- End of Quarter Period and Finals Week—No registered parties (with or without alcohol) can occur during the End of the Quarter Period (dead week) or Finals Week.
- Athletic Facilities—No alcohol is permitted inside Stanford athletic facilities public spaces during athletic events.
- Stanford Conferences and University Facilities—The University requires that event sponsors and student groups wishing to offer alcoholic beverages at their programs and events operate within state and local laws as provided by the Department of Alcohol and Beverage Control (ABC). Alcohol service is not allowed in classrooms.
- Admit Weekend—Stanford students are prohibited from providing, serving or in anyway making alcohol available to any prospective frosh (ProFro). All student groups/organizations and residences may host only alcohol-free parties or events during Admit Weekend. This specifically means that no alcohol is to be present, served or consumed at any student group/organization and/or dorm function during Admit Weekend.
- New Student Orientation (NSO) Period—At no time should any Stanford student provide, serve or in any way make alcohol available to any new, incoming undergraduate student (freshman or transfer). All undergraduate student groups/organizations and residences will host only alcohol-free parties or events during Orientation. This specifically means that no alcohol is to be present, served, or consumed at any student group/organization and/or dorm function during NSO.

### CALIFORNIA STATE LAWS

Students should be familiar with California laws governing the consumption of alcohol. The following summarizes those laws most relevant to individuals.

- It is illegal for persons under the age of 21 to possess an alcoholic beverage in any public place or any place open to the public (CA Business and Professions Code 25662).
- Any person who furnishes, gives or sells any alcoholic beverage to someone under the age of 21 is guilty of a misdemeanor (CA Business and Professions Code 25658(a)).
- Any person under the age of 21 who attempts to purchase an alcoholic beverage is guilty of an infraction (CA Business and Professions Code 25658.5).
- Any person under the influence of alcohol in a public place and unable to exercise care for one's own safety or that of others is guilty of a misdemeanor (CA Penal Code 647(f)).
- It is illegal for persons to operate a motor vehicle while under the influence of alcohol or other intoxicants or with a blood alcohol level of .08% or higher (CA Vehicle Code Section 23152). NOTE: A golf cart is a motor vehicle.
- It is unlawful for a person under the age of 21 years who has 0.05 percent or more, by weight, of alcohol in his or her blood to drive a vehicle (CA Vehicle Code Section 23140(a)).

- It is illegal for a person under the age of 21 to drive a vehicle when he or she has a blood alcohol concentration (BAC) of .01% or higher (CA Vehicle Code Section 23136).
- It is a misdemeanor to ride a bicycle under the influence of alcohol, drugs or both (CA Vehicle Code Section 21200.5).
- It is an infraction to possess an open container of an alcoholic beverage while in a motor vehicle (CA Vehicle Code Section 23223).
- It is an infraction for an owner or driver of a motor vehicle to allow an open container of alcohol in the passenger area (CA Vehicle Code Section 23225).

## HAZING POLICY

Hazing is not permitted at Stanford University. No individual, recognized student organization, club, team, or any other Stanford-affiliated student group is permitted to plan, engage in, or condone hazing, on or off the Stanford campus.

### DEFINITION OF HAZING AT STANFORD UNIVERSITY

Hazing includes any activity done in connection with a student organization, regardless of whether the organization is officially recognized at Stanford, that causes or is reasonably likely to cause another student to suffer bodily danger, physical harm, or significant personal degradation or humiliation, even if no bodily danger, physical harm, or significant degradation or humiliation in fact results. Hazing might occur during initiation or pre-initiation into a student organization, but is not limited to these time frames. Any individual who plans or intentionally assists in hazing activity has engaged in hazing, regardless of whether that individual is present when the hazing activity occurs.

### CONSEQUENCES OF A VIOLATION

Stanford University expects its students to conduct themselves in socially responsible and respectful ways. Thus, participation in hazing, either as an individual or as part of any student group, may result in serious individual and organizational consequences including, but not limited to: disciplinary action up to and including expulsion; permanent loss of organizational recognition; and loss of eligibility to remain a member of any club, team, or other Stanford-affiliated student group. Consent, implied or expressed, is not a defense to any complaint or charge alleging a hazing violation.

A number of University offices may take institutional action, including: the Organizational Conduct Board; Judicial Affairs; or other University offices, such as the Vice Provost for Student Affairs or the Department of Athletics.

### APPLICATIONS

Stanford's hazing policy is distinct from and broader than California Penal Code section 245.6, which prohibits: "any method of initiation or preinitiation into a student organization or student body, whether or not the organization or body is officially recognized by an educational institution, which is likely to cause serious bodily injury to any former, current, or prospective student of any school, community college, college, university or other educational institution in this state." A violation of Penal Code Section 245.6 that does not result in serious bodily injury is punishable as a misdemeanor, while a violation that results in death or injury is punishable as a felony or a misdemeanor.

Nothing in this hazing policy prevents Stanford from taking institutional action against hazing activity that falls outside the narrower definition of Penal Code section 245.6.

Stanford's hazing policy is not intended to prohibit student recruitment or new or continuing member activities that are positive and educational in nature, designed to instill a group ethos

or unity. Its intent is to deter those behaviors that cause or are likely to cause danger, harm or humiliation to another student.

Stanford's hazing policy is not intended to apply to customary athletic events or other similar institutionally-approved contests or competitions.

Questions should be directed to the Office of Student Activities, (650) 723-2733.

## SMOKE-FREE ENVIRONMENT

The University's policy on a smoke-free environment is published in its complete form in the Administrative Guide as Administrative Guide Memo 23.4, available at [http://adminguide.stanford.edu/23\\_4.pdf](http://adminguide.stanford.edu/23_4.pdf), and Judicial Affairs Office web site at <http://www.stanford.edu/dept/vpsa/judicialaffairs/index.html>.

**Applicability**—This policy applies to all academic and administrative units of Stanford University, including the SLAC National Accelerator Laboratory, and all campus student housing. This policy does not supersede more restrictive policies which may be in force in compliance with federal, state, or local laws or ordinances.

Note also that the School of Medicine has adopted a more restrictive policy; see <http://med.stanford.edu/tobaccofree>.

### POLICY

*The following is quoted from the policy:*

1. **Policy**  
It is the policy of Stanford University that the smoking of tobacco products in enclosed buildings and facilities and during indoor or outdoor events (and the selling of tobacco products) on the campus is prohibited.
2. **Guidelines**
  - a. **Smoking-Prohibited Areas**—Specifically, smoking is prohibited in classrooms and offices, all enclosed buildings and facilities, in covered walkways, in University vehicles, during indoor and outdoor athletic events, and during other University sponsored or designated indoor or outdoor events.
    - Ashtrays will not be provided in any enclosed University building or facility.
    - "Smoking Prohibited" signs will be posted.
  - b. **Outdoor Smoking Areas**—Smoking is permitted in outdoor areas, except during organized events. Outdoor smoking areas should be located far enough away from doorways, open windows, covered walkways, and ventilation systems to prevent smoke from entering enclosed buildings and facilities. To accommodate faculty, staff, and students who smoke, Vice Presidents, Vice Provosts, and Deans may designate certain areas of existing courtyards and patios as smoking areas in which case ashtrays must be provided. Costs associated with providing designated smoking areas and ashtrays will be absorbed by the specific academic or administrative unit(s).
3. **Enforcement**—This policy relies on the consideration and cooperation of smokers and non-smokers. It is the responsibility of all members of the University community to observe and follow this policy and its guidelines.
  - a. **Smoking Cessation Information**—Smoking cessation programs are available for faculty and staff through the Center for Research in Disease Prevention, and the Health Improvement Program (HIP). Students may contact the Health Promotion Program (HPP) through the Student Health Center for smoking cessation information or programs.
  - b. **Repeated Violations**—Faculty, staff, and students repeatedly violating this policy may be subject to appropriate action to correct any violation(s) and prevent future occurrences.

4. **Implementation and Distribution**—Copies of this policy will be disseminated by the Manager of HR Policy/Staff and Labor Relations and the Vice Provost for Student Affairs to all faculty, staff, and students, and to all new members of the University community.

## VISITOR POLICY/UNIVERSITY STATEMENT ON PRIVACY

Stanford University has an interest in ensuring that the privacy of its students, faculty, and staff is respected, and that no activities interfere with education, research, or residential life.

The University is private property; however, some areas of the campus typically are open to visitors. These areas include White Plaza, public eating areas (such as those at Tresidder Union), outdoor touring areas, and locations to which the public has been invited by advertised notice (such as for public educational, cultural, or athletic events). Even in these locations, visitors must not interfere with the privacy of students, faculty, and staff, or with educational, research, and residential activities. The University may revoke at any time permission to be present in these, or any other areas. Visitors should not be in academic or residential areas unless they have been invited for appropriate business or social purposes by the responsible faculty member, student, or staff member.

No commercial activity, including taking photos or similar audio or visual recordings that are sold to others or otherwise used for commercial purposes, may occur on the campus without the University's permission. Requests for permission should be submitted to the Director of University Communications or, as appropriate, the Dean of Students, the Department of Athletics, or the Office of Public Events. Recognized student groups and official units of the University will be granted such permission so long as they do not violate privacy or property interests of others; so long as any sale of their products is predominantly on campus to students, faculty, and staff; and so long as they comply with applicable University policies and procedures.

Violators of this policy may be subject to criminal and/or civil liability, as well as University disciplinary action.

## COMPUTER AND NETWORK USAGE

For a complete text of the currently applicable version of this policy, see Administrative Guide Memo 62, Computer and Network Usage Policy, available at <http://adminguide.stanford.edu/62.pdf>.

### POLICY

*The following is quoted from the policy:*

Users of Stanford network and computer resources have a responsibility not to abuse the network and resources. This policy provides guidelines for the appropriate and inappropriate use of information technologies.

### SUMMARY

*The following summarizes the policy on Computer and Network Usage:*

In particular, the policy provides that users of University information resources must respect software copyrights and licenses, respect the integrity of computer-based information resources, refrain from seeking to gain or permitting others to gain unauthorized access, including by sharing passwords, and respect the rights of other computer users.

This policy covers appropriate use of computers, networks, and information contained therein. As to political, personal and

commercial use, the University is a non-profit, tax-exempt organization and, as such, is subject to specific federal, state, and local laws regarding sources of income, political activities, use of property, and similar matters. It also is a contractor with government and other entities, and thus must assure proper use of property under its control and allocation of overhead and similar costs. For these reasons, University information resources must not be used for partisan political activities where prohibited by federal, state, or other applicable laws, and may be used for other political activities only when in compliance with federal, state, and other laws, and in compliance with applicable University policies. Similarly, University information resources should not be used for personal activities not related to appropriate University functions, except in a purely incidental manner. In addition, University information resources should not be used for commercial purposes, except in a purely incidental manner or except as permitted under other written policies of the University or with the written approval of a University officer having the authority to give such approval. Any such commercial use should be properly related to University activities, take into account proper cost allocations for government and other overhead determinations, and provide for appropriate reimbursement to the University for taxes and other costs the University may incur by reason of the commercial use. Users also are reminded that the .edu domain on the Internet has rules restricting or prohibiting commercial use, and thus activities not appropriately within the .edu domain and which otherwise are permissible within the University computing resources should use one or more other domains, as appropriate.

The University's Information Security Officer is authorized in appropriate circumstances to inspect or monitor private data (including email), such as when there is a reasonable cause to suspect improper use of computer or network resources.

For further information on the topic of peer-to-peer file sharing, see the section above on Copyright.

## PROTECTION OF SENSITIVE DATA

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Stanford University maintains sensitive non-public data protected by laws and agreements, including Social Security numbers, financial information, health information, and student records. It is incumbent on every member of the Stanford community with access to such data to be familiar with and abide by Stanford's data classifications requirements provided at [http://www.stanford.edu/group/security/securecomputing/dataclass\\_chart.html](http://www.stanford.edu/group/security/securecomputing/dataclass_chart.html). Members of the Stanford community should also familiarize themselves with applicable laws and University policies on privacy as provided by the University, including Administrative Guide Memo 63, Information Security, <http://adminguide.stanford.edu/63.pdf>, Administrative Guide Memo 64, Identification and Authentication of Systems, <http://adminguide.stanford.edu/64.pdf>, Administrative Guide Memo 65, Electronic Commerce, <http://adminguide.stanford.edu/65.pdf>, and Administrative Guide Memo 67, Information Security Incident Response, <http://adminguide.stanford.edu/67.pdf>. For information on best practices for securing mobile computing devices, see [http://www.stanford.edu/group/security/securecomputing/mobile\\_devices.html](http://www.stanford.edu/group/security/securecomputing/mobile_devices.html).

## CAMPUS SAFETY AND CRIMINAL STATISTICS

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Stanford University complies with the Jeanne Clery Disclosure of Campus Security Policy and Crime Statistics Act. A copy of Stanford's policies and statistics under this act are posted on the

Department of Public Safety web site at <http://stanford.edu/group/SUDPS/safety-report.shtml>. A paper copy can be obtained by calling the Stanford Department of Public Safety at (650) 723-9633.

## INDEX

**A**

ACADEMIC CALENDAR 2011-12 • 3  
 ACADEMIC POLICIES AND STATEMENTS • 46  
 ACADEMIC STANDING • 54  
 ACCREDITATION • 1  
 ACTIVITY COURSES • 30  
 ADA (AMERICANS WITH DISABILITIES ACT)/SECTION 504 GRIEVANCE PROCEDURE (STUDENT) • 1044  
 ADMISSION AND FINANCIAL AID • 14  
 ADVANCED PLACEMENT • 29  
 ADVISING AND CREDENTIALS • 45  
 AERONAUTICS AND ASTRONAUTICS • 120  
 AERONAUTICS AND ASTRONAUTICS (AA) • 105  
 AERONAUTICS AND ASTRONAUTICS (AA) COURSES • 423  
 AERONAUTICS AND ASTRONAUTICS (AA) MINOR • 103  
 AERONAUTICS AND ASTRONAUTICS INTRODUCTORY COURSES • 777  
 AFRICAN AND AFRICAN AMERICAN STUDIES • 163  
 AFRICAN AND AFRICAN AMERICAN STUDIES (AAAS) • 224  
 AFRICAN AND AFRICAN AMERICAN STUDIES (AFRICAAM) COURSES • 426  
 AFRICAN AND AFRICAN AMERICAN STUDIES INTRODUCTORY COURSES • 777  
 AFRICAN AND MIDDLE EASTERN LANGUAGES (AMELANG) COURSES • 429  
 AFRICAN AND MIDDLE EASTERN LANGUAGES AND LITERATURES PROGRAM • 314  
 AFRICAN STUDIES • 167  
 AFRICAN STUDIES (AFRICAST) COURSES • 435  
 AGE DISCRIMINATION ACT OF 1975 • 1047  
 AIR FORCE ROTC • 1042  
 ALLAN COX MEDAL FOR FACULTY EXCELLENCE FOSTERING UNDERGRADUATE RESEARCH • 1040  
 AMERICAN STUDIES • 170  
 AMERICAN STUDIES (AMSTUD) COURSES • 436  
 AMERICAN STUDIES INTRODUCTORY COURSES • 778  
 AMOUNT OF WORK • 47  
 ANTHROPOLOGY • 173  
 ANTHROPOLOGY (ANTHRO) COURSES • 441  
 ANTHROPOLOGY INTRODUCTORY COURSES • 778  
 ANTHROPOLOGY SOPHOMORE COLLEGE COURSES • 992  
 AP SCORES AND PLACEMENT • 30  
 APPLICATION FEE • 21  
 APPLIED PHYSICS • 180  
 APPLIED PHYSICS (APPPHYS) COURSES • 458  
 APPLIED PHYSICS INTRODUCTORY COURSES • 778  
 ARCHAEOLOGY • 181  
 ARCHAEOLOGY (ARCHLGY) COURSES • 461  
 ARCHITECTURAL DESIGN (AD) • 105  
 AREAS OF RESEARCH IN ELECTRICAL ENGINEERING • 147  
 ARMY ROTC • 1042  
 ART AND ART HISTORY • 184  
 ART HISTORY • 184  
 ART HISTORY (ARTHIST) COURSES • 463  
 ART HISTORY AND FILM STUDIES COURSE CATALOG NUMBERING SYSTEM • 191  
 ART HISTORY INTRODUCTORY COURSES • 778

ART PRACTICE (STUDIO) • 187  
 ART STUDIO (ARTSTUDI) COURSES • 473  
 ARTS INTENSIVE • 61  
 ASIAN AMERICAN STUDIES • 225  
 ASIAN AMERICAN STUDIES (ASNAMST) COURSES • 477  
 ASSOCIATED STUDENTS OF STANFORD UNIVERSITY (ASSU) • 13  
 ASSU FEES • 21  
 ASTRONOMY • 192  
 ATHLETICS, PHYSICAL EDUCATION, AND RECREATION • 193  
 ATHLETICS, PHYSICAL EDUCATION, AND RECREATION (ATHLETIC) COURSES • 478  
 ATMOSPHERE/ENERGY (A/E) • 106  
 AUDITING • 47  
 AWARDS AND HONORS • 1040

**B**

BACCALAUREATE HONORS • 35  
 BACHELOR OF ARTS (B.A.), BACHELOR OF SCIENCE (B.S.) • 26  
 BACHELOR OF ARTS AND SCIENCE (B.A.S.) • 26  
 BACHELOR OF ARTS AND SCIENCE (B.A.S.) IN THE SCHOOL OF ENGINEERING • 103  
 BACHELOR OF ARTS IN AFRICAN AND AFRICAN AMERICAN STUDIES • 164  
 BACHELOR OF ARTS IN AMERICAN STUDIES • 170  
 BACHELOR OF ARTS IN ANTHROPOLOGY • 173  
 BACHELOR OF ARTS IN ARCHAEOLOGY • 182  
 BACHELOR OF ARTS IN ART HISTORY • 185  
 BACHELOR OF ARTS IN ART PRACTICE (STUDIO) • 187  
 BACHELOR OF ARTS IN CLASSICS • 207  
 BACHELOR OF ARTS IN COMMUNICATION • 215  
 BACHELOR OF ARTS IN COMPARATIVE LITERATURE • 219  
 BACHELOR OF ARTS IN DRAMA • 233  
 BACHELOR OF ARTS IN ECONOMICS • 249  
 BACHELOR OF ARTS IN ENGLISH • 253  
 BACHELOR OF ARTS IN FEMINIST STUDIES • 260  
 BACHELOR OF ARTS IN FILM AND MEXDIA STUDIES • 189  
 BACHELOR OF ARTS IN FRENCH • 266  
 BACHELOR OF ARTS IN GERMAN STUDIES • 277  
 BACHELOR OF ARTS IN HISTORY • 280  
 BACHELOR OF ARTS IN HUMAN BIOLOGY • 293  
 BACHELOR OF ARTS IN IBERIAN AND LATIN AMERICAN CULTURES • 296  
 BACHELOR OF ARTS IN INTERNATIONAL RELATIONS • 306  
 BACHELOR OF ARTS IN ITALIAN • 267  
 BACHELOR OF ARTS IN LINGUISTICS • 321  
 BACHELOR OF ARTS IN MUSIC • 333  
 BACHELOR OF ARTS IN PHILOSOPHY • 338  
 BACHELOR OF ARTS IN POLITICAL SCIENCE • 350  
 BACHELOR OF ARTS IN PSYCHOLOGY • 354  
 BACHELOR OF ARTS IN PUBLIC POLICY • 359  
 BACHELOR OF ARTS IN RELIGIOUS STUDIES • 364  
 BACHELOR OF ARTS IN SCIENCE, TECHNOLOGY, AND SOCIETY • 370  
 BACHELOR OF ARTS IN SLAVIC LANGUAGES AND LITERATURES • 373  
 BACHELOR OF ARTS IN SOCIOLOGY • 378  
 BACHELOR OF ARTS IN URBAN STUDIES • 396  
 BACHELOR OF ARTS PROGRAMS IN EAST ASIAN LANGUAGES AND CULTURES • 239  
 BACHELOR OF SCIENCE IN BIOLOGY • 196  
 BACHELOR OF SCIENCE IN CHEMICAL ENGINEERING • 127  
 BACHELOR OF SCIENCE IN CHEMISTRY • 205



BACHELOR OF SCIENCE IN CIVIL AND ENVIRONMENTAL ENGINEERING • 132  
 BACHELOR OF SCIENCE IN COMPUTER SCIENCE • 139  
 BACHELOR OF SCIENCE IN EARTH SYSTEMS • 70  
 BACHELOR OF SCIENCE IN ENERGY RESOURCES ENGINEERING • 80  
 BACHELOR OF SCIENCE IN ENGINEERING (AERONAUTICS AND ASTRONAUTICS) • 121  
 BACHELOR OF SCIENCE IN ENGINEERING (BIOENGINEERING) • 123  
 BACHELOR OF SCIENCE IN GEOLOGICAL AND ENVIRONMENTAL SCIENCES • 88  
 BACHELOR OF SCIENCE IN GEOPHYSICS • 93  
 BACHELOR OF SCIENCE IN MANAGEMENT SCIENCE AND ENGINEERING • 149  
 BACHELOR OF SCIENCE IN MATERIALS SCIENCE AND ENGINEERING • 153  
 BACHELOR OF SCIENCE IN MATHEMATICAL AND COMPUTATIONAL SCIENCE • 325  
 BACHELOR OF SCIENCE IN MATHEMATICS • 328  
 BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING • 158  
 BACHELOR OF SCIENCE IN PHYSICS • 346  
 BACHELOR OF SCIENCE IN SCIENCE, TECHNOLOGY, AND SOCIETY • 372  
 BACHELOR OF SCIENCE IN SYMBOLIC SYSTEMS • 387  
 BACHELOR OF SCIENCE IN THE SCHOOL OF ENGINEERING • 102  
 BECHTEL INTERNATIONAL CENTER • 1034  
 BING HONORS COLLEGE • 61  
 BING OVERSEAS STUDIES PROGRAM • 61  
 BIOCHEMISTRY • 403  
 BIOCHEMISTRY (BIOC) COURSES • 485  
 BIOCHEMISTRY INTRODUCTORY COURSES • 779  
 BIOENGINEERING • 123  
 BIOENGINEERING (BIOE) • 107  
 BIOENGINEERING (BIOE) COURSES • 486  
 BIOENGINEERING INTRODUCTORY COURSES • 779  
 BIOLOGY • 195  
 BIOLOGY (BIO) COURSES • 491  
 BIOLOGY COURSE NUMBERING SYSTEM • 203  
 BIOLOGY INTRODUCTORY COURSES • 779  
 BIOLOGY SOPHOMORE COLLEGE COURSES • 992  
 BIOLOGY, HOPKINS MARINE STATION • 203  
 BIOLOGY, HOPKINS MARINE STATION (BIOHOPK) COURSES • 502  
 BIOMECHANICAL ENGINEERING (BME) • 107  
 BIOMEDICAL COMPUTATION (BMC) • 108  
 BIOMEDICAL INFORMATICS • 404  
 BIOMEDICAL INFORMATICS (BIOMEDIN) COURSES • 505  
 BIOPHYSICS • 203  
 BIOPHYSICS (BIOPHYS) COURSES • 508  
 BOOKSTORE • 1038  
 BOOTHE PRIZE FOR EXCELLENCE IN WRITING • 1040  
 BRANCH LIBRARIES • 1030

**C**

CAMPUS DISRUPTIONS • 1054  
 CAMPUS HEALTH SERVICE FEE • 21  
 CAMPUS SAFETY AND CRIMINAL STATISTICS • 1059, 1060  
 CANCER BIOLOGY • 407  
 CANCER BIOLOGY (CBIO) COURSES • 508  
 CANDIDACY • 43, 44  
 CARDIOTHORACIC SURGERY (CTS) COURSES • 509  
 CAREER DEVELOPMENT CENTER • 1033  
 CATALAN LANGUAGE (CATLANG) COURSES • 509  
 CENTER FOR AFRICAN STUDIES • 301  
 CENTER FOR BIOMEDICAL ETHICS • 404  
 CENTER FOR EAST ASIAN STUDIES • 301  
 CENTER FOR LATIN AMERICAN STUDIES • 301  
 CENTER FOR RUSSIAN, EAST EUROPEAN AND EURASIAN STUDIES • 302  
 CENTER FOR SOUTH ASIA • 302  
 CENTER FOR SPACE SCIENCE AND ASTROPHYSICS • 1028  
 CENTER FOR TEACHING AND LEARNING • 63  
 CENTER FOR TEACHING AND LEARNING (CTL) COURSES • 510  
 CENTERS, LABORATORIES, AND INSTITUTES • 1027  
 CENTRAL CAMPUS LIBRARIES • 1029  
 CERTIFICATION OF ENROLLMENT OR DEGREES • 48  
 CHANGES OF DEGREE PROGRAMS • 42  
 CHEMICAL AND SYSTEMS BIOLOGY • 408  
 CHEMICAL ENGINEERING • 126  
 CHEMICAL ENGINEERING (CHE) • 109  
 CHEMICAL ENGINEERING (CHE) MINOR • 103  
 CHEMICAL ENGINEERING (CHEMENG) COURSES • 511  
 CHEMICAL ENGINEERING INTRODUCTORY COURSES • 780  
 CHEMICAL SYSTEMS BIOLOGY (CSB) COURSES • 516  
 CHEMISTRY • 204  
 CHEMISTRY (CHEM) COURSES • 517  
 CHEMISTRY COURSES • 206  
 CHEMISTRY INTRODUCTORY COURSES • 780  
 CHICANA/O STUDIES • 226  
 CHICANA/O STUDIES (CHICANST) COURSES • 521  
 CHICANA/O STUDIES INTRODUCTORY COURSES • 781  
 CHILDBIRTH ACCOMMODATION POLICY • 38  
 CHINESE GENERAL (CHINGEN) COURSES • 522  
 CHINESE GENERAL INTRODUCTORY COURSES • 781  
 CHINESE LANGUAGE (CHINLANG) COURSES • 524  
 CHINESE LITERATURE (CHINLIT) COURSES • 527  
 CIVIL AND ENVIRONMENTAL ENGINEERING • 130  
 CIVIL AND ENVIRONMENTAL ENGINEERING (CEE) COURSES • 529  
 CIVIL AND ENVIRONMENTAL ENGINEERING INTRODUCTORY COURSES • 781  
 CIVIL ENGINEERING (CE) • 109  
 CIVIL ENGINEERING (CE) MINOR • 103  
 CLASSICS • 207  
 CLASSICS ART/ARCHAEOLOGY (CLASSART) COURSES • 547  
 CLASSICS ART/ARCHAEOLOGY INTRODUCTORY COURSES • 781  
 CLASSICS GENERAL (CLASSGEN) COURSES • 548  
 CLASSICS GENERAL INTRODUCTORY COURSES • 782  
 CLASSICS GREEK (CLASSGRK) COURSES • 553  
 CLASSICS HISTORY (CLASSHIS) COURSES • 553  
 CLASSICS HISTORY INTRODUCTORY COURSES • 782  
 CLASSICS LATIN (CLASSLAT) COURSES • 555  
 COMMITTEES AND PANELS APPOINTED BY THE PRESIDENT • 12  
 COMMITTEES OF THE ACADEMIC COUNCIL • 13  
 COMMUNICATION • 214  
 COMMUNICATION (COMM) COURSES • 555  
 COMMUNICATION INTRODUCTORY COURSES • 782  
 COMMUNITY CENTERS • 1033  
 COMMUNITY HOUSING • 24  
 COMPARATIVE LITERATURE • 218  
 COMPARATIVE LITERATURE (COMPLIT) COURSES • 562  
 COMPARATIVE LITERATURE COURSE CATALOG NUMBERING SYSTEM • 219  
 COMPARATIVE LITERATURE INTRODUCTORY COURSES • 782  
 COMPARATIVE LITERATURE SOPHOMORE COLLEGE COURSES • 992  
 COMPARATIVE MEDICINE • 409  
 COMPARATIVE MEDICINE (COMP MED) COURSES • 570

- COMPARATIVE MEDICINE INTRODUCTORY COURSES • 782  
 COMPARATIVE MEDICINE SOPHOMORE COLLEGE COURSES • 992  
 COMPARATIVE STUDIES IN RACE AND ETHNICITY • 226  
 COMPARATIVE STUDIES IN RACE AND ETHNICITY (CSRE) • 222  
 COMPARATIVE STUDIES IN RACE AND ETHNICITY (CSRE) COURSES • 571  
 COMPARATIVE STUDIES IN RACE AND ETHNICITY INTRODUCTORY COURSES • 783  
 COMPUTATIONAL AND MATHEMATICAL ENGINEERING (CME) COURSES • 576  
 COMPUTER AND NETWORK USAGE • 1058  
 COMPUTER SCIENCE • 138  
 COMPUTER SCIENCE (CS) • 110  
 COMPUTER SCIENCE (CS) COURSES • 579  
 COMPUTER SCIENCE (CS) MINOR • 104  
 COMPUTER SCIENCE COURSE CATALOG NUMBERING SYSTEM • 139  
 COMPUTER SCIENCE INTRODUCTORY COURSES • 783  
 COMPUTER SCIENCE SOPHOMORE COLLEGE COURSES • 992  
 CONCURRENT ENROLLMENT • 31  
 CONFERRAL OF DEGREES • 36, 41  
 CONSENT TO USE OF PHOTOGRAPHIC IMAGES • 50  
 COORDINATE LIBRARIES • 1030  
 COPYRIGHT • 1048  
 CORE CURRICULUM AND PROGRAM REQUIREMENTS IN BIOMEDICAL INFORMATICS • 405  
 COTERMINAL B.A. AND M.A. PROGRAM IN HISTORY • 287  
 COTERMINAL B.A. AND M.A. PROGRAMS IN EAST ASIAN LANGUAGES AND CULTURES • 241  
 COTERMINAL B.S. AND M.S. DEGREES IN EARTH SYSTEMS • 72  
 COTERMINAL B.S. AND M.S. DEGREES IN GEOLOGICAL AND ENVIRONMENTAL SCIENCES • 91  
 COTERMINAL B.S. AND M.S. PROGRAM IN ENERGY RESOURCES ENGINEERING • 82  
 COTERMINAL B.S./M.S. PROGRAM IN BIOENGINEERING • 123  
 COTERMINAL B.S./M.S. PROGRAM IN CIVIL AND ENVIRONMENTAL ENGINEERING • 134  
 COTERMINAL B.S./M.S. PROGRAM IN GEOPHYSICS • 94  
 COTERMINAL B.S./M.S. PROGRAM IN MATERIALS SCIENCE AND ENGINEERING • 153  
 COTERMINAL B.S./M.S. PROGRAM IN MECHANICAL ENGINEERING • 159  
 COTERMINAL BACHELOR'S AND MASTER OF ARTS IN AFRICAN STUDIES • 168  
 COTERMINAL BACHELOR'S AND MASTER'S DEGREE PROGRAM IN LINGUISTICS • 322  
 COTERMINAL BACHELOR'S AND MASTER'S DEGREES • 27  
 COTERMINAL BACHELOR'S AND MASTER'S DEGREES IN ANTHROPOLOGY • 176  
 COTERMINAL BACHELOR'S AND MASTER'S DEGREES IN CHEMICAL ENGINEERING • 128  
 COTERMINAL BACHELOR'S AND MASTER'S DEGREES IN EARTH SCIENCES • 67  
 COTERMINAL BACHELOR'S AND MASTER'S DEGREES IN LATIN AMERICAN STUDIES • 318  
 COTERMINAL BACHELOR'S AND MASTER'S DEGREES IN PHILOSOPHY • 340  
 COTERMINAL BACHELOR'S AND MASTER'S DEGREES IN SYMBOLIC SYSTEMS • 392  
 COTERMINAL BACHELOR'S AND MASTER'S PROGRAM IN EAST ASIAN STUDIES • 245  
 COTERMINAL BACHELOR'S AND MASTER'S PROGRAM IN EDUCATION • 98  
 COTERMINAL BACHELOR'S AND MASTER'S PROGRAM IN FRENCH OR ITALIAN • 268  
 COTERMINAL BACHELOR'S AND MASTER'S PROGRAM IN MODERN THOUGHT AND LITERATURE • 331  
 COTERMINAL BACHELOR'S AND MASTER'S PROGRAM IN SLAVIC LANGUAGES AND LITERATURES • 375  
 COTERMINAL DEGREES PROGRAM IN AERONAUTICS AND ASTRONAUTICS • 121  
 COTERMINAL M.A. IN PUBLIC POLICY • 360  
 COTERMINAL MASTER OF ARTS IN SOCIOLOGY • 380  
 COTERMINAL MASTER'S PROGRAM IN RUSSIAN, EAST EUROPEAN, AND EURASIAN STUDIES • 369  
 COTERMINAL PROGRAMS IN URBAN STUDIES • 399  
 COTERMINAL PROGRAMS RESIDENCY REQUIREMENT • 39  
 COTERMINAL STUDENT FINANCIAL AID • 19  
 COUNSELING AND PSYCHOLOGICAL SERVICES (CAPS) • 1037  
 COURSES IN LAW • 401  
 COURSES OF INSTRUCTION • 422  
 COURSES TAKEN ON SATISFACTORY/NO CREDIT OR CREDIT/NO CREDIT BASIS • 30  
 CREDIT • 29  
 CROSS-ENROLLMENT AGREEMENTS FOR ROTC • 1041  
 CROSS-SCHOOL LEARNING OPPORTUNITIES • 65  
 CTL SERVICES TO FACULTY, LECTURERS, AND TEACHING ASSISTANTS • 64  
 CTL SERVICES TO UNDERGRADUATES AND GRADUATE STUDENTS • 63  
 CURRENT INFORMATION AND ACCURACY STATEMENT • 2  
 CURRICULA IN THE SCHOOL OF ENGINEERING • 117
- D**
- DANCE (DANCE) COURSES • 593  
 DANCE DIVISION • 237  
 DEAN OF EDUCATIONAL RESOURCES • 1033  
 DEAN OF STUDENT LIFE • 1032  
 DEANS' AWARD FOR ACADEMIC ACHIEVEMENT • 1040  
 DEFINITION AND EXPLANATION OF GRADING SYSTEMS • 52  
 DEGREE PROGRAMS • 26  
 DEGREE REQUIREMENTS • 27  
 DEGREE-SPECIFIC REQUIREMENTS • 42  
 DEMOCRACY, DEVELOPMENT, AND THE RULE OF LAW (DDRL) COURSES • 595  
 DEPARTMENTAL AND FACULTY SPONSORED RESEARCH OPPORTUNITIES • 63  
 DERMATOLOGY (DERM) COURSES • 595  
 DEVELOPMENTAL BIOLOGY • 409  
 DEVELOPMENTAL BIOLOGY (DBIO) COURSES • 595  
 DIRECTORY INFORMATION • 50  
 DISCONTINUATION AND REINSTATEMENT • 38  
 DISSERTATION • 45  
 DIVERSITY AND ACCESS OFFICE • 1038  
 DIVERSITY AND FIRST GEN PROGRAMS • 1033  
 DIVISION OF INTERNATIONAL, COMPARATIVE AND AREA STUDIES • 301  
 DIVISION OF LITERATURES, CULTURES, AND LANGUAGES • 323  
 DIVISION OF LITERATURES, CULTURES, AND LANGUAGES (DLCL) COURSES • 596  
 DOCTOR OF JURISPRUDENCE • 43  
 DOCTOR OF MEDICINE • 44  
 DOCTOR OF MUSICAL ARTS • 44  
 DOCTOR OF MUSICAL ARTS (D.M.A.) AND DOCTOR OF PHILOSOPHY (PH.D.) IN MUSIC • 336

DOCTOR OF PHILOSOPHY • 44  
 DOCTOR OF PHILOSOPHY IN AERONAUTICS AND ASTRONAUTICS • 122  
 DOCTOR OF PHILOSOPHY IN ANTHROPOLOGY • 177  
 DOCTOR OF PHILOSOPHY IN APPLIED PHYSICS • 181  
 DOCTOR OF PHILOSOPHY IN ART HISTORY • 186  
 DOCTOR OF PHILOSOPHY IN BIOCHEMISTRY • 403  
 DOCTOR OF PHILOSOPHY IN BIOENGINEERING • 124  
 DOCTOR OF PHILOSOPHY IN BIOLOGY • 201  
 DOCTOR OF PHILOSOPHY IN BIOMEDICAL INFORMATICS • 406  
 DOCTOR OF PHILOSOPHY IN CANCER BIOLOGY • 408  
 DOCTOR OF PHILOSOPHY IN CHEMICAL AND SYSTEMS BIOLOGY • 408  
 DOCTOR OF PHILOSOPHY IN CHEMICAL ENGINEERING • 129  
 DOCTOR OF PHILOSOPHY IN CHEMISTRY • 206  
 DOCTOR OF PHILOSOPHY IN CIVIL AND ENVIRONMENTAL ENGINEERING • 135  
 DOCTOR OF PHILOSOPHY IN CLASSICS • 211  
 DOCTOR OF PHILOSOPHY IN COMMUNICATION • 217  
 DOCTOR OF PHILOSOPHY IN COMPARATIVE LITERATURE • 220  
 DOCTOR OF PHILOSOPHY IN COMPUTATIONAL AND MATHEMATICAL ENGINEERING • 137  
 DOCTOR OF PHILOSOPHY IN COMPUTER SCIENCE • 143  
 DOCTOR OF PHILOSOPHY IN DEVELOPMENTAL BIOLOGY • 409  
 DOCTOR OF PHILOSOPHY IN DRAMA • 235  
 DOCTOR OF PHILOSOPHY IN EARTH, ENERGY, AND ENVIRONMENTAL SCIENCES • 68  
 DOCTOR OF PHILOSOPHY IN ECONOMICS • 250  
 DOCTOR OF PHILOSOPHY IN ELECTRICAL ENGINEERING • 147  
 DOCTOR OF PHILOSOPHY IN ENGLISH • 256  
 DOCTOR OF PHILOSOPHY IN ENVIRONMENT AND RESOURCES • 77  
 DOCTOR OF PHILOSOPHY IN ENVIRONMENTAL EARTH SYSTEM SCIENCE • 87  
 DOCTOR OF PHILOSOPHY IN FRENCH • 269  
 DOCTOR OF PHILOSOPHY IN FRENCH AND ITALIAN • 273  
 DOCTOR OF PHILOSOPHY IN GENETICS • 410  
 DOCTOR OF PHILOSOPHY IN GEOLOGICAL AND ENVIRONMENTAL SCIENCES • 92  
 DOCTOR OF PHILOSOPHY IN GEOPHYSICS • 95  
 DOCTOR OF PHILOSOPHY IN GERMAN STUDIES • 278  
 DOCTOR OF PHILOSOPHY IN HISTORY • 288  
 DOCTOR OF PHILOSOPHY IN IBERIAN AND LATIN AMERICAN CULTURES • 298  
 DOCTOR OF PHILOSOPHY IN IMMUNOLOGY • 413  
 DOCTOR OF PHILOSOPHY IN ITALIAN • 271  
 DOCTOR OF PHILOSOPHY IN LINGUISTICS • 322  
 DOCTOR OF PHILOSOPHY IN MANAGEMENT SCIENCE AND ENGINEERING • 151  
 DOCTOR OF PHILOSOPHY IN MATERIALS SCIENCE ENGINEERING • 155  
 DOCTOR OF PHILOSOPHY IN MATHEMATICS • 329  
 DOCTOR OF PHILOSOPHY IN MECHANICAL ENGINEERING • 161  
 DOCTOR OF PHILOSOPHY IN MICROBIOLOGY AND IMMUNOLOGY • 414  
 DOCTOR OF PHILOSOPHY IN MODERN THOUGHT AND LITERATURE • 331  
 DOCTOR OF PHILOSOPHY IN MOLECULAR AND CELLULAR PHYSIOLOGY • 415  
 DOCTOR OF PHILOSOPHY IN NEUROSCIENCES • 417  
 DOCTOR OF PHILOSOPHY IN PETROLEUM ENGINEERING OR ENERGY RESOURCES ENGINEERING • 85  
 DOCTOR OF PHILOSOPHY IN PHILOSOPHY • 341

DOCTOR OF PHILOSOPHY IN PHYSICS • 349  
 DOCTOR OF PHILOSOPHY IN POLITICAL SCIENCE • 352  
 DOCTOR OF PHILOSOPHY IN PSYCHOLOGY • 356  
 DOCTOR OF PHILOSOPHY IN RELIGIOUS STUDIES • 365  
 DOCTOR OF PHILOSOPHY IN SLAVIC LANGUAGES AND LITERATURES • 376  
 DOCTOR OF PHILOSOPHY IN SOCIOLOGY • 380  
 DOCTOR OF PHILOSOPHY IN STATISTICS • 385  
 DOCTOR OF PHILOSOPHY IN STEM CELL BIOLOGY AND REGENERATIVE MEDICINE • 419  
 DOCTOR OF PHILOSOPHY IN STRUCTURAL BIOLOGY • 420  
 DOCTOR OF PHILOSOPHY IN THE SCHOOL OF ENGINEERING • 119  
 DOCTOR OF PHILOSOPHY PROGRAMS IN EAST ASIAN LANGUAGES AND CULTURES • 242  
 DOCTOR OF THE SCIENCE OF LAW • 43  
 DOCTORAL DEGREES IN EDUCATION • 98  
 DOCTORAL DISSERTATION READING COMMITTEE • 45  
 DOCUMENT FEE • 21  
 DOMESTIC PARTNERS • 1048  
 DRAMA • 232  
 DRAMA (DRAMA) COURSES • 597  
 DRAMA INTRODUCTORY COURSES • 784  
 DRAMA SOPHOMORE COLLEGE COURSES • 993  
 DUAL BACHELOR'S DEGREES (CONCURRENT B.A. AND B.S.) • 26

## E

EARTH SYSTEMS • 69  
 EARTH SYSTEMS (EARTHSYS) COURSES • 605  
 EARTH SYSTEMS INTRODUCTORY COURSES • 784  
 EARTH SYSTEMS SOPHOMORE COLLEGE COURSES • 993  
 EARTH, ENERGY, AND ENVIRONMENTAL SCIENCES (EEES) COURSES • 613  
 EARTH, ENERGY, AND ENVIRONMENTAL SCIENCES GRADUATE PROGRAM (EEES) • 68  
 EAST ASIAN LANGUAGES AND CULTURES • 237  
 EAST ASIAN STUDIES • 244  
 EAST ASIAN STUDIES (EASTASN) COURSES • 613  
 ECONOMICS • 247  
 ECONOMICS (ECON) COURSES • 614  
 ECONOMICS INTRODUCTORY COURSES • 785  
 ECONOMICS SOPHOMORE COLLEGE COURSES • 993  
 EDUCATION (EDUC) COURSES • 622  
 EDUCATION INTRODUCTORY COURSES • 785  
 ELECTRICAL ENGINEERING • 143  
 ELECTRICAL ENGINEERING (EE) • 111  
 ELECTRICAL ENGINEERING (EE) COURSES • 644  
 ELECTRICAL ENGINEERING (EE) MINOR • 104  
 ELECTRICAL ENGINEERING COURSE CATALOG NUMBERING SYSTEM • 145  
 ELECTRICAL ENGINEERING INTRODUCTORY COURSES • 785  
 ELECTRICAL ENGINEERING SOPHOMORE COLLEGE COURSES • 993  
 EMMETT INTERDISCIPLINARY PROGRAM IN ENVIRONMENT AND RESOURCES (E-IPER) • 73  
 END-QUARTER EXAMINATIONS • 51  
 END-QUARTER POLICY STATEMENT • 51  
 ENERGY RESOURCES ENGINEERING • 80  
 ENERGY RESOURCES ENGINEERING (ENERGY) COURSES • 657  
 ENGINEER • 43  
 ENGINEER DEGREE IN ELECTRICAL ENGINEERING • 146  
 ENGINEER DEGREE IN GEOLOGICAL AND ENVIRONMENTAL SCIENCES • 92  
 ENGINEER IN AERONAUTICS AND ASTRONAUTICS • 122  
 ENGINEER IN CHEMICAL ENGINEERING • 129

ENGINEER IN CIVIL AND ENVIRONMENTAL ENGINEERING • 134  
 ENGINEER IN MATERIALS SCIENCE ENGINEERING • 154  
 ENGINEER IN MECHANICAL ENGINEERING • 161  
 ENGINEER IN PETROLEUM ENGINEERING OR ENERGY RESOURCES ENGINEERING • 84  
 ENGINEER IN THE SCHOOL OF ENGINEERING • 119  
 ENGINEERING (ENGR) COURSES • 661  
 ENGINEERING GEOLOGY AND HYDROGEOLOGY UNDERGRADUATE SPECIALIZED CURRICULUM • 90  
 ENGINEERING INTRODUCTORY COURSES • 786  
 ENGINEERING PHYSICS (EPHYS) • 112  
 ENGLISH • 252  
 ENGLISH (ENGLISH) COURSES • 666  
 ENGLISH FOR FOREIGN STUDENTS (EFSLANG) COURSES • 674  
 ENGLISH INTRODUCTORY COURSES • 786  
 ENGLISH SOPHOMORE COLLEGE COURSES • 993  
 ENROLLMENT REQUIREMENTS • 37  
 ENVIRONMENT AND RESOURCES (ENVRES) COURSES • 676  
 ENVIRONMENTAL EARTH SYSTEM SCIENCE • 86  
 ENVIRONMENTAL EARTH SYSTEM SCIENCE (EESS) COURSES • 678  
 ENVIRONMENTAL EARTH SYSTEM SCIENCE INTRODUCTORY COURSES • 787  
 ENVIRONMENTAL EARTH SYSTEM SCIENCE SOPHOMORE COLLEGE COURSES • 993  
 ENVIRONMENTAL ENGINEERING (ENV) • 113  
 ENVIRONMENTAL ENGINEERING (ENV) MINOR • 104  
 EPIDEMIOLOGY • 412  
 ETHICS IN SOCIETY (ETHICSOC) COURSES • 683  
 ETHICS IN SOCIETY PROGRAM • 258  
 EXAMINATIONS • 51  
 EXCHANGE PROGRAMS • 1041  
 EXCHANGE PROGRAMS AND CROSS-ENROLLMENT AGREEMENTS • 1041  
 EXECUTIVE OFFICERS • 11

**F**

FACULTY AND STAFF AWARDS • 1040  
 FAMILY MEDICINE (FAMMED) COURSES • 686  
 FELLOWSHIPS AND ASSISTANTSHIPS • 19  
 FEMINIST STUDIES • 260  
 FEMINIST STUDIES (FEMST) COURSES • 687  
 FEMINIST STUDIES INTRODUCTORY COURSES • 787  
 FIELD SCHOOL AND RESEARCH OPPORTUNITIES IN ANTHROPOLOGY • 175  
 FILM AND MEXDIA STUDIES • 189  
 FILM STUDIES (FILMSTUD) COURSES • 689  
 FILM, PRACTICE OF (FILMPROD) COURSES • 693  
 FINANCIAL MATHEMATICS • 263  
 FIRESTONE MEDAL FOR EXCELLENCE IN RESEARCH • 1040  
 FOCAL GROUPS • 324  
 FORD DORSEY PROGRAM IN INTERNATIONAL POLICY STUDIES • 302  
 FOREIGN LANGUAGE REQUIREMENT • 44  
 FRANCE-STANFORD CENTER FOR INTERDISCIPLINARY STUDIES • 302  
 FREDERICK EMMONS TERMAN ENGINEERING SCHOLASTIC AWARD • 1041  
 FREEMAN SPOGLI INSTITUTE FOR INTERNATIONAL STUDIES (FSI) • 1028  
 FRENCH AND ITALIAN • 264  
 FRENCH GENERAL (FRENGEN) COURSES • 694  
 FRENCH LANGUAGE (FRENLANG) COURSES • 696  
 FRENCH LITERATURE (FRENLIT) COURSES • 698  
 FRENCH LITERATURE INTRODUCTORY COURSES • 787

FRESHMAN-SOPHOMORE COLLEGE • 61  
 FUNDAMENTAL STANDARD • 2, 1035

**G**

GENERAL EDUCATION REQUIREMENTS • 28  
 GENERAL HISTORY TRACK • 282  
 GENERAL REQUIREMENTS • 37  
 GENETICS • 410  
 GENETICS (GENE) COURSES • 700  
 GENETICS INTRODUCTORY COURSES • 787  
 GEOLOGICAL AND ENVIRONMENTAL SCIENCES • 87  
 GEOLOGICAL AND ENVIRONMENTAL SCIENCES (GES) COURSES • 703  
 GEOLOGICAL AND ENVIRONMENTAL SCIENCES INTRODUCTORY COURSES • 788  
 GEOLOGICAL AND ENVIRONMENTAL SCIENCES SOPHOMORE COLLEGE COURSES • 993  
 GEOPHYSICS • 93  
 GEOPHYSICS (GEOPHYS) COURSES • 710  
 GEOPHYSICS INTRODUCTORY COURSES • 788  
 GERMAN GENERAL (GERGEN) COURSES • 715  
 GERMAN GENERAL INTRODUCTORY COURSES • 788  
 GERMAN LANGUAGE (GERLANG) COURSES • 717  
 GERMAN LITERATURE (GERLIT) COURSES • 718  
 GERMAN LITERATURE INTRODUCTORY COURSES • 788  
 GERMAN STUDIES • 276  
 GLOBAL AFFAIRS AND WORLD HISTORY TRACK • 284  
 GRADING SYSTEMS • 52  
 GRADUATE ADMISSION • 14  
 GRADUATE COURSES IN AERONAUTICS AND ASTRONAUTICS • 423  
 GRADUATE COURSES IN AFRICAN AND AFRICAN AMERICAN STUDIES • 429  
 GRADUATE COURSES IN AFRICAN AND MIDDLE EASTERN LANGUAGES • 435  
 GRADUATE COURSES IN AFRICAN STUDIES • 435  
 GRADUATE COURSES IN AMERICAN STUDIES • 440  
 GRADUATE COURSES IN ANTHROPOLOGY • 450  
 GRADUATE COURSES IN APPLIED PHYSICS • 458  
 GRADUATE COURSES IN ARCHAEOLOGY • 462  
 GRADUATE COURSES IN ART HISTORY • 468  
 GRADUATE COURSES IN ART STUDIO • 477  
 GRADUATE COURSES IN BIOCHEMISTRY • 485  
 GRADUATE COURSES IN BIOENGINEERING • 488  
 GRADUATE COURSES IN BIOLOGY • 498  
 GRADUATE COURSES IN BIOLOGY, HOPKINS MARINE STATION • 503  
 GRADUATE COURSES IN BIOMEDICAL INFORMATICS • 505  
 GRADUATE COURSES IN BIOPHYSICS • 508  
 GRADUATE COURSES IN CANCER BIOLOGY • 509  
 GRADUATE COURSES IN CARDIOTHORACIC SURGERY • 509  
 GRADUATE COURSES IN CATALAN LANGUAGE • 509  
 GRADUATE COURSES IN CENTER FOR TEACHING AND LEARNING • 511  
 GRADUATE COURSES IN CHEMICAL ENGINEERING • 513  
 GRADUATE COURSES IN CHEMICAL SYSTEMS BIOLOGY • 516  
 GRADUATE COURSES IN CHEMISTRY • 519  
 GRADUATE COURSES IN CHICANA/O STUDIES • 522  
 GRADUATE COURSES IN CHINESE GENERAL • 523  
 GRADUATE COURSES IN CHINESE LANGUAGE • 527  
 GRADUATE COURSES IN CHINESE LITERATURE • 528  
 GRADUATE COURSES IN CIVIL AND ENVIRONMENTAL ENGINEERING • 536  
 GRADUATE COURSES IN CLASSICS ART/ARCHAEOLOGY • 548  
 GRADUATE COURSES IN CLASSICS GENERAL • 551

- GRADUATE COURSES IN CLASSICS GREEK • 553  
 GRADUATE COURSES IN CLASSICS HISTORY • 554  
 GRADUATE COURSES IN CLASSICS LATIN • 555  
 GRADUATE COURSES IN COMMUNICATION • 558  
 GRADUATE COURSES IN COMPARATIVE LITERATURE • 566  
 GRADUATE COURSES IN COMPARATIVE MEDICINE • 570  
 GRADUATE COURSES IN COMPARATIVE STUDIES IN RACE AND ETHNICITY • 575  
 GRADUATE COURSES IN COMPUTATIONAL AND MATHEMATICAL ENGINEERING • 576  
 GRADUATE COURSES IN COMPUTER SCIENCE • 583  
 GRADUATE COURSES IN DANCE • 595  
 GRADUATE COURSES IN DERMATOLOGY • 595  
 GRADUATE COURSES IN DEVELOPMENTAL BIOLOGY • 596  
 GRADUATE COURSES IN DIVISION OF LITERATURES, CULTURES, AND LANGUAGES • 597  
 GRADUATE COURSES IN DRAMA • 602  
 GRADUATE COURSES IN EARTH SYSTEMS • 610  
 GRADUATE COURSES IN EARTH, ENERGY, AND ENVIRONMENTAL SCIENCES • 613  
 GRADUATE COURSES IN EAST ASIAN STUDIES • 613  
 GRADUATE COURSES IN ECONOMICS • 618  
 GRADUATE COURSES IN EDUCATION • 626  
 GRADUATE COURSES IN ELECTRICAL ENGINEERING • 647  
 GRADUATE COURSES IN ENERGY RESOURCES ENGINEERING • 658  
 GRADUATE COURSES IN ENGINEERING • 664  
 GRADUATE COURSES IN ENGLISH • 671  
 GRADUATE COURSES IN ENGLISH FOR FOREIGN STUDENTS • 675  
 GRADUATE COURSES IN ENVIRONMENT AND RESOURCES • 676  
 GRADUATE COURSES IN ENVIRONMENTAL EARTH SYSTEM SCIENCE • 680  
 GRADUATE COURSES IN ETHICS IN SOCIETY • 685  
 GRADUATE COURSES IN FAMILY MEDICINE • 686  
 GRADUATE COURSES IN FEMINIST STUDIES • 688  
 GRADUATE COURSES IN FILM STUDIES • 691  
 GRADUATE COURSES IN FILM, PRACTICE OF • 694  
 GRADUATE COURSES IN FRENCH GENERAL • 695  
 GRADUATE COURSES IN FRENCH LANGUAGE • 697  
 GRADUATE COURSES IN FRENCH LITERATURE • 699  
 GRADUATE COURSES IN GENETICS • 700  
 GRADUATE COURSES IN GEOLOGICAL AND ENVIRONMENTAL SCIENCES • 706  
 GRADUATE COURSES IN GEOPHYSICS • 712  
 GRADUATE COURSES IN GERMAN GENERAL • 716  
 GRADUATE COURSES IN GERMAN LANGUAGE • 718  
 GRADUATE COURSES IN GERMAN LITERATURE • 720  
 GRADUATE COURSES IN HEALTH RESEARCH AND POLICY • 722  
 GRADUATE COURSES IN HISTORY • 743  
 GRADUATE COURSES IN HISTORY AND PHILOSOPHY OF SCIENCE • 754  
 GRADUATE COURSES IN HUMANITIES AND SCIENCES • 762  
 GRADUATE COURSES IN IBERIAN AND LATIN AMERICAN STUDIES • 765  
 GRADUATE COURSES IN IBERIAN LANGUAGES • 767  
 GRADUATE COURSES IN IMMUNOLOGY • 768  
 GRADUATE COURSES IN INTERNATIONAL POLICY STUDIES • 769  
 GRADUATE COURSES IN ITALIAN GENERAL • 798  
 GRADUATE COURSES IN ITALIAN LANGUAGE • 800  
 GRADUATE COURSES IN ITALIAN LITERATURE • 801  
 GRADUATE COURSES IN JAPANESE GENERAL • 802  
 GRADUATE COURSES IN JAPANESE LANGUAGE • 805  
 GRADUATE COURSES IN JAPANESE LITERATURE • 806  
 GRADUATE COURSES IN JEWISH STUDIES • 809  
 GRADUATE COURSES IN KOREAN GENERAL • 811  
 GRADUATE COURSES IN KOREAN LANGUAGE • 812  
 GRADUATE COURSES IN LATIN AMERICAN STUDIES • 812  
 GRADUATE COURSES IN LAW, NONPROFESSIONAL • 813  
 GRADUATE COURSES IN LINGUISTICS • 816  
 GRADUATE COURSES IN MANAGEMENT SCIENCE AND ENGINEERING • 823  
 GRADUATE COURSES IN MASTER OF LIBERAL ARTS • 830  
 GRADUATE COURSES IN MATERIALS SCIENCE AND ENGINEERING • 833  
 GRADUATE COURSES IN MATHEMATICS • 839  
 GRADUATE COURSES IN MECHANICAL ENGINEERING • 845  
 GRADUATE COURSES IN MEDICINE • 859  
 GRADUATE COURSES IN MEDICINE INTERDISCIPLINARY • 863  
 GRADUATE COURSES IN MICROBIOLOGY AND IMMUNOLOGY • 867  
 GRADUATE COURSES IN MODERN THOUGHT AND LITERATURE • 868  
 GRADUATE COURSES IN MOLECULAR AND CELLULAR PHYSIOLOGY • 869  
 GRADUATE COURSES IN MUSIC • 875  
 GRADUATE COURSES IN NATIVE AMERICAN STUDIES • 880  
 GRADUATE COURSES IN NEUROBIOLOGY • 880  
 GRADUATE COURSES IN NEUROLOGY AND NEUROLOGICAL SCIENCES • 881  
 GRADUATE COURSES IN NEUROSCIENCES PROGRAM • 882  
 GRADUATE COURSES IN NEUROSURGERY • 882  
 GRADUATE COURSES IN OBSTETRICS AND GYNECOLOGY • 883  
 GRADUATE COURSES IN OPHTHALMOLOGY • 883  
 GRADUATE COURSES IN ORTHOPEDIC SURGERY • 884  
 GRADUATE COURSES IN OTOLARYNGOLOGY • 885  
 GRADUATE COURSES IN PATHOLOGY • 904  
 GRADUATE COURSES IN PEDIATRICS • 905  
 GRADUATE COURSES IN PHILOSOPHY • 917  
 GRADUATE COURSES IN PHYSICS • 929  
 GRADUATE COURSES IN POLITICAL SCIENCE • 937  
 GRADUATE COURSES IN PORTUGUESE LANGUAGE • 941  
 GRADUATE COURSES IN PSYCHIATRY • 943  
 GRADUATE COURSES IN PSYCHOLOGY • 948  
 GRADUATE COURSES IN PUBLIC POLICY • 954  
 GRADUATE COURSES IN RADIATION ONCOLOGY • 957  
 GRADUATE COURSES IN RADIOLOGY • 957  
 GRADUATE COURSES IN RELIGIOUS STUDIES • 968  
 GRADUATE COURSES IN RUSSIAN, EAST EUROPEAN, AND EURASIAN STUDIES • 973  
 GRADUATE COURSES IN SCIENCE, TECHNOLOGY, AND SOCIETY • 974  
 GRADUATE COURSES IN SLAVIC GENERAL • 976  
 GRADUATE COURSES IN SLAVIC LANGUAGE • 978  
 GRADUATE COURSES IN SLAVIC LITERATURE • 979  
 GRADUATE COURSES IN SOCIOLOGY • 985  
 GRADUATE COURSES IN SPANISH LANGUAGE • 996  
 GRADUATE COURSES IN SPECIAL LANGUAGE PROGRAM • 1001  
 GRADUATE COURSES IN STATISTICS • 1002  
 GRADUATE COURSES IN STEM CELL BIOLOGY AND REGENERATIVE MEDICINE • 1007  
 GRADUATE COURSES IN STRUCTURAL BIOLOGY • 1007  
 GRADUATE COURSES IN SURGERY • 1009

GRADUATE COURSES IN SYMBOLIC SYSTEMS • 1011  
 GRADUATE COURSES IN TIBETAN LANGUAGE • 1012  
 GRADUATE DEGREES • 37  
 GRADUATE EDUCATION • 64  
 GRADUATE FELLOWSHIP PROGRAMS • 65  
 GRADUATE FINANCIAL AID • 19  
 GRADUATE LIFE OFFICE • 1034  
 GRADUATE POLICY • 64  
 GRADUATE PROGRAM IN BIOPHYSICS • 204  
 GRADUATE PROGRAMS IN EARTH SCIENCES • 67  
 GRADUATE PROGRAMS IN ENERGY RESOURCES  
 ENGINEERING • 82  
 GRADUATE PROGRAMS IN GEOLOGICAL AND  
 ENVIRONMENTAL SCIENCES • 91  
 GRADUATE PROGRAMS IN THE SCHOOL OF  
 ENGINEERING • 116  
 GRADUATE RESIDENCES • 24  
 GRADUATE RESIDENCY TRANSFER CREDIT • 25, 39  
 GRADUATE SCHOOL OF BUSINESS • 66  
 GRADUATE SCHOOL OF BUSINESS GRADES • 53  
 GRADUATE STUDENT DIVERSITY • 65  
 GRADUATE STUDENT RESIDENCE PROGRAM • 1034  
 GRADUATE STUDENT TUITION • 20  
 GRADUATE TUITION ADJUSTMENT • 41  
 GRADUATE UNITS REQUIREMENTS • 40  
 GRADUATION QUARTER STATUS • 41  
 GRIEVANCES • 1046  
 GUIDELINES FOR DISMISSAL OF GRADUATE STUDENTS  
 FOR ACADEMIC REASONS • 40

**H**

HAAS CENTER FOR PUBLIC SERVICE • 1034  
 HAMID AND CHRISTINA MOGHADAM PROGRAM IN  
 IRANIAN STUDIES • 302  
 HAZING POLICY • 1057  
 HEALTH INSURANCE • 22, 1037  
 HEALTH PROMOTION SERVICES • 1037  
 HEALTH RESEARCH AND POLICY • 411  
 HEALTH RESEARCH AND POLICY (HRP) COURSES • 722  
 HEALTH RESEARCH AND POLICY INTRODUCTORY  
 COURSES • 788  
 HEALTH SERVICES RESEARCH • 411  
 HERBERT HOOVER MEDAL FOR DISTINGUISHED  
 SERVICE • 1040  
 HISTORY • 280  
 HISTORY (HISTORY) COURSES • 725  
 HISTORY AND LAW • 286  
 HISTORY AND PHILOSOPHY OF SCIENCE (HPS) COURSES  
 • 754  
 HISTORY AND PHILOSOPHY OF SCIENCE AND  
 TECHNOLOGY • 291  
 HISTORY INTRODUCTORY COURSES • 788  
 HISTORY OF SCIENCE, AND MEDICINE • 286  
 HISTORY SECONDARY TEACHER'S CREDENTIAL • 287  
 HISTORY SOPHOMORE COLLEGE COURSES • 994  
 HISTORY TRACKS WITH INTERDISCIPLINARY EMPHASIS  
 (HMIE) • 285  
 HISTORY, LITERATURE, AND THE ARTS • 285  
 HOFER PRIZE FOR EXCELLENCE IN UNDERGRADUATE  
 WRITING • 1041  
 HOLDS AND RESCISSION • 17  
 HONOR CODE • 2, 1035  
 HONORS COOPERATIVE PROGRAM • 17, 119  
 HONORS IN ETHICS IN SOCIETY • 258  
 HONORS IN LATIN AMERICAN STUDIES • 317  
 HONORS PROGRAM IN COMPARATIVE STUDIES IN RACE  
 AND ETHNICITY • 224  
 HONORS PROGRAM IN EDUCATION (UNDERGRADUATE)  
 • 97

HOOVER INSTITUTION ON WAR, REVOLUTION AND  
 PEACE • 1030  
 HOUSING • 23  
 HUMAN BIOLOGY • 292  
 HUMAN BIOLOGY (HUMBIO) COURSES • 754  
 HUMAN BIOLOGY INTRODUCTORY COURSES • 789  
 HUMAN BIOLOGY SOPHOMORE COLLEGE COURSES • 994  
 HUMANITIES AND SCIENCES (HUMSCI) COURSES • 761  
 HUMANITIES EDUCATION • 324  
 HUME WRITING CENTER • 59

**I**

IBERIAN AND LATIN AMERICAN CULTURES • 295  
 IBERIAN AND LATIN AMERICAN CULTURES COURSE  
 CATALOG NUMBERING SYSTEM • 299  
 IBERIAN AND LATIN AMERICAN STUDIES (ILAC)  
 COURSES • 762  
 IBERIAN AND LATIN AMERICAN STUDIES  
 INTRODUCTORY COURSES • 790  
 IBERIAN LANGUAGES (IBERLANG) COURSES • 767  
 IDENTIFICATION CARDS • 50  
 IMMUNOLOGY • 412  
 IMMUNOLOGY (IMMUNOL) COURSES • 767  
 INDIVIDUALLY DESIGNED MAJOR IN JEWISH STUDIES •  
 310  
 INDIVIDUALLY DESIGNED MAJORS AND INDIVIDUALLY  
 DESIGNED HONORS PROGRAM IN HUMANITIES • 300  
 INDIVIDUALLY DESIGNED MAJORS IN ENGINEERING  
 (IDMENS) • 113  
 INFORMATION TECHNOLOGY SERVICES (IT SERVICES) •  
 1030  
 INSTITUTE FOR COMPUTATIONAL AND MATHEMATICAL  
 ENGINEERING • 135  
 INSTITUTE FOR DIVERSITY IN THE ARTS AND BLACK  
 PERFORMING ARTS DIVISION • 237  
 INSTITUTE FOR INTERNATIONAL STUDIES (FREEMAN  
 SPOGLI) (IIS) COURSES • 769  
 INTERDISCIPLINARY STUDIES IN HUMANITIES  
 (HUMNTIES) COURSES • 769  
 INTERNATIONAL POLICY STUDIES • 303  
 INTERNATIONAL POLICY STUDIES (IPS) COURSES • 769  
 INTERNATIONAL RELATIONS • 305  
 INTERNATIONAL RELATIONS (INTNLREL) COURSES • 772  
 INTERNATIONAL RELATIONS INTRODUCTORY COURSES  
 • 790  
 INTERNATIONAL STUDENTS • 21  
 INTERNSHIP GUIDELINES • 30  
 INTRODUCTION TO THE HUMANITIES (IHUM) COURSES •  
 773  
 INTRODUCTION TO THE HUMANITIES PROGRAM • 58  
 INTRODUCTORY SEMINARS • 60, 777  
 ITALIAN GENERAL (ITALGEN) COURSES • 797  
 ITALIAN GENERAL INTRODUCTORY COURSES • 791  
 ITALIAN LANGUAGE (ITALLANG) COURSES • 799  
 ITALIAN LITERATURE (ITALLIT) COURSES • 800  
 ITALIAN LITERATURE INTRODUCTORY COURSES • 791

**J**

JAPANESE GENERAL (JAPANGEN) COURSES • 801  
 JAPANESE GENERAL INTRODUCTORY COURSES • 791  
 JAPANESE LANGUAGE (JAPANLNG) COURSES • 803  
 JAPANESE LITERATURE (JAPANLIT) COURSES • 805  
 JEWISH STUDIES • 310  
 JEWISH STUDIES (JEWISHST) COURSES • 807  
 JEWISH STUDIES INTRODUCTORY COURSES • 791  
 JOINT AND DUAL DEGREE PROGRAMS IN EAST ASIAN  
 STUDIES • 247  
 JOINT AND DUAL DEGREES IN LAW • 401

JOINT DEGREE PROGRAM IN PH.D. IN ECONOMICS AND  
 MASTER OF PUBLIC POLICY • 251  
 JOINT DEGREE PROGRAMS • 39  
 JOINT DEGREE PROGRAMS IN BIOENGINEERING AND  
 THE SCHOOL OF LAW • 125  
 JOINT DEGREE PROGRAMS IN ECONOMICS WITH THE  
 SCHOOL OF LAW • 251  
 JOINT M.S. AND LAW DEGREE • 142  
 JOINT MAJOR IN PHILOSOPHY AND RELIGIOUS STUDIES  
 • 340  
 JOINT MS&E AND LAW DEGREES • 151  
 JOINT PROGRAMS IN SOCIOLOGY WITH THE SCHOOL OF  
 LAW • 383  
 JUDICIAL AFFAIRS AND STUDENT CONDUCT • 1035

**K**

KENNETH M. CUTHBERTSON AWARD • 1040  
 KOREAN GENERAL (KORGEN) COURSES • 811  
 KOREAN LANGUAGE (KORLANG) COURSES • 811

**L**

LANGUAGE CENTER • 312  
 LANGUAGE REQUIREMENT • 29  
 LAST UNITS OUT OF RESIDENCE • 31  
 LATIN AMERICAN STUDIES • 315  
 LATIN AMERICAN STUDIES (LATINAM) COURSES • 812  
 LATIN AMERICAN STUDIES COGNATE COURSES • 318  
 LAW, NONPROFESSIONAL (LAWGEN) COURSES • 812  
 LAW, NONPROFESSIONAL INTRODUCTORY COURSES •  
 791  
 LEAVES OF ABSENCE (GRADUATE) • 37  
 LEAVES OF ABSENCE AND REINSTATEMENT  
 (UNDERGRADUATE) • 48  
 LIBRARIES AND COMPUTING RESOURCES • 1029  
 LINGUISTICS • 320  
 LINGUISTICS (LINGUIST) COURSES • 813  
 LINGUISTICS COURSE CATALOG NUMBERING SYSTEM •  
 321  
 LINGUISTICS INTRODUCTORY COURSES • 791  
 LLOYD W. DINKELSPIEL AWARDS • 1040

**M**

M.D. PROGRAM IN THE SCHOOL OF MEDICINE • 402  
 M.D./PH.D. DUAL DEGREE PROGRAM • 125  
 M.S. AND PH.D. PROGRAMS IN THE SCHOOL OF  
 MEDICINE • 402  
 MAJOR IN RELIGIOUS STUDIES AND PHILOSOPHY • 365  
 MANAGEMENT SCIENCE AND ENGINEERING • 148  
 MANAGEMENT SCIENCE AND ENGINEERING (MS&E) •  
 114  
 MANAGEMENT SCIENCE AND ENGINEERING (MS&E)  
 COURSES • 821  
 MANAGEMENT SCIENCE AND ENGINEERING (MS&E)  
 MINOR • 104  
 MANAGEMENT SCIENCE AND ENGINEERING  
 INTRODUCTORY COURSES • 791  
 MASTER IN PUBLIC POLICY • 42  
 MASTER OF ARTS AND MASTER OF SCIENCE • 42  
 MASTER OF ARTS IN ANTHROPOLOGY • 176  
 MASTER OF ARTS IN ART HISTORY • 186  
 MASTER OF ARTS IN CLASSICS • 209  
 MASTER OF ARTS IN COMMUNICATION • 217  
 MASTER OF ARTS IN EAST ASIAN STUDIES • 245  
 MASTER OF ARTS IN ECONOMICS • 250  
 MASTER OF ARTS IN EDUCATION • 98  
 MASTER OF ARTS IN ENGLISH • 255  
 MASTER OF ARTS IN FRENCH • 268  
 MASTER OF ARTS IN GERMAN STUDIES • 278  
 MASTER OF ARTS IN HISTORY • 288

MASTER OF ARTS IN IBERIAN AND LATIN AMERICAN  
 CULTURES • 297  
 MASTER OF ARTS IN INTERNATIONAL POLICY STUDIES •  
 304  
 MASTER OF ARTS IN LATIN AMERICAN STUDIES • 318  
 MASTER OF ARTS IN LINGUISTICS • 322  
 MASTER OF ARTS IN MUSIC • 335  
 MASTER OF ARTS IN PHILOSOPHY • 340  
 MASTER OF ARTS IN POLITICAL SCIENCE • 352  
 MASTER OF ARTS IN PSYCHOLOGY • 356  
 MASTER OF ARTS IN RELIGIOUS STUDIES • 365  
 MASTER OF ARTS IN RUSSIAN, EAST EUROPEAN AND  
 EURASIAN STUDIES • 367  
 MASTER OF ARTS IN SLAVIC LANGUAGES AND  
 LITERATURES • 376  
 MASTER OF ARTS IN SOCIOLOGY FOR CURRENT  
 STANFORD GRADUATE STUDENTS • 380  
 MASTER OF ARTS PROGRAMS IN EAST ASIAN  
 LANGUAGES AND CULTURES • 241  
 MASTER OF BUSINESS ADMINISTRATION • 43  
 MASTER OF FINE ARTS • 43  
 MASTER OF FINE ARTS IN ART PRACTICE (STUDIO) • 188  
 MASTER OF FINE ARTS IN DESIGN • 188  
 MASTER OF FINE ARTS IN DOCUMENTARY FILM AND  
 VIDEO • 190  
 MASTER OF LAWS • 43  
 MASTER OF LEGAL STUDIES • 43  
 MASTER OF LIBERAL ARTS • 43  
 MASTER OF LIBERAL ARTS (MLA) COURSES • 830  
 MASTER OF LIBERAL ARTS PROGRAM • 1031  
 MASTER OF SCIENCE IN AERONAUTICS AND  
 ASTRONAUTICS • 121  
 MASTER OF SCIENCE IN APPLIED PHYSICS • 180  
 MASTER OF SCIENCE IN BIOENGINEERING • 124  
 MASTER OF SCIENCE IN BIOLOGY • 200  
 MASTER OF SCIENCE IN BIOMEDICAL INFORMATICS  
 (ACADEMIC) • 405  
 MASTER OF SCIENCE IN BIOMEDICAL INFORMATICS  
 (COTERMINAL) • 406  
 MASTER OF SCIENCE IN BIOMEDICAL INFORMATICS  
 (PROFESSIONAL/HONORS COOPERATIVE PROGRAM) •  
 406  
 MASTER OF SCIENCE IN CHEMICAL AND SYSTEMS  
 BIOLOGY • 408  
 MASTER OF SCIENCE IN CHEMICAL ENGINEERING • 128  
 MASTER OF SCIENCE IN CHEMISTRY • 206  
 MASTER OF SCIENCE IN CIVIL AND ENVIRONMENTAL  
 ENGINEERING • 134  
 MASTER OF SCIENCE IN COMPUTATIONAL AND  
 MATHEMATICAL ENGINEERING • 136  
 MASTER OF SCIENCE IN COMPUTER SCIENCE • 139  
 MASTER OF SCIENCE IN DEVELOPMENTAL BIOLOGY •  
 409  
 MASTER OF SCIENCE IN EARTH, ENERGY, AND  
 ENVIRONMENTAL SCIENCES • 68  
 MASTER OF SCIENCE IN ELECTRICAL ENGINEERING •  
 145  
 MASTER OF SCIENCE IN ENERGY RESOURCES  
 ENGINEERING • 84  
 MASTER OF SCIENCE IN ENGINEERING (AA) • 122  
 MASTER OF SCIENCE IN ENGINEERING,  
 BIOMECHANICAL ENGINEERING • 160  
 MASTER OF SCIENCE IN ENGINEERING, PRODUCT  
 DESIGN • 161  
 MASTER OF SCIENCE IN ENVIRONMENT AND  
 RESOURCES • 74  
 MASTER OF SCIENCE IN ENVIRONMENTAL EARTH  
 SYSTEM SCIENCE • 86  
 MASTER OF SCIENCE IN EPIDEMIOLOGY • 412

- MASTER OF SCIENCE IN FINANCIAL MATHEMATICS • 263  
 MASTER OF SCIENCE IN GEOLOGICAL AND ENVIRONMENTAL SCIENCES • 92  
 MASTER OF SCIENCE IN GEOPHYSICS • 95  
 MASTER OF SCIENCE IN HEALTH SERVICES RESEARCH • 411  
 MASTER OF SCIENCE IN HUMAN GENETICS AND GENETIC COUNSELING • 410  
 MASTER OF SCIENCE IN IMMUNOLOGY • 413  
 MASTER OF SCIENCE IN MANAGEMENT SCIENCE AND ENGINEERING • 150  
 MASTER OF SCIENCE IN MATERIALS SCIENCE ENGINEERING • 153  
 MASTER OF SCIENCE IN MATHEMATICS • 329  
 MASTER OF SCIENCE IN MECHANICAL ENGINEERING • 159  
 MASTER OF SCIENCE IN MEDICINE PROGRAM • 403  
 MASTER OF SCIENCE IN PETROLEUM ENGINEERING • 83  
 MASTER OF SCIENCE IN STATISTICS • 384  
 MASTER OF SCIENCE IN SYMBOLIC SYSTEMS • 392  
 MASTER OF SCIENCE IN THE SCHOOL OF ENGINEERING • 118  
 MASTER OF THE SCIENCE OF LAW • 43  
 MASTER'S DEGREES IN PUBLIC POLICY • 361  
 MASTER'S PROGRAM PROPOSAL • 42  
 MATERIALS SCIENCE AND ENGINEERING • 152  
 MATERIALS SCIENCE AND ENGINEERING (MATSCI) • 115  
 MATERIALS SCIENCE AND ENGINEERING (MATSCI) COURSES • 831  
 MATERIALS SCIENCE AND ENGINEERING (MATSCI) MINOR • 104  
 MATERIALS SCIENCE AND ENGINEERING INTRODUCTORY COURSES • 792  
 MATHEMATICAL AND COMPUTATIONAL SCIENCE • 325  
 MATHEMATICAL AND COMPUTATIONAL SCIENCE (MCS) COURSES • 836  
 MATHEMATICAL AND COMPUTATIONAL SCIENCE BIOLOGY OPTION • 326  
 MATHEMATICAL AND COMPUTATIONAL SCIENCE ELECTIVES (9 UNITS) • 326  
 MATHEMATICAL AND COMPUTATIONAL SCIENCE ENGINEERING OPTION • 326  
 MATHEMATICS • 327  
 MATHEMATICS (MATH) COURSES • 836  
 MATHEMATICS INTRODUCTORY COURSES • 792  
 MEAL PLANS • 22  
 MECHANICAL ENGINEERING • 156  
 MECHANICAL ENGINEERING (ME) • 115  
 MECHANICAL ENGINEERING (ME) COURSES • 843  
 MECHANICAL ENGINEERING (ME) MINOR • 105  
 MECHANICAL ENGINEERING COURSE CATALOG NUMBERING SYSTEM • 162  
 MECHANICAL ENGINEERING INTRODUCTORY COURSES • 792  
 MEDICAL SCIENTIST TRAINING PROGRAM • 402  
 MEDICAL SERVICES • 1037  
 MEDICINE (MED) COURSES • 857  
 MEDICINE INTERDISCIPLINARY (INDE) COURSES • 863  
 MEDICINE INTRODUCTORY COURSES • 792  
 MEDIEVAL STUDIES • 330  
 MEDITERRANEAN STUDIES FORUM • 302  
 MICROBIOLOGY AND IMMUNOLOGY • 414  
 MICROBIOLOGY AND IMMUNOLOGY (MI) COURSES • 866  
 MICROBIOLOGY AND IMMUNOLOGY INTRODUCTORY COURSES • 793  
 MICROBIOLOGY AND IMMUNOLOGY SOPHOMORE COLLEGE COURSES • 994  
 MIDTERMS • 51  
 MINIMUM PROGRESS FOR UNDERGRADUATES • 36  
 MINIMUM PROGRESS REQUIREMENTS FOR GRADUATE STUDENTS • 40  
 MINOR IN AFRICAN AND AFRICAN AMERICAN STUDIES • 167  
 MINOR IN AFRICAN STUDIES • 168  
 MINOR IN AMERICAN STUDIES • 173  
 MINOR IN ANTHROPOLOGY • 175  
 MINOR IN ARCHAEOLOGY • 183  
 MINOR IN ART HISTORY • 186  
 MINOR IN ART PRACTICE (STUDIO) • 188  
 MINOR IN BIOLOGY • 200  
 MINOR IN CHEMISTRY • 206  
 MINOR IN CIVIL ENGINEERING OR ENVIRONMENTAL ENGINEERING • 132  
 MINOR IN CLASSICS • 209  
 MINOR IN COMMUNICATION • 215  
 MINOR IN DRAMA • 234  
 MINOR IN DRAMA WITH DANCE CONCENTRATION • 237  
 MINOR IN ECONOMICS • 250  
 MINOR IN EDUCATION (UNDERGRADUATE) • 97  
 MINOR IN ENERGY RESOURCES ENGINEERING • 81  
 MINOR IN ENGLISH OR IN CREATIVE WRITING • 255  
 MINOR IN ETHICS IN SOCIETY • 259  
 MINOR IN FEMINIST STUDIES • 262  
 MINOR IN FILM AND MEXDIA STUDIES • 190  
 MINOR IN GEOLOGICAL AND ENVIRONMENTAL SCIENCES • 91  
 MINOR IN GEOPHYSICS • 94  
 MINOR IN GERMAN STUDIES • 278  
 MINOR IN HISTORY • 287  
 MINOR IN HUMAN BIOLOGY • 294  
 MINOR IN INTERNATIONAL RELATIONS • 308  
 MINOR IN JEWISH STUDIES • 311  
 MINOR IN LATIN AMERICAN STUDIES • 317  
 MINOR IN LINGUISTICS • 322  
 MINOR IN MATHEMATICAL AND COMPUTATIONAL SCIENCE • 327  
 MINOR IN MATHEMATICS • 329  
 MINOR IN MIDDLE EASTERN LANGUAGES, LITERATURES, AND CULTURES • 313  
 MINOR IN MODERN LANGUAGES • 268, 323  
 MINOR IN MUSIC • 335  
 MINOR IN PHILOSOPHY • 340  
 MINOR IN PHYSICS OR ASTRONOMY • 348  
 MINOR IN POLITICAL SCIENCE • 351  
 MINOR IN PSYCHOLOGY • 355  
 MINOR IN RELIGIOUS STUDIES • 365  
 MINOR IN RUSSIAN, EAST EUROPEAN, AND EURASIAN STUDIES • 367  
 MINOR IN SCIENCE, TECHNOLOGY, AND SOCIETY • 372  
 MINOR IN SOCIOLOGY • 379  
 MINOR IN STATISTICS • 384  
 MINOR IN SYMBOLIC SYSTEMS • 392  
 MINOR IN THE SCHOOL OF ENGINEERING • 103  
 MINOR IN URBAN STUDIES • 399  
 MINORS IN COMPARATIVE LITERATURE • 220  
 MINORS IN EAST ASIAN LANGUAGES AND CULTURES • 241  
 MINORS IN PUBLIC POLICY • 362  
 MINORS IN SLAVIC LANGUAGES AND LITERATURES • 375  
 MINORS IN SPANISH AND PORTUGUESE • 297  
 MODERN THOUGHT AND LITERATURE • 330  
 MODERN THOUGHT AND LITERATURE (MTL) COURSES • 868  
 MOLECULAR AND CELLULAR PHYSIOLOGY • 415  
 MOLECULAR AND CELLULAR PHYSIOLOGY (MCP) COURSES • 869  
 MULTIPLE MAJORS • 34



MULTIPLE-DEGREE PROGRAMS IN THE SCHOOL OF  
 MEDICINE • 402  
 MUSIC • 332  
 MUSIC (MUSIC) COURSES • 869  
 MUSIC INTRODUCTORY COURSES • 793

**N**

NATIVE AMERICAN STUDIES • 229  
 NATIVE AMERICAN STUDIES (NATIVEAM) COURSES •  
 879  
 NAVAL ROTC • 1043  
 NEUROBIOLOGY • 416  
 NEUROBIOLOGY (NBIO) COURSES • 880  
 NEUROLOGY AND NEUROLOGICAL SCIENCES (NENS)  
 COURSES • 881  
 NEUROLOGY AND NEUROLOGICAL SCIENCES  
 INTRODUCTORY COURSES • 793  
 NEUROSCIENCES • 416  
 NEUROSCIENCES PROGRAM (NEPR) COURSES • 882  
 NEUROSURGERY (NSUR) COURSES • 882  
 NEUROSURGERY INTRODUCTORY COURSES • 793  
 NOISE AND AMPLIFIED SOUND • 1055  
 NONACADEMIC REGULATIONS • 1044  
 NONDISCRIMINATION POLICY • 1, 1044  
 NONMATRICULATED STUDY (GRADUATE STUDENTS) •  
 15  
 NOTIFICATION (ACADEMIC STANDING) • 55  
 NOTIFICATION OF RIGHTS UNDER FERPA • 49

**O**

OBSTETRICS AND GYNECOLOGY • 417  
 OBSTETRICS AND GYNECOLOGY (OBGYN) COURSES •  
 882  
 OFFICE FOR RELIGIOUS LIFE • 1039  
 OFFICE OF ACCESSIBLE EDUCATION (OAE) • 1033  
 OFFICE OF RESIDENTIAL EDUCATION • 1035  
 OLD UNION • 1035  
 OMBUDS • 1038  
 OPHTHALMOLOGY (OPHT) COURSES • 883  
 ORAL COMMUNICATION PROGRAM • 64  
 ORTHOPEDIC SURGERY (ORTHO) COURSES • 884  
 ORTHOPEDIC SURGERY INTRODUCTORY COURSES • 793  
 OTHER SERVICES AND PROGRAMS • 1038  
 OTOLARYNGOLOGY (OTOHNS) COURSES • 885  
 OVAL POLICY • 1055  
 OVERSEAS STUDIES  
   AUSTRALIA (OSPAUSTL) COURSES • 885  
   BARCELONA (CASB) (OSPBARCL) COURSES • 885  
   BEIJING (OSPBEIJ) COURSES • 887  
   BERLIN (OSPBER) COURSES • 888  
   CAPETOWN (OSPCPTWNL) COURSES • 890  
   FLORENCE (OSPFLOR) COURSES • 891  
   KYOTO (OSPKYOTO) COURSES • 894  
   KYOTO-KCJS (OSPKYOCT) COURSES • 893  
   MADRID (OSPMADR) COURSES • 895  
   MOSCOW (OSPMOSC) COURSES • 897  
   OXFORD (OSPOXFRD) COURSES • 897  
   PARIS (OSPPARIS) COURSES • 900  
   SANTIAGO (OSPSANTG) COURSES • 902  
 OVERSEAS STUDIES COURSES IN AFRICAN AND  
 AFRICAN AMERICAN STUDIES • 167  
 OVERSEAS STUDIES COURSES IN AFRICAN STUDIES • 169  
 OVERSEAS STUDIES COURSES IN ANTHROPOLOGY • 180  
 OVERSEAS STUDIES COURSES IN ARCHAEOLOGY • 184  
 OVERSEAS STUDIES COURSES IN ART AND ART  
 HISTORY • 191  
 OVERSEAS STUDIES COURSES IN BIOLOGY • 203  
 OVERSEAS STUDIES COURSES IN CIVIL AND  
 ENVIRONMENTAL ENGINEERING • 135

OVERSEAS STUDIES COURSES IN CLASSICS • 214  
 OVERSEAS STUDIES COURSES IN COMMUNICATION • 218  
 OVERSEAS STUDIES COURSES IN COMPUTER SCIENCE •  
 143  
 OVERSEAS STUDIES COURSES IN DRAMA • 237  
 OVERSEAS STUDIES COURSES IN EARTH SYSTEMS • 73  
 OVERSEAS STUDIES COURSES IN ECONOMICS • 252  
 OVERSEAS STUDIES COURSES IN ELECTRICAL  
 ENGINEERING • 147  
 OVERSEAS STUDIES COURSES IN ENGINEERING • 119  
 OVERSEAS STUDIES COURSES IN ENGLISH • 258  
 OVERSEAS STUDIES COURSES IN FEMINIST STUDIES •  
 262  
 OVERSEAS STUDIES COURSES IN FRENCH AND ITALIAN  
 • 275  
 OVERSEAS STUDIES COURSES IN GERMAN STUDIES • 279  
 OVERSEAS STUDIES COURSES IN HISTORY • 290  
 OVERSEAS STUDIES COURSES IN HISTORY AND  
 PHILOSOPHY OF SCIENCE AND TECHNOLOGY • 292  
 OVERSEAS STUDIES COURSES IN HUMAN BIOLOGY • 295  
 OVERSEAS STUDIES COURSES IN IBERIAN AND LATIN  
 AMERICAN STUDIES • 299  
 OVERSEAS STUDIES COURSES IN INTERNATIONAL  
 RELATIONS • 308  
 OVERSEAS STUDIES COURSES IN LATIN AMERICAN  
 STUDIES • 319  
 OVERSEAS STUDIES COURSES IN LINGUISTICS • 323  
 OVERSEAS STUDIES COURSES IN POLITICAL SCIENCE •  
 353  
 OVERSEAS STUDIES COURSES IN PUBLIC POLICY • 363  
 OVERSEAS STUDIES COURSES IN RELIGIOUS STUDIES •  
 366  
 OVERSEAS STUDIES COURSES IN SCIENCE,  
 TECHNOLOGY, AND SOCIETY • 372  
 OVERSEAS STUDIES COURSES IN SLAVIC LANGUAGES  
 AND LITERATURES • 377  
 OVERSEAS STUDIES COURSES IN SOCIOLOGY • 383  
 OVERSEAS STUDIES COURSES IN THE LANGUAGE  
 CENTER • 314  
 OVERSEAS STUDIES COURSES IN URBAN STUDIES • 399  
 OVERSEAS STUDIES IN EAST ASIAN LANGUAGES AND  
 CULTURES • 243  
 OWNERSHIP AND USE OF STANFORD NAME AND  
 TRADEMARKS • 1048

**P**

PATHOLOGY • 417  
 PATHOLOGY (PATH) COURSES • 903  
 PATHOLOGY INTRODUCTORY COURSES • 794  
 PAYMENTS • 22  
 PEDIATRICS (PEDS) COURSES • 905  
 PEDIATRICS INTRODUCTORY COURSES • 794  
 PEER WRITING CONSULTANTS • 60  
 PEER-TO-PEER FILE SHARING • 1048  
 PERFORMANCE • 324  
 PH.D. MINOR • 45  
 PH.D. MINOR IN AERONAUTICS AND ASTRONAUTICS •  
 123  
 PH.D. MINOR IN ANTHROPOLOGY • 179  
 PH.D. MINOR IN ART HISTORY • 187  
 PH.D. MINOR IN BIOENGINEERING • 125  
 PH.D. MINOR IN BIOMEDICAL INFORMATICS • 406  
 PH.D. MINOR IN CHEMICAL ENGINEERING • 130  
 PH.D. MINOR IN CHEMISTRY • 206  
 PH.D. MINOR IN CIVIL AND ENVIRONMENTAL  
 ENGINEERING • 135  
 PH.D. MINOR IN CLASSICS • 214  
 PH.D. MINOR IN COMMUNICATION • 217  
 PH.D. MINOR IN COMPARATIVE LITERATURE • 222

- PH.D. MINOR IN COMPUTATIONAL AND MATHEMATICAL ENGINEERING • 138  
 PH.D. MINOR IN COMPUTER SCIENCE • 143  
 PH.D. MINOR IN EAST ASIAN LANGUAGES AND CULTURES • 243  
 PH.D. MINOR IN ECONOMICS • 251  
 PH.D. MINOR IN EDUCATION • 99  
 PH.D. MINOR IN ELECTRICAL ENGINEERING • 147  
 PH.D. MINOR IN FRENCH OR ITALIAN • 275  
 PH.D. MINOR IN GEOLOGICAL AND ENVIRONMENTAL SCIENCES • 92  
 PH.D. MINOR IN HISTORY • 290  
 PH.D. MINOR IN IBERIAN AND LATIN AMERICAN CULTURES • 299  
 PH.D. MINOR IN LINGUISTICS • 323  
 PH.D. MINOR IN MANAGEMENT SCIENCE AND ENGINEERING • 152  
 PH.D. MINOR IN MATERIALS SCIENCE AND ENGINEERING • 156  
 PH.D. MINOR IN MATHEMATICS • 330  
 PH.D. MINOR IN MECHANICAL ENGINEERING • 162  
 PH.D. MINOR IN PETROLEUM ENGINEERING OR ENERGY RESOURCES ENGINEERING • 86  
 PH.D. MINOR IN PHILOSOPHY • 343  
 PH.D. MINOR IN PHYSICS • 349  
 PH.D. MINOR IN POLITICAL SCIENCE • 353  
 PH.D. MINOR IN PSYCHOLOGY • 357  
 PH.D. MINOR IN RELIGIOUS STUDIES • 366  
 PH.D. MINOR IN SOCIOLOGY • 383  
 PH.D. MINOR IN STATISTICS • 386  
 PHI BETA KAPPA • 1041  
 PHILOSOPHY • 338  
 PHILOSOPHY (PHIL) COURSES • 907  
 PHILOSOPHY AND LITERATURE • 324  
 PHILOSOPHY INTRODUCTORY COURSES • 794  
 PHYSICS • 344  
 PHYSICS (PHYSICS) COURSES • 925  
 PHYSICS COURSE CATALOG NUMBERING SYSTEM • 346  
 PHYSICS INTRODUCTORY COURSES • 794  
 POLICE SERVICES • 1039  
 POLITICAL ACTIVITIES • 1052  
 POLITICAL SCIENCE • 349  
 POLITICAL SCIENCE (POLISCI) COURSES • 932  
 POLITICAL SCIENCE INTRODUCTORY COURSES • 794  
 POLITICAL SCIENCE SOPHOMORE COLLEGE COURSES • 994  
 PORTUGUESE LANGUAGE (PORTLANG) COURSES • 941  
 PORTUGUESE LANGUAGE INTRODUCTORY COURSES • 795  
 POSTDOCTORAL SCHOLARS • 16  
 PRESIDENT'S AWARD FOR ACADEMIC EXCELLENCE IN THE FRESHMAN YEAR • 1040  
 PRIVACY OF STUDENTS RECORDS • 49  
 PROBATION • 55  
 PRODUCT DESIGN (PD) • 116  
 PROFICIENCY IN FOREIGN LANGUAGE NOTATION • 312  
 PROGRAM IN INTERNATIONAL RELATIONS • 302  
 PROGRAM IN WRITING AND RHETORIC • 59  
 PROGRAMS OF GRADUATE STUDY IN CIVIL AND ENVIRONMENTAL ENGINEERING • 132  
 PROHIBITION OF THE POSSESSION OF DANGEROUS WEAPONS ON CAMPUS • 1055  
 PROTECTION OF SENSITIVE DATA • 1059  
 PROVISIONAL REGISTRATION • 55  
 PSYCHIATRY (PSYC) COURSES • 942  
 PSYCHIATRY INTRODUCTORY COURSES • 795  
 PSYCHOLOGY • 354  
 PSYCHOLOGY (PSYCH) COURSES • 944  
 PSYCHOLOGY INTRODUCTORY COURSES • 795  
 PSYCHOLOGY SOPHOMORE COLLEGE COURSES • 994  
 PUBLIC HISTORY/PUBLIC SERVICE • 286  
 PUBLIC POLICY • 358  
 PUBLIC POLICY (PUBLPOL) COURSES • 953  
 PWR PEDAGOGY PROGRAM • 60
- R**  
 RADIATION ONCOLOGY • 418  
 RADIATION ONCOLOGY (RADO) COURSES • 957  
 RADIOLOGY • 418  
 RADIOLOGY (RAD) COURSES • 957  
 RECORDS • 48  
 REFUNDS • 22  
 REGISTRAR'S OFFICE • 2  
 REGISTRATION AND STUDY LISTS • 46  
 RELIGIOUS HOLIDAYS • 47  
 RELIGIOUS STUDIES • 363  
 RELIGIOUS STUDIES (RELIGST) COURSES • 958  
 RELIGIOUS STUDIES INTRODUCTORY COURSES • 796  
 RENAISSANCES • 324  
 REPEATED COURSES • 47  
 REPORTING OF GRADES • 53  
 RESEARCH POLICIES FOR GRADUATE STUDENTS • 64  
 RESIDENCE DEANS • 1036  
 RESIDENCY POLICY FOR GRADUATE STUDENTS • 38  
 RESIDENTIAL EDUCATION PROGRAM • 1036  
 RETURNING FROM SUSPENSION • 55  
 REVISION OF END-QUARTER GRADES • 53  
 ROBERT H. N. HO FAMILY FOUNDATION CENTER FOR BUDDHIST STUDIES AT STANFORD UNIVERSITY • 302  
 ROBERT M. GOLDEN MEDAL FOR EXCELLENCE IN THE HUMANITIES AND CREATIVE ARTS • 1041  
 RUSSIAN, EAST EUROPEAN AND EURASIAN STUDIES • 366  
 RUSSIAN, EAST EUROPEAN, AND EURASIAN STUDIES (REES) COURSES • 972
- S**  
 SCHOLARSHIPS AND FELLOWSHIPS, AND POST-BACCALAUREATE STUDIES • 62  
 SCHOOL OF EARTH SCIENCES • 67  
 SCHOOL OF EDUCATION • 96  
 SCHOOL OF ENGINEERING • 100  
 SCHOOL OF HUMANITIES AND SCIENCES • 163  
 SCHOOL OF LAW • 400  
 SCHOOL OF MEDICINE • 402  
 SCHOOL OF MEDICINE GRADES • 54  
 SCHOOLS OF THE UNIVERSITY • 12  
 SCIENCE, TECHNOLOGY, AND SOCIETY • 369  
 SCIENCE, TECHNOLOGY, AND SOCIETY (STS) COURSES • 973  
 SCIENCE, TECHNOLOGY, AND SOCIETY INTRODUCTORY COURSES • 796  
 SECOND BACHELOR'S DEGREE • 26  
 SECONDARY MAJOR • 35  
 SEPTEMBER STUDIES • 60  
 SEXUAL ASSAULT • 1052  
 SEXUAL ASSAULT AND RELATIONSHIP ABUSE EDUCATION AND RESPONSE • 1036  
 SEXUAL HARASSMENT AND CONSENSUAL SEXUAL OR ROMANTIC RELATIONSHIPS • 1049  
 SHARING INFORMATION WITH PARENTS • 49  
 SLAVIC GENERAL (SLAVGEN) COURSES • 974  
 SLAVIC GENERAL INTRODUCTORY COURSES • 796  
 SLAVIC LANGUAGE (SLAVLANG) COURSES • 977  
 SLAVIC LANGUAGES AND LITERATURES • 372  
 SLAVIC LITERATURE (SLAVLIT) COURSES • 978  
 SMOKE-FREE ENVIRONMENT • 1058  
 SOCIOLOGY • 377

SOCIOLOGY (SOC) COURSES • 980  
 SOCIOLOGY INTRODUCTORY COURSES • 797  
 SOHAIB AND SARA ABBASI PROGRAM IN ISLAMIC STUDIES • 302  
 SOPHOMORE COLLEGE • 60  
 SOPHOMORE COLLEGE (SCS) COURSES • 992  
 SPANISH LANGUAGE (SPANLANG) COURSES • 995  
 SPECIAL FEES • 22  
 SPECIAL LANGUAGE PROGRAM • 313  
 SPECIAL LANGUAGE PROGRAM (SPECLANG) COURSES • 997  
 SPECIAL LANGUAGE PROGRAM INTRODUCTORY COURSES • 797  
 SPECIAL REGISTRATION STATUSES (UNDERGRADUATE) • 35  
 STANFORD ALUMNI ASSOCIATION • 1039  
 STANFORD BULLETIN • 1  
 STANFORD CONFERENCE SERVICES • 1038  
 STANFORD EVENTS • 1039  
 STANFORD GRADUATE FELLOWSHIPS PROGRAM IN SCIENCE AND ENGINEERING (SGF) • 65  
 STANFORD GRADUATE SUMMER INSTITUTE (SGSI) • 65  
 STANFORD IN WASHINGTON • 400  
 STANFORD INTERDISCIPLINARY GRADUATE FELLOWSHIPS (SIGF) • 65  
 STANFORD INTRODUCTORY STUDIES • 58  
 STANFORD LAW SCHOOL GRADES • 53  
 STANFORD TEACHER EDUCATION PROGRAM (STEP) • 98  
 STANFORD UNIVERSITY ID NUMBER • 50  
 STANFORD UNIVERSITY LIBRARIES AND ACADEMIC INFORMATION RESOURCES • 1029  
 STANFORD'S MISSION • 9  
 STATEMENT CONCERNING EARLY EXAMINATIONS • 52  
 STATISTICS • 384  
 STATISTICS (STATS) COURSES • 1001  
 STATISTICS INTRODUCTORY COURSES • 797  
 STEM CELL BIOLOGY AND REGENERATIVE MEDICINE • 418  
 STEM CELL BIOLOGY AND REGENERATIVE MEDICINE (STEMREM) COURSES • 1007  
 STEM CELL BIOLOGY AND REGENERATIVE MEDICINE INTRODUCTORY COURSES • 797  
 STOREY HOUSE • 295  
 STRUCTURAL BIOLOGY • 420  
 STRUCTURAL BIOLOGY (SBIO) COURSES • 1007  
 STRUCTURED LIBERAL EDUCATION • 60  
 STRUCTURED LIBERAL EDUCATION (SLE) COURSES • 1008  
 STUDENT ACADEMIC GRIEVANCE PROCEDURE • 55  
 STUDENT ACTIVITIES AND LEADERSHIP • 1036  
 STUDENT AFFAIRS • 1032  
 STUDENT ALCOHOL POLICY • 1056  
 STUDENT AWARDS • 1040  
 STUDENT GRANT PROGRAMS • 63  
 STUDENT LOANS (GRADUATE STUDENTS) • 19  
 STUDENT NON-ACADEMIC GRIEVANCE PROCEDURE • 1046  
 STUDENT SERVICES CENTER • 1032  
 STUDENTS OF NEW FACULTY • 16  
 STUDY ABROAD PROGRAMS IN IBERIAN AND LATIN AMERICAN CULTURES • 297  
 STUDY LIST CHANGES • 47  
 SUMMER SESSION • 1031  
 SUNET ID • 50  
 SURGERY (SURG) COURSES • 1008  
 SURGERY INTRODUCTORY COURSES • 797  
 SUSPENSION • 55  
 SYMBOLIC SYSTEMS • 386  
 SYMBOLIC SYSTEMS (SYMSYS) COURSES • 1011

**T**  
 TAUBE CENTER FOR JEWISH STUDIES • 229, 302  
 TEACHING AND RESEARCH ASSISTANTSHIPS IN COMPUTER SCIENCE • 143  
 TEACHING AND RESEARCH REQUIREMENTS • 44  
 TERMINAL GRADUATE REGISTRATION (TGR) • 41  
 THE ACADEMIC COUNCIL • 13  
 THE BOARD OF TRUSTEES • 11  
 THE CONTINUING STUDIES PROGRAM • 1030  
 THE EUROPE CENTER • 301  
 THE MAJOR • 31  
 THE PRESIDENT • 12  
 THE PROVOST • 12  
 THEMATIC CONCENTRATION IN AMERICAN DIVERSITY • 230  
 THEMATIC CONCENTRATION IN EDUCATION, ACCESS, AND EQUITY • 230  
 THEMATIC CONCENTRATION IN IDENTITY, DIVERSITY AND AESTHETICS (IDA) • 231  
 THEMATIC CONCENTRATION IN PUBLIC SERVICE • 231  
 THEMATIC CONCENTRATION IN RACE AND HEALTH • 232  
 THEMATIC CONCENTRATION IN RACE AND THE AMERICAN CITY • 232  
 THESIS • 43  
 TIBETAN LANGUAGE (TIBETLNG) COURSES • 1012  
 TIME LIMIT FOR COMPLETION OF A DEGREE WITH CANDIDACY • 44  
 TIME LIMIT FOR COMPLETION OF THE MASTER'S DEGREE • 42  
 TITLE IX OF THE EDUCATION AMENDMENTS OF 1972 • 1045  
 TITLE VI OF THE CIVIL RIGHTS ACT OF 1964 • 1045  
 TRANSCRIPTS • 48  
 TRANSFER WORK • 24  
 TRESIDDER MEMORIAL UNION • 1036  
 TUITION, FEES, AND HOUSING • 20

**U**  
 UNDERGRADUATE ADMISSION • 14  
 UNDERGRADUATE ADVISING AND RESEARCH • 62  
 UNDERGRADUATE COURSES IN AERONAUTICS AND ASTRONAUTICS • 423  
 UNDERGRADUATE COURSES IN AFRICAN AND AFRICAN AMERICAN STUDIES • 426  
 UNDERGRADUATE COURSES IN AFRICAN AND MIDDLE EASTERN LANGUAGES • 429  
 UNDERGRADUATE COURSES IN AFRICAN STUDIES • 435  
 UNDERGRADUATE COURSES IN AMERICAN STUDIES • 436  
 UNDERGRADUATE COURSES IN ANTHROPOLOGY • 441  
 UNDERGRADUATE COURSES IN APPLIED PHYSICS • 458  
 UNDERGRADUATE COURSES IN ARCHAEOLOGY • 461  
 UNDERGRADUATE COURSES IN ART HISTORY • 463  
 UNDERGRADUATE COURSES IN ART STUDIO • 473  
 UNDERGRADUATE COURSES IN ASIAN AMERICAN STUDIES • 477  
 UNDERGRADUATE COURSES IN ATHLETICS, PHYSICAL EDUCATION, AND RECREATION • 478  
 UNDERGRADUATE COURSES IN BIOCHEMISTRY • 485  
 UNDERGRADUATE COURSES IN BIOENGINEERING • 486  
 UNDERGRADUATE COURSES IN BIOLOGY • 491  
 UNDERGRADUATE COURSES IN BIOLOGY, HOPKINS MARINE STATION • 502  
 UNDERGRADUATE COURSES IN BIOMEDICAL INFORMATICS • 505  
 UNDERGRADUATE COURSES IN CANCER BIOLOGY • 508  
 UNDERGRADUATE COURSES IN CARDIOTHORACIC SURGERY • 509

- UNDERGRADUATE COURSES IN CATALAN LANGUAGE • 509  
 UNDERGRADUATE COURSES IN CENTER FOR TEACHING AND LEARNING • 510  
 UNDERGRADUATE COURSES IN CHEMICAL ENGINEERING • 511  
 UNDERGRADUATE COURSES IN CHEMICAL SYSTEMS BIOLOGY • 516  
 UNDERGRADUATE COURSES IN CHEMISTRY • 517  
 UNDERGRADUATE COURSES IN CHICANA/O STUDIES • 521  
 UNDERGRADUATE COURSES IN CHINESE GENERAL • 522  
 UNDERGRADUATE COURSES IN CHINESE LANGUAGE • 524  
 UNDERGRADUATE COURSES IN CHINESE LITERATURE • 527  
 UNDERGRADUATE COURSES IN CIVIL AND ENVIRONMENTAL ENGINEERING • 529  
 UNDERGRADUATE COURSES IN CLASSICS ART/ARCHAEOLOGY • 547  
 UNDERGRADUATE COURSES IN CLASSICS GENERAL • 548  
 UNDERGRADUATE COURSES IN CLASSICS GREEK • 553  
 UNDERGRADUATE COURSES IN CLASSICS HISTORY • 553  
 UNDERGRADUATE COURSES IN CLASSICS LATIN • 555  
 UNDERGRADUATE COURSES IN COMMUNICATION • 555  
 UNDERGRADUATE COURSES IN COMPARATIVE LITERATURE • 562  
 UNDERGRADUATE COURSES IN COMPARATIVE MEDICINE • 570  
 UNDERGRADUATE COURSES IN COMPARATIVE STUDIES IN RACE AND ETHNICITY • 571  
 UNDERGRADUATE COURSES IN COMPUTATIONAL AND MATHEMATICAL ENGINEERING • 576  
 UNDERGRADUATE COURSES IN COMPUTER SCIENCE • 579  
 UNDERGRADUATE COURSES IN DANCE • 593  
 UNDERGRADUATE COURSES IN DEMOCRACY, DEVELOPMENT, AND THE RULE OF LAW • 595  
 UNDERGRADUATE COURSES IN DERMATOLOGY • 595  
 UNDERGRADUATE COURSES IN DEVELOPMENTAL BIOLOGY • 595  
 UNDERGRADUATE COURSES IN DIVISION OF LITERATURES, CULTURES, AND LANGUAGES • 596  
 UNDERGRADUATE COURSES IN DRAMA • 597  
 UNDERGRADUATE COURSES IN EARTH SYSTEMS • 605  
 UNDERGRADUATE COURSES IN EAST ASIAN STUDIES • 613  
 UNDERGRADUATE COURSES IN ECONOMICS • 614  
 UNDERGRADUATE COURSES IN EDUCATION • 622  
 UNDERGRADUATE COURSES IN ELECTRICAL ENGINEERING • 644  
 UNDERGRADUATE COURSES IN ENERGY RESOURCES ENGINEERING • 657  
 UNDERGRADUATE COURSES IN ENGINEERING • 661  
 UNDERGRADUATE COURSES IN ENGLISH • 666  
 UNDERGRADUATE COURSES IN ENGLISH FOR FOREIGN STUDENTS • 674  
 UNDERGRADUATE COURSES IN ENVIRONMENTAL EARTH SYSTEM SCIENCE • 678  
 UNDERGRADUATE COURSES IN ETHICS IN SOCIETY • 683  
 UNDERGRADUATE COURSES IN FAMILY MEDICINE • 686  
 UNDERGRADUATE COURSES IN FEMINIST STUDIES • 687  
 UNDERGRADUATE COURSES IN FILM STUDIES • 689  
 UNDERGRADUATE COURSES IN FILM, PRACTICE OF • 693  
 UNDERGRADUATE COURSES IN FRENCH GENERAL • 694  
 UNDERGRADUATE COURSES IN FRENCH LANGUAGE • 696  
 UNDERGRADUATE COURSES IN FRENCH LITERATURE • 698  
 UNDERGRADUATE COURSES IN GENETICS • 700  
 UNDERGRADUATE COURSES IN GEOLOGICAL AND ENVIRONMENTAL SCIENCES • 703  
 UNDERGRADUATE COURSES IN GEOPHYSICS • 710  
 UNDERGRADUATE COURSES IN GERMAN GENERAL • 715  
 UNDERGRADUATE COURSES IN GERMAN LANGUAGE • 717  
 UNDERGRADUATE COURSES IN GERMAN LITERATURE • 718  
 UNDERGRADUATE COURSES IN HEALTH RESEARCH AND POLICY • 722  
 UNDERGRADUATE COURSES IN HISTORY • 725  
 UNDERGRADUATE COURSES IN HISTORY AND PHILOSOPHY OF SCIENCE • 754  
 UNDERGRADUATE COURSES IN HUMAN BIOLOGY • 754  
 UNDERGRADUATE COURSES IN HUMANITIES AND SCIENCES • 761  
 UNDERGRADUATE COURSES IN IBERIAN AND LATIN AMERICAN STUDIES • 762  
 UNDERGRADUATE COURSES IN IBERIAN LANGUAGES • 767  
 UNDERGRADUATE COURSES IN IMMUNOLOGY • 767  
 UNDERGRADUATE COURSES IN INSTITUTE FOR INTERNATIONAL STUDIES (FREEMAN SPOGLI) • 769  
 UNDERGRADUATE COURSES IN INTERDISCIPLINARY STUDIES IN HUMANITIES • 769  
 UNDERGRADUATE COURSES IN INTERNATIONAL RELATIONS • 772  
 UNDERGRADUATE COURSES IN INTRODUCTION TO THE HUMANITIES • 773  
 UNDERGRADUATE COURSES IN ITALIAN GENERAL • 797  
 UNDERGRADUATE COURSES IN ITALIAN LANGUAGE • 799  
 UNDERGRADUATE COURSES IN ITALIAN LITERATURE • 800  
 UNDERGRADUATE COURSES IN JAPANESE GENERAL • 801  
 UNDERGRADUATE COURSES IN JAPANESE LANGUAGE • 803  
 UNDERGRADUATE COURSES IN JAPANESE LITERATURE • 805  
 UNDERGRADUATE COURSES IN JEWISH STUDIES • 807  
 UNDERGRADUATE COURSES IN KOREAN GENERAL • 811  
 UNDERGRADUATE COURSES IN KOREAN LANGUAGE • 811  
 UNDERGRADUATE COURSES IN LATIN AMERICAN STUDIES • 812  
 UNDERGRADUATE COURSES IN LAW, NONPROFESSIONAL • 812  
 UNDERGRADUATE COURSES IN LINGUISTICS • 813  
 UNDERGRADUATE COURSES IN MANAGEMENT SCIENCE AND ENGINEERING • 821  
 UNDERGRADUATE COURSES IN MATERIALS SCIENCE AND ENGINEERING • 831  
 UNDERGRADUATE COURSES IN MATHEMATICAL AND COMPUTATIONAL SCIENCE • 836  
 UNDERGRADUATE COURSES IN MATHEMATICS • 836  
 UNDERGRADUATE COURSES IN MECHANICAL ENGINEERING • 843  
 UNDERGRADUATE COURSES IN MEDICINE • 857  
 UNDERGRADUATE COURSES IN MICROBIOLOGY AND IMMUNOLOGY • 866  
 UNDERGRADUATE COURSES IN MODERN THOUGHT AND LITERATURE • 868  
 UNDERGRADUATE COURSES IN MOLECULAR AND CELLULAR PHYSIOLOGY • 869  
 UNDERGRADUATE COURSES IN MUSIC • 869

- UNDERGRADUATE COURSES IN NATIVE AMERICAN STUDIES • 879  
 UNDERGRADUATE COURSES IN NEUROBIOLOGY • 880  
 UNDERGRADUATE COURSES IN NEUROLOGY AND NEUROLOGICAL SCIENCES • 881  
 UNDERGRADUATE COURSES IN NEUROSURGERY • 882  
 UNDERGRADUATE COURSES IN OBSTETRICS AND GYNECOLOGY • 882  
 UNDERGRADUATE COURSES IN OPHTHALMOLOGY • 883  
 UNDERGRADUATE COURSES IN ORTHOPEDIC SURGERY • 884  
 UNDERGRADUATE COURSES IN OTOLARYNGOLOGY • 885  
 UNDERGRADUATE COURSES IN OVERSEAS STUDIES  
   AUSTRALIA • 885  
   BARCELONA • 885  
   BEIJING • 887  
   BERLIN • 888  
   CAPETOWN • 890  
   FLORENCE • 891  
   KYOTO • 894  
   KYOTO-KCJS • 893  
   MADRID • 895  
   MOSCOW • 897  
   OXFORD • 897  
   PARIS • 900  
   SANTIAGO • 902  
 UNDERGRADUATE COURSES IN PATHOLOGY • 903  
 UNDERGRADUATE COURSES IN PEDIATRICS • 905  
 UNDERGRADUATE COURSES IN PHILOSOPHY • 907  
 UNDERGRADUATE COURSES IN PHYSICS • 925  
 UNDERGRADUATE COURSES IN POLITICAL SCIENCE • 932  
 UNDERGRADUATE COURSES IN PORTUGUESE LANGUAGE • 941  
 UNDERGRADUATE COURSES IN PSYCHIATRY • 942  
 UNDERGRADUATE COURSES IN PSYCHOLOGY • 944  
 UNDERGRADUATE COURSES IN PUBLIC POLICY • 953  
 UNDERGRADUATE COURSES IN RADIATION ONCOLOGY • 957  
 UNDERGRADUATE COURSES IN RADIOLOGY • 957  
 UNDERGRADUATE COURSES IN RELIGIOUS STUDIES • 958  
 UNDERGRADUATE COURSES IN RUSSIAN, EAST EUROPEAN, AND EURASIAN STUDIES • 972  
 UNDERGRADUATE COURSES IN SCIENCE, TECHNOLOGY, AND SOCIETY • 973  
 UNDERGRADUATE COURSES IN SLAVIC GENERAL • 974  
 UNDERGRADUATE COURSES IN SLAVIC LANGUAGE • 977  
 UNDERGRADUATE COURSES IN SLAVIC LITERATURE • 978  
 UNDERGRADUATE COURSES IN SOCIOLOGY • 980  
 UNDERGRADUATE COURSES IN SPANISH LANGUAGE • 995  
 UNDERGRADUATE COURSES IN SPECIAL LANGUAGE PROGRAM • 997  
 UNDERGRADUATE COURSES IN STATISTICS • 1001  
 UNDERGRADUATE COURSES IN STEM CELL BIOLOGY AND REGENERATIVE MEDICINE • 1007  
 UNDERGRADUATE COURSES IN STRUCTURAL BIOLOGY • 1007  
 UNDERGRADUATE COURSES IN STRUCTURED LIBERAL EDUCATION • 1008  
 UNDERGRADUATE COURSES IN SURGERY • 1008  
 UNDERGRADUATE COURSES IN SYMBOLIC SYSTEMS • 1011  
 UNDERGRADUATE COURSES IN TIBETAN LANGUAGE • 1012  
 UNDERGRADUATE COURSES IN URBAN STUDIES • 1012  
 UNDERGRADUATE COURSES IN WRITING AND RHETORIC, PROGRAM IN • 1014  
 UNDERGRADUATE DEGREES AND PROGRAMS • 26  
 UNDERGRADUATE EDUCATION • 58  
 UNDERGRADUATE FINANCIAL AID • 18  
 UNDERGRADUATE FINANCIAL AID APPLICATION AND AWARD NOTIFICATION PROCESS • 18  
 UNDERGRADUATE MAJOR UNIT REQUIREMENTS • 32  
 UNDERGRADUATE MINOR • 35  
 UNDERGRADUATE PROGRAMS IN EARTH SCIENCES • 67  
 UNDERGRADUATE PROGRAMS IN THE SCHOOL OF ENGINEERING • 100  
 UNDERGRADUATE PROGRAMS IN THE SCHOOL OF MEDICINE • 402  
 UNDERGRADUATE RESEARCH • 62  
 UNDERGRADUATE RESIDENCES • 23  
 UNDERGRADUATE TRANSFER WORK • 24, 30  
 UNDERGRADUATE TUITION • 20  
 UNIT OF CREDIT • 47  
 UNIVERSITY GOVERNANCE AND ORGANIZATION • 11  
 UNIVERSITY MINIMUM RESIDENCY REQUIREMENTS FOR GRADUATE DEGREES • 38  
 UNIVERSITY ORAL EXAMINATION • 44  
 URBAN STUDIES • 395  
 URBAN STUDIES (URBANST) COURSES • 1012  
 USE OF THE MAIN QUADRANGLE AND MEMORIAL COURT • 1055
- V**
- VADEN HEALTH CENTER • 1036  
 VETERANS' EDUCATIONAL BENEFITS • 19  
 VISAS • 17  
 VISITING STUDENT RESEARCHERS • 16  
 VISITOR POLICY/UNIVERSITY STATEMENT ON PRIVACY • 1058  
 VOLUNTARY STUDENT ORGANIZATIONS • 1036
- W**
- WALTER J. GORES AWARDS • 1040  
 WOODS INSTITUTE FOR THE ENVIRONMENT  
   GOLDMAN INTERSCHOOL HONORS PROGRAM IN ENVIRONMENTAL SCIENCE, TECHNOLOGY, AND POLICY • 1029  
 WORKSHOP IN POETICS • 324  
 WRITING AND RHETORIC 2 REQUIREMENT • 59  
 WRITING AND RHETORIC REQUIREMENT • 29  
 WRITING AND RHETORIC, PROGRAM IN (PWR) COURSES • 1014
- Y**
- YWCA SEXUAL ASSAULT CENTER AT STANFORD • 1037